Bid Package – ISSUED FOR BID

Bear Creek Redwoods Public Access Project

Bear Creek Redwoods Open Space Preserve
Santa Clara County, California

Date: March 7, 2018

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   B. Alma Parking Area and Trailhead
   C. Webb Creek Bridge Replacement
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2. Project Specifications:
   A. Soldier Pile Retaining Wall (N/A, included on plan sheets)
   B. Alma Parking Area and Trailhead
   C. Webb Creek Bridge Replacement (N/A, included on plan sheets)
   D. Road and Trail Improvements

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A. PROJECT NARRATIVE

Project Description

The purpose of this project is to provide construction services for the installation of public access improvement projects within the Bear Creek Redwoods (BCR) Open Space Preserve. The scope of work shall include, but is not limited to: 50 space parking lot construction, prefabricated restroom installation, bridge removal and replacement, roadway grading and slope repair; removal and replacement of roadway drainage inlets and culverts; aggregate base road improvements, rocked shoulders, rock slope protection, and headwall protection; new soldier pile retaining wall; removal and disposal of fuel tanks; as further detailed and described herein as the Contract Documents. Included in the Contract Documents are the following sets of plans:

- Bear Creek Redwoods – Phase One Road Work Retaining Wall at MP 204 by Waterways Consulting Inc., dated 01/16/2018. *(This work to be completed first.)*
- Bear Creek Redwoods – Phase One Road and Trail Improvements by Waterways Consulting Inc., dated 03/06/2018.
- Webb Creek Bridge Replacement Project by Mesiti – Miller Engineering, Inc., dated 2/20/2018
- Alma College Parking Area and Trailhead by Harris Design, 2/2/2018

Project Location

Bear Creek Redwoods Open Space Preserve is located roughly 5 miles South of Los Gatos along Bear Creek Road between Highway 17 and Highway 35 in the County of Santa Clara. Project addresses vary on Bear Creek Road, Los Gatos, CA 95033.

- The retaining wall is located on RD 300, 0.17 miles past gate BC05 on Bear Creek Road
- The parking lot is located at Alma College Road and Bear Creek Road, approximately 1.0 mile from Highway 17
- Webb Creek Bridge is located on RD 300, 0.28 miles past gate BC09 on Bear Creek Road

Project Schedule

Award of Contract is anticipated to occur on April 26, 2018. On site activities cannot commence prior to May 7, 2018, by which date contractor must comply with all pre-construction submittal requirements. **Project must be complete no later than October 23, 2018.**

Project Budget

Total project cost has been estimated to be approximately $2,800,000 which includes the cost of General Conditions, mobilization, demolition, grading, construction of all site elements, and associated site restoration, and allowances for all EIR site mitigation requirements.

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B. BIDDING DOCUMENTS

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1. INVITATION TO BID

Notice Is Hereby Given that the Midpeninsula Regional Open Space District will receive bids at the Office of the Midpeninsula Regional Open Space District, 330 Distel Circle, Los Altos, CA **on or before 9:00 a.m. on Monday, April 9, 2018** for the furnishing of all labor, materials and services required for the following designated scope of work:

1. **Project:**

   Bear Creek Redwoods Public Access Project

2. **Scope of Work:**

   The scope of work shall include, but is not limited to: construction of new 50 space parking lot, removal and replacement of existing 30' bridge, construction of a new soldier pile retaining wall, roadway grading and slope repair; removal and replacement of roadway drainage inlets and culverts; miscellaneous drainage infrastructure improvements; installation of aggregate base, rocked shoulders, rock slope protection, and headwall protection; as further detailed and described herein as the Contract Documents.

   Type A Contractor license required.

Two pre-bid site visits will be held. It is MANDATORY that all bidders attend one of these site visits. Site Visit # 1 is scheduled for Thursday, March 15th at 2:00 pm and Site Visit #2 is scheduled for Tuesday, March 20th at 9:00 am. Mandatory Reservation Required: RSVP to Melissa Borgesi at 650-691-1200 (or by email at mborgesi@openspace.org) by 2:00 p.m. the day before the site visit. Melissa will provide directions to the meeting location and notice of any weather delays or changes.

Complete project information is contained within the project Bid Package, which is available online, at the office of the District, and at local Builders Exchanges. Please visit the District's Request for Bids page at http://www.openspace.org/news/request_for_bids.asp.

For additional information, contact Matt Brunnings, Senior Capital Project Manager, Midpeninsula Regional Open Space District, 330 Distel Circle, Los Altos, CA 94022-1404; (650) 691-1200.

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2. INSTRUCTIONS TO BIDDERS

To be considered, bids must be made in accordance with these Instructions to Bidders.

1. CONTRACT DOCUMENT AVAILABILITY

Each bid proposal shall be made in accordance with the Bid Package documents on file, included in this package, and available for inspection by the end of **the day on March 7, 2018** at the District website at http://www.openspace.org/news/request_for_bids.asp and at the locations below:

Builders Exchange of Santa Clara County 400 Reed Street Santa Clara, CA 95050 408.727.4000 408.727.2779 fax www.bxscco.com/	Peninsula Builders Exchange 735 Industrial Road #100 San Carlos, CA 94070 650.591.4486 650.591.8108 fax www.constructionplans.org	The San Francisco Builders Exchange 850 S. Van Ness San Francisco, CA 94110 415.282.8220 415.821.0363 fax www.bxofsf.com
Builders Exchange of Alameda County 3055 Alvarado Street San Leandro, CA 94577 510.483.8890 510.352.1509 fax www.beac.com		

Electronic copies of the Bid Package are available and may be downloaded from the following link: http://www.openspace.org/news/request_for_bids.asp

A hard copy of the Bid Package document may be reviewed at the District administrative office located at 330 Distel Circle, Los Altos, CA 94022. Bidders can download and print / plot hard copies or order them through the Builders Exchange. A CD containing the Bid Package can be requested by contacting Melissa Borgesi at 650-691-1200. Please allow 24 hours and CD must be picked up at the District administrative office.

2. MANDATORY PRE-BID SITE WALK INFORMATION

All bidders must attend one of the mandatory pre-bid site walks. Pre-bid Site Walk #1 will be held on Thursday, March 15th, 2018 at 2:00 pm and Pre-bid Site Walk #2 will be held on Tuesday, March 20th, 2018 at 9:00 am. Participants will meet at a prearranged parking location at or near the Preserve. **To receive directions to the meeting location and notice of any weather delays, bidders must RSVP to Melissa Borgesi at (650) 691-1200 no later than 2:00 P.M. on the day before the site walk. Due to logistical constraints, a maximum of 2 representatives per company will be permitted.** The mandatory pre-bid meeting will include a tour of the site. Tour participants should allow a minimum of two hours and should wear suitable footwear and appropriate dress for the open space conditions. Extreme weather

conditions or other unforeseen conditions could cause the tour to be **cancelled and re-scheduled. You will be sent an e-mail the afternoon before the pre-bid meeting if it is cancelled.** The pre-bid meeting and site walk will take at least 2 hours, not including your travel time to arrive at the meeting location. The District will provide water, but attendees should bring their own food.

3. TENTATIVE PROJECT SCHEDULE

March 7, 2018	Request for Bids issued
March 15, 2018	Pre-Bid Site Walk #1 at 2:00 pm
March 20, 2018	Pre-Bid Site Walk #2 at 9:00 am
March 29, 2018	11:00 a.m. - Deadline for Bidders to pose questions.
April 2, 2018	6:00 p.m. - Final Addendum to Bid Package issued
April 9, 2018	Bid Opening, 9:00 a.m. 330 Distel Circle, Los Altos, CA, 94022
April 25, 2018	Award of Contract by District Board of Directors Regular Meeting, begins at 7:00 p.m.
April 26, 2018	Written Notice of Award of Contract
May 2, 2018	Pre-Construction Meeting and deadline to submit Labor and Materials Payment Bond, Performance Bond, Proof of Insurance, and signed Agreement
May 7, 2018	Written Notice to Proceed issued by District
October 23, 2018	Project Completion

4. BID PROPOSAL GENERAL REQUIREMENTS

Prior to submitting his/her proposal, the Bidder shall thoroughly examine the Contract Documents and shall participate in the mandatory pre-bid conference and site walk to understand the site conditions and scope of Work. Any questions, concerns, errors or ambiguities noted by the Bidder during said examination shall immediately be called to the attention of the District Representative prior to a submission of a bid. The District will issue addenda with interpretation of the cited questions, concern, error or ambiguity. No subsequent claim for extra work will be allowed on account of claimed misunderstanding of the meaning or intent of the Contract Documents, site conditions, or any other documents included in this Bid Package if the item occasioning the claim appeared in, or was inferable from, said documents or from site investigations mandated for bidding purposes.

Examination of Site. Attention is directed to Bidder's obligation to examine the Work site; compare the site with the Plans and Specifications; determine any site variation that affects the Bid; and investigate the conditions of existing clearances, restrictions, or limitations that affect access to the Work. Bidder’s failure to do any and all of the above shall not be a basis for claim of additional monies or extension of time.

Examination of Contract Documents. Bidder shall examine the Contract Documents to verify that there are no missing pages or sheets and shall obtain and examine any and all missing material prior to submitting the Bid.

Contract Documents Addenda. Explanations or interpretations will be made by District in the form of addenda to the documents and furnished to all bidders. **Oral explanations and interpretations made prior to the Bid opening shall not be binding.** All questions to the District must be made by the General Contractor. No questions from proposed Subcontractors will be received. Written addenda modifying Bid Package documents will be emailed, mailed or faxed to the Builders Exchanges listed above and to all prospective Bidders that attend the pre-bid meeting or otherwise submit a written request for notice of addenda.

Addenda will also be posted on the District's website at www.openspace.org/news/request_for_bids.asp. The final Addendum will be furnished no less than 72 hours prior to the opening of Bid Proposals. **Addenda must be referred to by number and date on the Bid Proposal form.** It is the Bidder's obligation to consider all addenda before submitting a Bid Proposal.

Form and Delivery. The Bid Proposal must be submitted on the Bid Proposal form supplied with these instructions. Alterations to the printed text are not permitted. ***Every blank on the enclosed Bid Proposal form should be filled out completely (or provided in another format). Either cross out or insert "N/A" in the blanks that are not applicable. Bid Proposals containing blanks may be disqualified, at the District's sole discretion.*** The Bid Proposal must be delivered (with enclosures, if any) to the following address, in a sealed envelope marked Bear Creek Redwoods Public Access Project":

Midpeninsula Regional Open Space District
Attention: Matt Brunnings
330 Distel Circle
Los Altos, CA 94022-1404

Bid Proposals will be received only at the address identified above. If the Bid Proposal is mailed via the United States Postal Service, it must be sent by certified or registered mail, return receipt requested; if sent by courier or commercial carrier, it must have a tracking number or proof of receipt, and be received by the District prior **to 9:00 a.m. April 9, 2018**. **Bid Proposals will not be accepted via fax or email.**

Bid Proposal Opening Information. **Sealed Bid Proposals shall be publicly opened at 9:00 a.m. on April 9, 2018. Any Bid Proposal not delivered before the time set for the opening of bids will be returned unopened.** Incomplete Bid Proposals may result in bid rejection, in District's sole discretion. Bid Proposals are expected to be presented to the Board of Directors of the District at their regular meeting on April 25, 2018. The Board will take formal action at that time to determine whether, and to whom, to award the contract.

5. BID SUBMITTAL

Bidders shall execute and submit the attached Bid Proposal form. Each Bid Proposal must give the full business address of the Bidder, and be signed by him/her. Bid Proposals by corporations must identify the legal name of the corporation, be signed by an authorized officer of the

corporation, and include a corporate resolution conferring such authorization. Bid Proposals by partnerships must furnish the full name of all partners and must be signed by one of the partners. After the signature, the Bid Proposal shall designate the position of the person signing.

The following forms are to be executed and submitted by Bidders with Bid. ***Bid Proposals must include the following:***

- Attachment 1: Bid Proposal
- Attachment 2: List of Subcontractors
- Attachment 3: Noncollusion Affidavit
- Attachment 4: Bid Bond
- **Permeable Concrete Qualifications** (per Permeable Concrete Paving Technical Spec Section B-32-13-43)

6. BID NON-REVOCABLE

In consideration of District's reliance on and investigation and consideration of the Bid Proposal of the undersigned, the undersigned agrees that such Bid shall be irrevocable and shall not be withdrawn for ninety (90) calendar days following the Bid opening even though an award is made to another Bidder. Thereafter, such Bid shall be automatically relieved.

7. BID GUARANTEE

No Bid will be considered unless accompanied by a guarantee in the amount of ten percent (10%) of the Total Base Bid, which shall be one of the following: (a) a Bid Bond supplied in the enclosed Bid Form written by an admitted surety satisfactory to the District in its sole discretion, (b) a certified or cashier's check made payable to the District, or (c) a cash deposit. In the event a successful Bidder fails to satisfy all conditions for accepting the award within the stated time limits, the District may declare the Bidder's Bid Guarantee in default. Bidder acknowledges that the amount of actual damages the District would suffer in such event is extremely difficult and impractical to determine at this time by reason of the uncertainties, lapse of time, expense and loss of likely bidders resulting from the probable need to re-advertise and call for new bids. Bidder agrees that if a default occurs, the amount of such Bid Guarantee shall be kept by the District as liquidated damages and agrees that the District may then award the work to any other bidder or may call for new bids. **All Bid Guarantees will be held until after an award is made, an Agreement entered into, and required bonds and proof of insurance provided for the Work, at which time they will be returned.**

8. NONCOLLUSION AFFIDAVIT

No bid will be considered unless accompanied by a fully executed Noncollusion Affidavit, which is supplied with these instructions.

9. LICENSE REQUIREMENTS

Under California Business and Professions Code §7000 through § 7145, commonly known as the "Contractor's License Law", Contractor must possess an appropriate license that is current and valid at the commencement of and throughout the Term of the Agreement for the Work. The License required for this Agreement is **Class A, General Building Contractor**. All subcontractors must possess an appropriate license that is current and valid at the commencement of and throughout the Term of the Agreement.

10. INELIGIBLE CONTRACTORS

No contractor or subcontractor who is ineligible to Bid on a public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code may Bid or work on the Project.

11. BOND AND INSURANCE REQUIREMENTS

The successful Bidder shall obtain and maintain in full force, workers compensation insurance (California Labor Code §§ 1860 & 1861) and commercial general liability and automobile insurance as further described in the Agreement. Bond and Insurance requirements are further described in the Agreement.

12. PREVAILING WAGES

As required by law, the Contractor shall pay all workers California prevailing wages for each trade or classification on the job during the term of this project. These rates include employer payments for health and welfare, pension, vacation, travel time, subsistence pay and apprenticeship or training. Prevailing wage information can be found at the following website: http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm.

Contractors and subcontractors listed on bid proposals must be registered with the California Department of Industrial Relations (DIR) in order to be eligible to work on public works projects (Cal. Lab. Code §§ 1725.5, 1771.1). Work performed on public works projects is subject to compliance monitoring and enforcement by the DIR. All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner. More information can be found at the following website: http://www.dir.ca.gov/Public-Works/PublicWorks.html

13. NON-DISCRIMINATION

The successful Bidder and its subcontractors must comply with all applicable state and federal equal employment opportunity and affirmative action laws throughout the term of the Contract.

14. RESPONSIBLE BIDDER

It is the intention of the District to award the contract to the responsible Bidder with the lowest responsive Bid. Public Contract Code §1103 defines "responsible bidder" as "a bidder who has demonstrated the attributes of trustworthiness, as well as quality, fitness, capacity and experience to satisfactorily perform the Contract." This includes the ability to complete projects on time, specifically when working on multiple projects concurrently. A bidder that is determined by the

District not to be responsible due to a failure to meet these requirements shall have his/her Bid disqualified.

15. RESPONSIVE PROPOSAL

The District will award the contract to the lowest responsible bidder submitting a responsive proposal based on the information contained in the bid. The lowest bid shall be the lowest bid price on the Total Base Bid. District may contact firms to clarify information contained in their proposal. The District reserves the right to reject any or all proposals and to waive any conditions or formalities.

Every blank on the enclosed Bid Proposal form should be filled out completely (or provided in another format). Either cross out or insert "N/A" in the blanks that are not applicable. Bid Proposals containing blanks may be disqualified.

Before contract is awarded the District may, at its discretion, require from the bidders further evidence of qualification, ability to perform, and financial responsibility, and may consider such evidence in making the decision on the award of such proposed contract. In addition, District may require that Contractor submit a complete disclosure of contractor's staffing level, current and anticipated workload, and affirm that they can meet all project requirements and have the personnel and equipment to complete the project within the budget and schedule stipulated in the Contract Documents. Notwithstanding Contractor's affirmation that they can meet the project requirements, if District, in their review of Contractor's past performance, finds documented evidence of inability to meet project schedule or cost requirements, District will have cause to reject the Bid. Refer to Item 16.

Criteria for a responsive proposal from a responsible bidder include but are not limited to the following requirements:

- Qualifications and appropriate licensing of assigned personnel & listed subcontractors
- Ability to perform work within the specified project schedule and budget
- Proposed fee and overall cost effectiveness of the bid
- Experience completing similar work

16. RIGHT TO REJECT BIDS

The District reserves the right to reject any or all Bid Proposals, to waive any informality, minor technical defect, or irregularity in Bid Proposals, and to accept or reject any items of a Bid Proposal. The District, at its discretion, may reject as incomplete any bid which is in any way conditional, includes exceptions, alterations or omissions, or includes reservations to the terms of the Bid Proposal form, drawings, specifications, or other contract documents. The District reserves the right to reject any and all bids. District will reject bids from any contractor for whom there is documented evidence of project schedule delays and cost overruns and / or documented inability to meet project performance requirements.

17. WITHDRAWAL OF BIDS

Bid Proposals may be withdrawn prior to the opening only by a signed, written notice received by the District Representative prior to the commencement of the Bid Proposal opening.

18. BID PROTESTS

A bidder who intends to protest the apparent low bid must submit the protest to the District project manager within five (5) working days after the District's issuance of the Memorandum of the Bid Opening, excluding Saturdays, Sundays and District holidays. The Memorandum of the Bid Opening is normally issued by District staff on the day of the Bid Opening to all bidders, identifying the apparent low bidder.

a. The bid protest must be a complete written statement detailing the basis for the protest, including reference to specific facts, portions of the bid or contract documents, or reference to specific statutes, that form the basis for the protest. The protest must be signed by the party filing the protest. Failure to give written notice by Close of Business on the fifth working day following issuance of the Memorandum of the Bid Opening shall waive the right to protest.
b. Notification by personal delivery, overnight courier, email and/or facsimile is sufficient. If the written protest is sent by facsimile, Protesting Bidder must provide a FAX (facsimile) number and verify that the pages were all received by the District project manager.
c. The protest may be withdrawn at any time while under consideration by the District.
d. Review by District
    i. The District project manager will notify the apparent low bidder of the bid protest.
    ii. The District will afford the apparent low bidder the opportunity to submit a response to the written protest.
    iii. The District will review timely protests prior to awarding the contract. The District is not be required to hold an administrative hearing to consider a bid protest, but may do so at the sole option of the Assistant General Manager, or if otherwise legally required. The AGM or his/her designee shall consider the merits of any timely protests and make a final determination thereon.

19. BASIS OF CONTRACT AWARD

Definitions:

(a) The ***Total Base Bid*** is the contractor's Bid for all items listed in the Bid Proposal;
(b) For a definition of ***Responsible Bidder***, see Instructions to Bidders, Item 14.

The contract will be awarded to the lowest Responsible Bidder, as defined above under Responsive Proposal considering the following factors:

(a) If the lowest *Total Base Bid* is equal to or less than the *Project Budget* (as stated in *Instructions to Bidders*), the contract will be awarded to that Bidder;
(b) If the lowest *Total Base Bid* is greater than the *Project Budget*, that Bidder may be awarded the contract, or, all Bids may be rejected, at the sole discretion of the District;
(c) In the event of a tied low bid, the award would be based on a coin toss or equivalent random selection process.
(d) The District reserves the right to reject any or all of the Bids at its sole discretion.

20. NOTICE OF AWARD

Immediately after Board action, the District Representative will notify the Contractor in writing of award of the contract. Contractor shall provide District Representative a Labor and Materials Payment Bond, Performance Bond, Proof of Insurance, and signed Agreement within ten (10) calendar days of Award of Contract.

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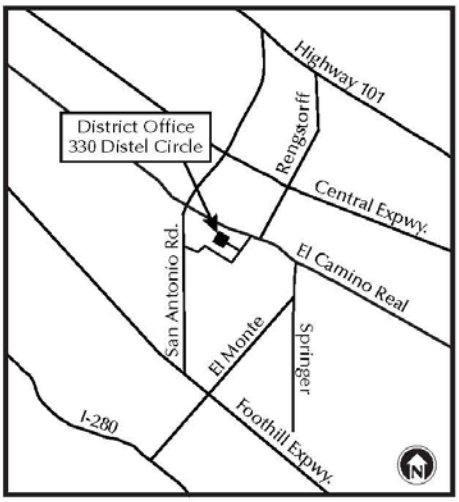
3. LOCATION MAP OF BID OPENING

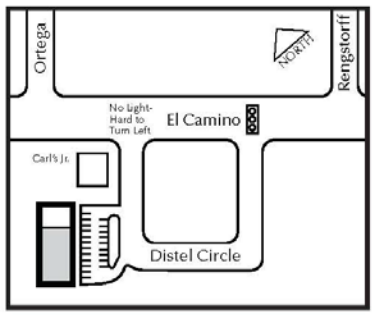
Midpeninsula Regional
Open Space District

Directions to the Administrative Office
330 Distel Circle, Los Altos, CA 94022
Phone: 650.691.1200

From Highway 101 in Mountain View, take the Rengstorff Avenue exit. Drive southwest on Rengstorff Avenue for approximately 2 miles. Turn right at El Camino Real. Turn left on Distel Circle. (Look for the Carl's Jr. restaurant at the corner of El Camino and Distel Circle. There is no traffic signal at the intersection.) The District office is the second building on the right.

From I-280 in Los Altos, take the El Monte Avenue exit. Drive northeast on El Monte Avenue for approximately 2.5 miles. Turn left on El Camino Real and drive half a mile. Turn left on Distel Circle. (Look for the Carl's Jr. restaurant at the corner of El Camino and Distel Circle. There is no traffic signal at the intersection.) The District office is the second building on the right.





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C. BID FORMS

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1. BID PROPOSAL FORM

(To be executed by Bidder and Submitted)

Project Name:	Bear Creek Redwoods Public Access Project
Location:	Bear Creek Redwoods Open Space Preserve
Budget Code:	
Scope of Work:	Retaining Wall, Road and Trail Improvements, Parking Lot, Webb Creek Bridge, Tank Removal
District Representative:	Matt Brunnings Midpeninsula Regional Open Space District 330 Distel Circle Los Altos, CA 94022 (650) 691-1200

The undersigned has carefully examined the site conditions for the Work, attended the Mandatory Pre-Bid Meeting, reviewed all documents in the Bid Package, including the Drawings, Plans and Specifications, accepts all terms and conditions of the Agreement, and has reviewed the following Addenda (fill in blanks below as appropriate to the number of Addenda issued for the project):

Addendum No._____, dated _____, 20_____,

Addendum No._____, dated _____, 20_____,

Addendum No._____, dated _____, 20_____.

1. BASE BID

Bid Proposal will be evaluated based on **Total Base Bid.** District may opt to award additional work based on unit pricing submitted herein. Bidders proposed Duration for Completion shall be for Total Base Bid. **Please reference D.3 Supplemental Conditions, Article Four, Paragraph K – Typical Work Scenario – Base Bid and Stand-Down Time for critical information required to complete the Bid Form.**

Item No.	Item Description	QTY.	Unit	Unit Price	Extension
1	General Conditions, Safety, Site Supervision & Insurance;	1	LS	$	$
2	Traffic Control	1	LS	$	$
3	Site SWPPP / BMP's	1	LS	$	$
4	Construction Staking	1	LS	$	$
5	Phytophthora Contamination Prevention Requirements	1	LS	$	$
6	Stand-down Time Allowance	1	LS	$50,000	$ 50,000

7	Allowance for removal and disposal of unforeseen hazardous materials	1	LS	$20,000	$ 20,000
8	Temporary protection of site trees to remain	1	LS	$	$
9	Access Road Improvements: Blade and place 4" of 90% compacted Class II AB between BC12 and Parking Lot Site	13,000	SF	$	$
	SUB TOTAL SITE WIDE WORK			$	
1	**RETAINING WALL**		Unit	Unit Price	Extension
1.0	Mobilization / Demobilization	1	LS	$	$
1.1	Retaining Wall Project Area Per Retaining Wall plan set, including but not limited to the follow items: • Solider Pile Retaining Wall • Demolition and Disposal • 25 LF 24" Culvert • 50 LF 24" Slope Drain • Excavation and Grading • Rock Slope Protection	1	LS	$	$
	SUB TOTAL RETAINING WALL IMPROVEMENTS			$	
2	**ROAD IMPROVEMENTS**	QTY.	Unit	Unit Price	Extension
Road 300 and 340 Common Features					
2.0	Mobilization / Demobilization	1	LS	$	$
2.1	Supply and Place Gabion Rock	8	CY	$	$
2.2	Lime Treated Aggregate Base (4" thick)	140,000	SF	$	$
2.3	New Inboard Ditch	1,280	LF	$	$
2.4	Clean Inboard Ditch	930	LF	$	$
2.5	Road Stabilization Fabric	780	LF	$	$
2.6	Subgrade Stabilization	280	LF	$	$
2.7	Timber Headwall Protection	1	LS	$	$
2.8	Reshape Road Section	550	LF	$	$
2.9	New Reverse Grade Dip with Knock Out	9	EA	$	$
2.10	Clean Ditch Relief Culvert	3	EA	$	$
2.11	Reverse Grade Dips	55	EA	$	$

2.12	Knicks	3	LS	$	$
2.13	Remove and Dispose of Two 8 FT dia. X 14 FT Long Steel Fuel Tank; Include Foundations and Pipes	1	LS	$	$
2.14	Work Area MP202 Per Sheet C3 and C8: • 60 LF 36" Culvert • 9 CY RSP • Demolition and Disposal • Earthwork • Rock Slope Buttress	1	LS	$	$
2.15	Work Area MP 205.1 Per Sheet C3: • 40 LF 18" DRC • 20 LF Downspout • 3 CY RED	1	LS	$	$
2.16	Work Area MP 206 Per Sheet C3 and C8: • 40 LF 24" DRC • 40 LF 24" Slope Drain • 7 CY Grading • 1 Timber Headwall Protection • 7 CY RED at Inlet and Outlet	1	LS	$	$
2.17	Work Area MP 207 Per Sheet C3 and C9: • 60 LF 18" Pipe • 40 LF 18" Slope Drain • 35 CY Grading • 1 Pipe Demolition • 20 CY Rock Buttress • 130 LF Rock-Lined Shoulder • 2 Tee Fittings	1	LS	$	$
2.18	Work Area MP 210 Per Sheet C3 and C9: • 190 LF Road Construction • 95 LF Extra AB Treatment • 20 LF 18" DRC • 1 Pipe Demolition and Disposal	1	LS	$	$
2.19	Work Area WW2 Per Sheet C3: • 40 LF DRC	1	LS	$	$

2.20	Work Area WW3 Per Sheet C3: • 30 LF 24" Culvert • 30 LF 24" Slope Drain	1	LS	$	$
2.21	Work Area WW3.1 Per Sheet C3: • 30 LF 18" DRC • 30 CY Grading	1	LS	$	$
2.22	Work Area WW4 Per Sheet C3: • 40 LF 24" Culvert • 6 CY RED/RIP	1	LS	$	$
2.23	Work Area MP 216 Per Sheet C3, C11, and C12: • 40 LF 36" Culvert • 15 CY RED/RIP • 70 CY Rock Debris Buttress	1	LS	$	$
2.24	Work Area MP 216.1 Per Sheet C3: • 40 LF 18" DRC • 3 CY RED/RIP	1	LS	$	$
2.25	Work Area MP 216.2 Per Sheet C3: • 170 LF Gabion Rock-Supply and Install • 170 LF Road Shaping	1	LS	$	$
2.26	Work Area MP 217 Per Sheet C3: • 500 LF Gabion Rock-Supply and Install • 500 LF Road Shaping	1	LS	$	$
2.27	Work Area MP 217.1 Per Sheet C3: • 30 LF 18" DRC • 4 CY RED/RIP	1	LS	$	$
2.28	Work Area MP 217.2 Per Sheet C3: • 30 LF 18" DRC • 4 CY RED/RIP	1	LS	$	$
2.29	Work Area MP 219 Per Sheet C3: • 30 LF 18" DRC • 4 CY RED/RIP	1	LS	$	$
2.30	Work Area MP 221 Per Sheet C3 and C13: • 40 LF 24" STC	1	LS	$	$

	• 8 CY RED/RIP				
2.31	Work Area MP 221.1 Per Sheet C3: • 30 LF 18" DRC • 7 CY RED/RIP	1	LS	$	$
2.32	Work Area 225.1 Per Sheet C3 and C13: • 20 LF 15" DRC • 30 LF 15" Slope Drain • 1 15" Tee Fitting • 1 Timber Headwall Protection • 10 CY Grading • 1 Drop Inlet with Traffic Rated Grate • 3 Anchor Assemblies	1	LS	$	$
2.33	Work Area 265 Per Sheet C5 and C17: • 150 LF Rock-Lined IBD • 60 LF 18" DRC • 1 Demolition of Existing Culvert • 3550 SF AC Paving • 145 LF AC Dike • 40 LF 24" DRC • 1 Timber Headwall Protection • 1 Drain Rock Berm • 1 Extend KO Down Road	1	LS	$	$
	SUB TOTAL ROAD IMPROVEMENTS			$	
3	**PARKING LOT AREA IMPROVEMENTS**		Unit	Unit Price	Extension
3.0	Mobilization / Demobilization	1	LS	$	$
3.1	Site Clearing and Grubbing	1	LS	$	$
3.2	Broken Asphalt Paving Removal or Recycle on site for Class II AB	20,000	SF	$	$
3.3	Scarify and Compact Existing Gravel Road	4,400	SF	$	$
3.4	Relocate Mortar Rocks and Other Boulders	1	LS	$	$
3.5	Removal of Existing improvements (site demo)	1	LS	$	$
3.6	Site Grading	1	LS	$	$

3.7	Import Fill	705	CY	$	$
3.7	Excavate pit and install District furnished restroom	1	LS	$	$
3.8	Pond Overflow connection and vault	1	LS	$	$
3.9	Pond Overflow 30” HDPE Pipe	170	LF	$	$
3.10	Connection from new 30” HDPE Pipe to existing 60” culvert	1	LS	$	$
3.11	Driveway Entrance – AC Conform and Baserock	1	LS	$	$
3.12	Concrete Wheelstop	51	EA	$	$
3.13	¾” Open Graded Crushed Drain Rock (6” thick)	17,500	SF	$	$
3.14	Permeable Concrete Paving (6” thick)	11,500	SF	$	$
3.15	Permeable Concrete Paving with Macrofiber (6” thick)	6,000	SF	$	$
3.16	Parking Lot Signs – includes signs, poles and installation	5	EA	$	$
3.17	Parking Lot and Sidewalk Striping	1	LS	$	$
3.18	Concrete Curb and gutter	175	LF	$	$
3.19	Concrete edger (flush curb)	736	LF	$	$
3.20	Concrete Curb Ramp	1	EA	$	$
3.21	Concrete vertical curb (6”)	65	LF	$	$
3.22	Truncated Dome panels	48	SF	$	$
3.23	Resin Paving pathway (2.5” over 6”AB)	17,000	SF	$	$
3.24	Aggregate Base Pathway (9” thick)	3,800	SF	$	$
3.25	Aggregate Base Shoulder (4” thick)	950	SF	$	$
3.26	Dry stack stone retaining wall (24” max height)	130	LF	$	$
3.27	Split rail fence (double)	105	LF	$	$
3.28	Wire Fence	650	LF	$	$
3.29	Installation of 10’ redwood log (Provided by District)	8	EA	$	$
3.30	8’ bench	3	EA	$	$
3.31	6’ bench	2	EA	$	$
3.32	Installation of District provided Signs (Entrance sign and two informational signs)	3	EA	$	$
3.33	Reinstall Salvaged Gates	2	EA	$	$

3.34	Horse Hitching Post	1	EA	$	$
3.35	Bicycle Parking Bollard	2	EA	$	$
3.36	Folding Bollard	3	EA	$	$
3.37	Boot Brush	1	EA	$	$
3.38	Step Up Stone (2’ x 2’ x 4’)	1	EA	$	$
3.39	Soil preparation for planting and fine grading	1	LS	$	$
3.40	Rectangular rapid flashing beacons per Pole and Equipment schedule on sheet E-2	1	LS	$	$
3.41	Bear Creek Road pavement striping and markings	1	LS	$	$
3.42	Bear Creek Road crossing signage per E-2 and SS-1	1	LS	$	$
3.43	Electrical connection per sheet E-2 for RRFB	1	LS	$	$
	SUB TOTAL PARKING LOT AREA IMPROVEMENTS			$	
4	**WEBB CREEK BRIDGE**	Quantity	Unit	Unit Price	Extension
4.0	Mobilization / Demobilization	1	LS	$	$
4.1	Site clearing and grubbing	1	LS	$	$
4.2	Demolition of Existing Bridge	1	LS	$	$
4.3	Structure Excavation and Export	60	CY	$	$
4.4	Drilled Piers	1	LS	$	$
4.5	Concrete Abutments	1	LS	$	$
4.6	Furnish and Install Steel Girder Bridge	1	LS	$	$
4.7	Roadway Excavation and Embankment	1	LS	$	$
4.8	Class II Aggregate Base for road and pullout (6” thick)	2,500	SF	$	$
	SUB TOTAL WEBB CREEK BRIDGE IMPROVEMENTS			$	
TOTAL BASE BID		$			
Deadline for Completion of the Work on site, including Demolition, Construction, Site Clean-up & Restoration.		Final Completion by October 24, 2018			

2. ADDITIVE ALTERNATE

In order for a Bid to be responsive, Bidder must submit an additive bid price for the Alternate listed below. **The basis of award for the contract is the Base Bid Total only.** The additive alternate listed below may or may not be awarded at the District's discretion.

Description	**Plan Detail #**	Quantity	Unit	Unit Price	Extension
Parking Lot Double Leaf Access Gate and Controller	Sheet 5.1, Detail 1 and Detail 3	1	LS		

3. UNIT PRICES

Unit Prices shall be used for adding or deleting work at the sole discretion of the District Representative, and may be exercised at any time during the execution of the Work. Unit pricing shall be utilized to complete additional grading, restoration & erosion control work.

Item No.	Description of Item	Unit	Unit Price
1	Stand Down Time – Equipment Operator*	Hour	$
2	Stand Down Time – Forman*	Hour	$
3	Stand Down Time – Laborer*	Hour	$
4	Earthwork – Grading	Hour	$
5	Tree Removal (trunk <12")	Per Tree	$
6	Tree Removal (trunk ≥12")	Per Tree	$
7	Straw Waddles / Fiber Roll	LF	$
8	Stabilized Construction Entrance / Exit	EA	$

***NOTE: Stand-Down time will be documented daily on site and compiled weekly into a change order against a set aside contract allowance. District will review actual Stand-Down time and hourly rates against Contractors' certified payroll.**

4. EXPERIENCE. List three recently (within last 5 years) completed jobs of comparable scope, the contract amount, names, and telephone numbers of contract officers. Use additional sheets as necessary.

NOTE: At Least one project listed must include specialized experience working adjacent to protected habitat.

Job/Project Name_____

Owner_____ Year _____ Contract Amt $_____

Contact _____ Phone_____

Project Description_____

_____

_____

_____

Job/Project Name_____

Owner_____Year _____ Contract Amt $_____

Contact _____ Phone_____

Project Description_____

_____

_____

_____

Job/Project Name_____

Owner_____Year _____ Contract Amt $_____

Contact _____ Phone_____

Project Description_____

_____

_____

5. **NONCOLLUSION CERTIFICATION.** The undersigned has executed and hereby submits the Noncollusion Affidavit (Attachment 3), in accordance with Public Contracts Code Section 7106.

6. **BID GUARANTEE.** No Bid will be considered unless accompanied by a guarantee in the amount of ten percent (10%) of the Total Base Bid), which shall be either a **BID BOND** (Attachment 4) written by an admitted surety satisfactory to the District in its sole discretion, a certified or cashier's check made payable to the District, or a cash deposit. In the event a successful bidder fails to satisfy all conditions for accepting the award (i.e. executed Agreement, provision of required bonds and proof of insurance) within the stated time limits, the District may declare the bidder's Bid Guarantee in default. Bidder acknowledges that the amount of actual damages the District would suffer in such event is extremely difficult and impractical to determine at this time by reason of the uncertainties, lapse of time, expense and loss of likely bidders resulting from the probable need to re-advertise and call for new bids.

Bidder agrees that the amount of such Bid Guarantee shall be kept by the District as liquidated damages and agrees that the District may then award the work to any other bidder or may call for new bids. All Bid Guarantees will be held until after an award is made, an Agreement entered into, and required bonds and proof of insurance provided, at which time they will be returned.

7. **DISCLOSURE.** The names of all persons financially interested in this Bid Proposal are as follows:

   Bidder, or any partner of Bidder, is a corporation, provide the legal name of the corporation, the state of its incorporation and the name and address of the President and of the Secretary. If Bidder is a partnership, provide name of the firm and names and addresses of all individual co-partners. Use additional sheets as necessary. If Bidder is an individual, provide the first and last name and address.

Name of Corporation:_____

State of Incorporation: _____

Name of Officer/ShareholderTitleAddress

_____

_____

_____

_____

Name of Bidder(s)/Partner(s) (If not a corporation)

_____

_____

_____

8. **WITHDRAWAL OF BIDS.** Bids may be withdrawn prior to the opening of bids only by a signed, written notice received by the District Representative prior to the commencement of the bid opening. In consideration of District's reliance on and consideration of this Bid Proposal, the undersigned agrees that such Bid Proposal shall be irrevocable upon opening and shall not be withdrawn for ninety (90) calendar days following the bid opening even though award may be made to another bidder. Thereafter, such bid shall be automatically relieved.

I make the above Bid and declare under penalty of perjury that the statements made in this Bid Proposal are true and correct.

FULLY EXECUTED at _____, _____
City State

on _____ _____, _____
Month Day Year

Signature[1] _____ Title _____

Name (please type or print) _____

Federal Employer I.D. Number _____

License Type _____

License Number _____ Expiration Date _____

DIR Number _____

Name of Firm _____

Mailing Address _____

City _____ State _____ Zip _____

Phone (Bus) _____ Phone (Cell) _____

Email _____

[1] An authorized person for the Bidder must sign this Bid Proposal. If the Bidder is a partnership, a general partner must sign. If the Bidder is a corporation, an authorized officer of the corporation must sign and a corporate resolution conferring such authority must be provided.

(Page left intentionally blank)

4. LIST OF SUBCONTRACTORS

(To be executed by Bidder and Submitted with Bid)

Contractor must set forth the name, address, phone number, type and cost of work, and proof of required license for each subcontractor who will perform work or render services in any amount exceeding one-half percent (1/2%) of the total bid according to provisions of the California Public Contract Code §4100 through §4113. Each subcontractor must be licensed by the State of California Department of Consumer Affairs for the portion of work they perform in accordance with Contractor's License Law, and registered with the California Department of Industrial Relations (DIR). Please attach as many sheets as necessary.

Company Name:

Contact:

Address:

Phone Number:

Type of Work:

Cost of Work:

Required License:

Company Name:

Contact:

Address:

Phone Number:

Type of Work:

Cost of Work:

Required License:

Company Name:

Contact:

Address:

Phone Number:

Type of Work:

Cost of Work:

Required License:

(Page left intentionally blank)

5. **NONCOLLUSION AFFIDAVIT**
(To be executed by Bidder and Submitted with Bid)

State of California

County of

(Name of party bidding), under penalty of perjury, deposes and says that he or she is of , the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Signature_____ Title_____

Date

(Page left intentionally blank)

6. BID BOND

(Note: Bidder must use this form if Bid Guarantee is a Bond)

KNOW ALL PERSONS BY THESE PRESENTS THAT [name of Bidder] (hereinafter Principal), as Principal, and [name of Surety], a corporation organized and doing business under and by virtue of the laws of the State of _____ and duly licensed for the purpose of making, guarantying or becoming sole surety upon bonds or undertakings required or authorized by the laws of the State of California, as Surety, are held and firmly bound unto the Midpeninsula Regional Open Space District, a California Special District, (hereinafter called the Obligee) in the just and full sum of _____ Dollars ($ _____) _____ lawful money of the United States of America, for the payment of which we hereby bind ourselves and each of our successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, WHEREAS, the Principal is about to hand in to the Obligee a Bid for the project known as **Bear Creek Redwood Public Access Project** in accordance with the Contract Documents filed in the office of the Obligee and under the notice inviting proposals therefor.

NOW, THEREFORE, if the Bid as submitted by said Principal shall be accepted, and the contract for such work or supplies be awarded to the Principal, and the said Principal shall fail, neglect or refuse to enter into a contract to perform said work or deliver said supplies, and furnish good and sufficient bond and proof of insurance therefore, then the amount of this bond shall be declared to be forfeited to the Obligee, Midpeninsula Regional Open Space District.

IN WITNESS WHEREOF, Principal and Surety have caused these presents to be duly signed and sealed this day of _____, 2018.

_____

Signature of Principal Signature of Surety

_____

Attorney-in-Fact

State of California,

County of _____)

On_____before me, _____
(insert name and title of the officer)

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.

_____

Signature Seal

(Page left intentionally blank)

D. AGREEMENT FORMS

Notice to Bidders:

Documents in the following section are not to be submitted with Bid Proposal. They will be signed and submitted at time of Award of Contract.

(Page left intentionally blank)

D.1 AGREEMENT

Bear Creek Redwoods Public Access Project

Bear Creek Redwoods Open Space Preserve
Santa Clara County, California

March 7, 2018

(Page left intentionally blank)

LEVEL 4 AGREEMENT
CONTRACT INFORMATION SHEET

1. Name of Project: Click here to enter text.
2. Project Description: Click here to enter text.
3. Working Days to Complete: Click here to enter text.
4. License(s): Click here to enter text.
5. District Representative: Click here to enter text.

Project: Click here to enter text

Click here to enter text Open Space Preserve

Click here to enter text County, California

Date: Click here to enter text

AGREEMENT
Level Four

1. **Project Name: Click here to enter text**

2. **Parties.**

District: Midpeninsula Regional Open Space District
Attn: **Click here to enter text** , District Representative
330 Distel Circle
Los Altos, CA 94022-1404
(650) 691-1200
(650) 691-0485 (facsimile)

Contractor: Click here to enter text.
Click here to enter text.
Click here to enter text.
Click here to enter text.

3. **Scope of Work.**

(a) *Project Description.* Contractor agrees to obtain all necessary permits and furnish all labor, materials, services, and equipment necessary to accomplish the following Project as more specifically set forth herein and in the Contract Documents fully incorporated herein as though attached hereto (the "Work") and generally described as follows:

i) Click here to enter text.

(b) *Contract Documents*. The Contract consists of the following:

Level Four Agreement

- Exhibit A: Agreement Scope of Services (Contractor Bid Proposal Form)

General Conditions of the Agreement

- Exhibit 1: Labor and Materials Payment Bond
- Exhibit 2: Performance Bond
- Exhibit.3: Worker's Compensation Certificate
- Exhibit 4: Proposed Change Order Request Template
- Exhibit 5: Change Order Template

Supplemental Conditions of the Agreement/ Attachments

- Att A: Location Map
- Att B: Site Access Map
- Att C: Project Work Area Maps
- Att D: Click here to enter text.

3. Click here to enter text.
   (c) *"Not in Contract" (N.I.C.) Items.* Any portions of the Project identified by the notation "N.I.C." on Drawings, Maps, and Specifications will be performed before or after Contractor's Work and are not part of the Work.

4. **Term.**
   The Term of this Agreement shall commence on the date of execution hereof by District's General Manager and shall end upon the filing of the *Notice of Completion* by District Representative as more specifically set forth in the General Conditions and Supplemental Conditions, attached hereto and incorporated herein by this reference.

5. **Contract Price.**
   As full compensation for the Work, District agrees to pay Contractor the sum of $Click here to enter text. as further described and set forth in Contractor's Bid Proposal attached hereto and incorporated herein as **Exhibit A.** The Contract Price includes the **Base Bid and Additive Alternate(s)** Click here to enter text.. Contractor agrees to delete or add Work tasks not covered by the provisions thereof, either under provisions for "ADD OR DEDUCT ALTERNATES" or for "UNIT PRICES", pursuant to the methods otherwise provided herein for Change Orders.

6. **Cash Allowances.**
   Contractor declares that the Contract price includes all expenses (including permit fees) and profit. Contractor shall make no demand for additional expenses and/or profit for work in this Contract.

7. **Beginning and Completion of Work.**
   Contractor shall provide District Representative with all certificates and licenses required for performance hereunder within ten (10) days of the commencement of the Term of this Agreement, not including County permits. Contractor agrees that permit application(s) to the County shall be submitted within five (5) working days from the date of issuance of a written *Notice to Proceed with Permittin*g. Contractor agrees that the Work shall be fully completed to District Representative's satisfaction within sixty (60) working days from the date of issuance of a written *Notice to Proceed with Construction*. Contractor shall not start any onsite construction work until such *Notice to Proceed with Construction* is issued. Working days shall mean every day except Saturday, Sunday, and Legal Holidays as hereinafter defined.

8. **Licensing.**
   Under California Business and Professions Code §7000 through § 7145, commonly known as the "Contractor's License Law", Contractor must possess an appropriate license that is current and valid at the commencement of and throughout the Term of this Agreement. The Licenses required by this Agreement: Class A – General Engineering Contractor.

9. **Insurance and Bonds**.
   Contractor shall provide, and keep in full force and effect during the Term of this Agreement, at Contractor's sole cost and expense, policies of insurance with companies licensed to do

business in the State of California that are acceptable to District for the Coverages as more particularly set forth below. Contractor shall keep all required policies in full force and effect until final acceptance of the Work by District.

(a) Certificates of Insurance. Contractor shall, within five (5) calendar days after *Notice of Award*, supply District with an acceptable Certificate of Insurance. An authorized insurance agent or broker must complete, execute and provide District with a Certificate of Insurance (ACORD 25-S, or a successor or comparable form, subject to prior approval by District) before a *Notice to Proceed* may issue. District reserves the right to cancel the contract if these requirements are not met within 30 calendar days of the *Notice of Award*.

(b) Endorsements. The General and Automobile Liability policies must be endorsed to name District as an additional insured and must be on a primary non-contributing basis in relationship to any other insurance available to District. All policies taken out by Contractor insuring work and materials supplied must list District as an additional insured and be payable to Contractor and District. All policies shall contain a provision that they shall not be canceled or materially changed without thirty (30) calendar days' prior written notice to District. No cancellation provision in any insurance policy shall be construed in derogation of the continuous duty of Contractor to furnish the required insurance during the term of the Agreement.

(c) Coverages.

i. *Workers' Compensation Employer's Liability* coverage as required by statute, in full compliance with California Labor Code §3700, and containing a waiver of subrogation in favor of District. Contractor hereby acknowledges having read and understood the provisions of the California Labor Code §3700, which require every employer to be insured against liability for workers' compensation or that they undertake self-insurance in accordance with the provisions of that code, and Contractor agrees to comply with such provisions before commencing the Work. Acknowledgment shall be in the form included herein and attached hereto as Exhibit 3.

ii. *Comprehensive or Commercial General Liability,* including coverage for Bodily Injury and Property Damage in the amount of $2,000,000.00 per occurrence, $2,000,000.00 aggregate.

iii. *Business Automobile Liability* coverage including owned, non-owned and hired vehicles in an amount of no less than $1,000,000.00 per occurrence.

iv. *Subcontractor(s) Insurance Requirements*. Contractor shall either require each subcontractor to procure and maintain during the life of its subcontract all insurance of the type and in the amounts specified above or insure the activities of subcontractor(s) under its own policy or policies.

10. **Contractor's Indemnification of District.**

i) *Contractor agrees to indemnify, hold harmless, defend, and protect District, its* officers, directors, agents and employees from any and all claims, losses, damages, demands, liabilities, suits, costs, expenses (including all reasonable attorney's fees), penalties, judgments or obligations whatsoever arising out of or in connection with any injury, death, or damage to any person or property or pecuniary or monetary loss

that results from, arises out of, or in any way relates to the activities of Contractor both on and off the Project, including but not limited to claims related to the presence, use or disposal of hazardous materials, except for injury or damage resulting from the sole negligence or willful misconduct of District.

ii) *Claim.* In the event a Contractor becomes aware that a claim has been, or is likely to be, made against District, its officers, directors, agents or employees, or they or District is named a co-defendant in any action concerning the Contract, Contractor shall immediately notify District. District may retain legal counsel at Contractor's sole expense and Contractor shall reimburse District for all legal expenses, including reasonable attorney's fees, spent in representing District.

iii) *Apportionment of Liability.* In the event that a judge in a court of competent jurisdiction makes an apportionment of liability between District and Contractor, neither District nor Contractor shall request that a jury determine apportionment of liability. Contractor shall indemnify and hold harmless District as set forth above, unless the court determines that the injury or damage resulted from the sole negligence or the intentional and willful misconduct of District.

iv) *Waiver.* Contractor hereby waives all claims and recourse against District, including the right of contribution for loss or damage to property, and hereby releases District from any and all liability related to or in any way connected to Contractor's activities or Contractor's use of the Project site, premises or facilities.

v) *Contractor Responsibility.* Contractor and its subcontractors shall have sole responsibility for the safety of their equipment, property and personnel (including, but not limited to, its employees, agents, and officers) from any and all injuries, deaths or damages.

vi) *Mutual Responsibility of Contractors.* If Contractor causes damage to the work or others, or willfully or negligently delays another contractor or subcontractor in the performance of other work, Contractor is hereby obliged to attempt to settle such claim with such contractor or subcontractor by agreement. If a contractor or subcontractor serves written notice on District of Contractor's failure to meet this obligation or to settle the claim by agreement, District shall notify Contractor in writing of the pending claim. Contractor shall defend itself (and District if included in claim) at Contractor's sole expense, including the payment of District's attorney fees. Contractor shall pay all costs, expenses and liabilities incurred by District as a result of any judgment in favor of another contractor.

Contractor further agrees to the District General Conditions for Indemnity and Assumption of Risk as detailed in Article 5 of the General Conditions attached hereto and incorporated herein by this reference.

11. **Laws Applicable to District Incorporated.**

(a) This Contract is subject to all Federal, State and local laws, regulations, ordinances, and governing codes, controlling, affecting, or enacted by the Midpeninsula Regional Open Space District. All such laws, regulations, ordinances, and codes are made a part of this Contract as if set forth fully herein.

(b) In compliance with California Government Code §4552 and California Public Contract Code §7103.5, the text of those codes are herein reproduced in full:

GC §4552. Submission of bids to public purchasing body; agreement to assign

In submitting a bid to a public purchasing body, the bidder offers and agrees that if the bid is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

PCC §7103.5. Unfair business practices claims; assignment to awarding body

(c) As used in this section:

"Public works of contract" means a contract awarded through competitive bids by the state or any of its political subdivisions or public agencies, on whose behalf the Attorney General may bring an action pursuant to subdivision (c) of Section 16750 of the Business and Professions Code, for the erection, construction, alteration, repair, or improvement of any structure, building, road, or other improvement of any kind.

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor without further acknowledgement by the parties.

12. **Assignment**.
Contractor shall not assign its rights or obligations under this Contract without the prior written consent of District Representative, which consent shall not be unreasonably withheld. Contractor shall not assign any monies due Contractor without the written consent of District. Any assignment or delegation without the written consent of the other party shall be void.

13. **Taxes**.
Contractor agrees and states that all taxes arising incidental to this Contract shall be paid in a timely manner by Contractor and are included in the Contract price.

14. **Federal Manufacturer's Excise Tax**.
District is exempt from Federal Manufacturer's Excise Tax. The manufacturers of items subject to such tax are entitled to a refund or credit for that tax on presentation of District's exemption certificate for items furnished exclusively to District. Contractor shall not be entitled to claim any additional monies for taxes paid where this exemption is available.

15. **Attorneys' Fees**.
If legal action shall be brought by either of the parties, the party prevailing in said action shall be entitled to recover from the party not prevailing the costs of the suit and reasonable attorney's fees. For purposes of this Agreement, the reasonable fees for attorneys who are employees of District shall be based on the fees regularly charged by private attorneys with an equivalent number of years of experience in the subject matter area of the law actively practicing within the San Francisco Bay Area.

16. **Notice**.
Any notice required or desired to be given under this Agreement shall be in writing and shall be personally served or, in lieu of personal service, may be given by (i) depositing such notice in the United States mail, registered or certified, return receipt requested, postage prepaid, addressed to a party at its address set forth above; (ii) transmitting such notice by means of Federal Express or similar overnight commercial courier ("Courier"), postage paid and addressed to the other at its street address set forth below; (iii) transmitting the same by facsimile, in which case notice shall be deemed delivered upon confirmation of receipt by the sending facsimile machine's acknowledgment of such with date and time printout; or (iv) by personal delivery. Any notice given by Courier shall be deemed given on the date shown on the receipt for acceptance or rejection of the notice. Either party may, by written notice, change the address to which notices addressed to it shall thereafter be sent.

17. **Miscellaneous**.
(a) Should any provision of this Agreement prove to be invalid or illegal, such invalidity or illegality shall in no way affect, impair or invalidate any other provision hereof, and such remaining provisions shall remain in full force and effect.
(b) Time is of the essence with respect to the performance of every provision of this Agreement in which time of performance is a factor.
(c) Any executed copy of this Agreement shall be deemed an original for all purposes.
(d) This Agreement may be executed in counterparts, which counterparts shall together constitute one agreement if signed by both parties.
(e) This Agreement shall be construed and enforced in accordance with the laws of the State of California.
(f) The language of this Agreement shall be construed as a whole according to its fair meaning, and not strictly for or against either party.
(g) Except to the extent that it provides a part of the definition of a term used herein, the captions used in this Agreement are for convenience only and shall not be considered in the construction or interpretation of any provision hereof nor taken as a correct or complete segregation of the several units of materials and labor.
(h) When the context of this Agreement requires, the neuter gender includes the masculine, the feminine, a partnership or corporation, trust or joint venture, and the singular

includes the plural.

(i) The terms “shall,” “will”, “must” and “agree” are mandatory. The term “may” is permissive.

(j) When a party is required to do something by this Agreement, it shall do so at its sole cost and expense without right to reimbursement from the other party unless specific provision is made otherwise.

(k) Where any party is obligated not to perform any act, such party is also obligated to restrain any others within its control from performing such act, including its agents, invitees, contractors, subcontractors and employees.

(l) The recitals to this Agreement are incorporated in this Agreement by this reference thereto.

(m) No responsibility either direct or implied will be assumed by District for omissions or duplications to Contractor or any subcontractors due to real or alleged error in arrangement of material in the Contract Documents. This Agreement with all attachments and the Project Scope Documents (e.g., General Conditions, Supplemental Conditions, the Agreement with all Exhibits, and the project Specifications, Drawings, and all Addenda, Clarifications and Modifications incorporated herein by reference or listed in the Agreement), constitute the "Contract Documents" and together represent the entire, integrated Agreement as to the Work contracted for between the parties. It supersedes all prior negotiations, representations or agreements, whether written or oral. The Contract Documents are complementary. Work shown on the Plans and not mentioned in the Specifications, or vice versa, is to be executed as if in both.

Contractor: _____

Name and Title (please type or print)

_____

Signature

_____ _____

Date Federal Employer I.D. Number

_____ _____

License Number Expiration Date

Fully executed at Los Altos, California for the
Midpeninsula Regional Open Space District:

_____

Ana M. Ruiz, Acting General Manager

_____

Date

Approved as to form:

_____
Hilary Stevenson, Acting General Counsel

Attest:

_____
Jennifer Woodworth, District Clerk

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GENERAL CONDITIONS
of the Agreement

Project

ARTICLE ONE

DEFINED TERMS

1.1 Defined terms. For the purposes of the Contract Documents, the following terms shall have the meanings set forth below.

Addendum: A document containing supplementary details, instructions or information issued by District prior to execution of the Agreement, which modifies, clarifies, supersedes or supplements one or more of the other Contract Documents.

Agreement: The Agreement between the District and the Contractor to which these General Conditions are attached.

Clarification: A document containing supplementary details, instructions or information, issued by the District after execution of the Agreement which modifies, clarifies, supersedes or supplements one or more of the other Contract Documents. Clarifications shall not give rise to a change in the Contract Price or Contract Time.

Contractor shall mean person, persons, firm, partnership, corporation, and assignees, licensed by the State of California, Department of Consumer's Affairs, named as such in the Agreement.

District: Shall mean the Midpeninsula Regional Open Space District.

District Representative: Designated person authorized to act on behalf of the District to the extent provided in the Contract documents or as otherwise specified by the District in writing.

Drawings: The graphic and pictorial representations of the design, location, character, dimensions and details of the Work, generally including plans, elevations, sections details, schedules and diagrams, as identified in the Agreement and as modified pursuant to Addenda, Clarifications, and Change Orders.

Day shall mean calendar day, including Saturday, Sunday, Legal Holidays or Inclement Condition Days.

Inclement Condition Day shall mean any day that, because of weather or site conditions, Contractor cannot work with seventy-five percent (75%) or more of Contractor's labor and equipment force for at least five (5) hours. In the event of inclement weather, Contractor shall be prepared, at the direction of District Representative, to secure the Project site and the Field Office building (if one is used for the Project), erect all necessary erosion control and water protection measures including covering all exposed soils, stockpiles, and building material if total rainfall exceeds 0.5 inch of rain within a 24-hour period.

Legal Holidays for the purposes of this Agreement are New Year's Day, Martin Luther King, Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, and Christmas Day.

Notice to Proceed: The written notice issued by District directing Contractor to commence performance for the Work. The commencement date set forth in the Notice to Proceed shall be the date from which the Substantial Completion and Contract Time are calculated.

Subcontractor**:** The person, firm, partnership, corporation, and assignees, licensed by the State of California, Department of Consumer's Affairs, listed in Attachment 2 to Contractor's Bid Proposal, and having a binding agreement with Contractor to perform specific portions of the Work. Definition extends to all second and third tier subcontractors.

Work: The term "Work" shall mean and include all demolition, excavation, grading, remediation, construction and other activities described in the Contract Documents or reasonably inferable from the Contract Documents as necessary to produce the intended results and includes all labor, materials, tools, equipment, supervision, coordination, and all other items necessary for the full and proper execution thereof.

Working Day or Work Day shall mean any day, except Saturday, Sunday, Legal Holidays or Inclement Condition Days. District Representative shall be the sole judge of a Working Day.

ARTICLE TWO

CONTRACT DOCUMENTS

2.1 Contract Documents Defined. Contract Documents shall mean these General Conditions, Supplemental Conditions, the Agreement with all Exhibits, and the project Specifications, Drawings, and all Addenda, Clarifications and Modifications incorporated herein by reference or listed in the Agreement, which together constitute the "Contract Documents" and represent the entire, integrated Agreement as to the Work contracted for between the parties. It supersedes all prior negotiations, representations or agreements, whether written or oral.

2.2 Intent of Contract Documents. The intent of the Contract Documents is for the Contractor to provide, for not more than the contract Sum, all labor, supervision, materials, water, power, fuel, tools, plant, equipment, transportation and other items as may be necessary or appropriate for proper execution of the Work (except to the extent expressly provided otherwise in the Contract Documents). The Contract Documents are complementary, and what is shown within one shall be as binding as if shown within all. For example, anything referenced in the Specifications and not shown on the Drawings, or shown in the Drawings and not referenced in the Specifications, shall be of like effect as if shown or referenced in both.

2.3 General Specifications. In the event the Specifications or any directions given by the District Representative pursuant to the Contract Documents require materials or other Work for which no detailed specifications are provided, the following general specifications shall apply:

The materials shall conform to the usual standards for first-class materials or article of the kind required with due consideration of the use to which they are to be put. Work shall conform to the usual standards for first-class work of the kind required, and shall be subject to the approval of the District Representative.

2.3.1 Specification References. Any material or method specified by reference to the number, symbol, or title of a specific standard such as a Commercial Standard, a Federal Specification, a trade association standard or similar standards, shall comply with the requirements in the latest revision thereof, including any amendments or supplements thereto in effect on the date of Request for Bids, except as limited as to type, class, or grade or modified in such reference.

2.4 Discrepancies, Errors and Omissions. The Contract Documents are not complete in every detail and in some cases may show only the purpose and intent. Contractor shall not avail itself of any manifest error, omission, discrepancy or ambiguity in the Contract Documents, or in the instructions given or in work provided by others. Contractor shall notify the District Representative in writing immediately upon the discovery of any such error, omission, discrepancy or ambiguity and the District Representative shall address the matter within a reasonable period of time, issuing a Clarification or Modification if appropriate. In the event of a discrepancy between documents, the most restrictive requirement shall govern. If Contractor proceeds with any Work-related activity involving an error, omission, discrepancy or ambiguity which Contractor knew of or reasonably should have known of, without first giving such notice, Contractor shall be responsible for all defects, delays, damages, and additional cost to District arising from or relating thereto, including without limitation all costs of correction, inspection testing, supervision and Project administration.

2.5 Division of Work. The organization of the Specifications and arrangement of the Drawings shall not control Contractor in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade. Similarly, any table of contents, titles and headings contained in the Contract Documents are provided solely to facilitate reference to various provisions of the Contract Documents and shall in no way affect or limit the interpretations of the provisions to which they refer, or be construed as a proposed segregation of the various units of the Work. Contractor shall arrange, divide and delegate its Work in conformance with sound trade practices, and shall be solely responsible for the division of the Work and establishment of subcontractor limits and scopes of work.

2.6 Clarifications. The District Representative may issue Clarifications to Contractor as necessary or desirable to clarify requirements of the Contract Documents. Contractor shall request a clarification from the District Representative through a Request for Information (RFI) if Contractor or any Subcontractor believes that (a) any Work is not sufficiently detailed or explained in the Drawings and Specifications, (b) there is a conflict between the Drawings and Specifications, (c) there is a conflict between the Drawings and/or Specifications and field conditions, or (d) any other questions arise that require direction from the District

Representative. Prior to submitting and RFI, Contractor shall complete a thorough review of the Contract Documents and inspect the Site to confirm that the grounds for an RFI exist.

2.7 "For Construction" Contract Documents. District shall furnish Contractor with one hard copy and five (5) CD copies of the final "For Construction" Contract Documents, including Plans, Specifications and any Addenda.

2.8 Ownership and Use of Documents. All Plans, Specifications, Models, and Samples furnished to Contractor are the property of District. Plans, Specifications, Models, and Samples are not to be used by Contractor on any other work. All such Plans, Specifications, Models, and Samples shall be returned to District upon request and in any event at the end of the Term unless otherwise directed by District Representative.

ARTICLE THREE

DISTRICT GENERAL REQUIREMENTS

3.1 Authority of District Representative. During the term of this Agreement, District Representative or his or her designee is fully authorized to represent District in all contractual matters. District Representative shall make all decisions as to the intent of the Plans and Specifications, the amount and quality of work performed and materials furnished, the manner and rate of work performed, the fulfillment of the Contract, and any compensation due Contractor. Disputes or claims between Contractor and District arising from this Contract valued at $375,000.00 or less shall be governed by the claims resolution procedures of California Public Contract Code Section 20104 *et seq.*. District Representative has the authority to reject any Work or material that does not conform with Contract requirements and to stop Work deemed necessary for such rejection and without cost to District. District Representative is authorized to require Contractor to immediately correct any unsafe or unsuitable condition to District Representative's satisfaction at Contractor's expense. District Representative may furnish additional instructions needed for the proper execution of the Work. District Representative has the authority to require minor field adjustments in the Work not involving extra cost. Contractor shall not relocate Contract items without District Representative's written approval. The District Representative for this Agreement is the person designated above unless Contactor is provided with oral or written notice of the designation of another person.

3.2 Separate Contracts. District reserves the right to let other contracts in connection with this Project. Contractor shall afford other contractors reasonable opportunity for storage of their materials, access to their work sites and execution of their work and shall properly connect and coordinate Work under this Contract with their works. Any dispute arising under the obligations imposed by this paragraph shall be resolved as provided for herein.

3.3 Boundaries. District shall establish Project boundaries in the field whether or not shown on the Plans.

3.4 Inspection.

3.4.1 D*istrict Access*. District and its duly authorized agent(s) shall have unrestricted access to the Work whether it is in preparation or in progress. District and its duly authorized agent(s)

shall at all times reserve the right to inspect and/or test for compliance with the Contract Documents any or all materials and/or work provided to or installed in the Work. Contractor shall provide safe and proper facilities for access and inspection.
3.4.2 *Required Inspections and Testing*. If any law, regulation, ordinance, public authority, specification or District Representative requires any part of the Work to be specially inspected or tested, Contractor shall notify District Representative three (3) working days prior to the Work's readiness for testing or inspection.
3.4.3 *Inspection of Phases*. Contractor shall notify District Representative two (2) working days in advance of each phase set forth in the Plans or Specifications for inspection.

3.5 Work, Examination; Re-examination. District Representative may order and Contractor shall comply with the examination or re-examination of work. Contractor shall not cause any work to be covered or enclosed without approval of District Representative. Any work enclosed or covered before approval shall be uncovered. After inspection Contractor shall restore all work to its original condition at Contractor's expense.

3.6 Correction of Work.
3.6.1 *Removal; Replacement*. Contractor shall promptly remove from the site all materials or Work rejected by District Representative. Contractor shall promptly replace material or Work, without cost or expense to District, and shall make good any Work destroyed or damaged by removal of condemned Work.
3.6.2 *District Right to Remove Material; Deductions and Accounting*. If Contractor does not remove rejected Work or materials within a time prescribed by District Representative, District may remove and store salvageable Work or materials at Contractor's expense. If Contractor does not pay the expense of removal within five (5) calendar days, District may, after providing ten (10) days prior written notice, sell Work or materials at auction or private sale. District shall give an accounting of the net proceeds from the sale after deducting all costs and expenses including auction or sale expenses.
3.6.3 *Deductions for Uncorrected Work.* If District determines not to require corrective Work, the Contract price shall be reduced by an amount equal to the estimated cost of making the Work conform to the Contract Documents as determined by District Representative, plus an administrative fee of fifteen percent (15%) of that cost.

3.7 Testing/Inspection Services.
3.7.1 *District*. District may require that specialized test(s) and/or inspection(s) of the Work be performed by an independent testing/inspecting service of its choice. District shall pay for initial specialized tests or inspections. Contractor shall pay for any re-test or re-inspection that is thereafter required as a result of a failed test or inspection due to nonconformity with Contract requirements.
3.7.2 *Contractor*. When Contractor is required by Contract or regulation of government authority having jurisdiction over the Work to provide certification by an independent testing/inspection service, Contractor shall be responsible for, and promptly pay, all costs thereof. District Representative must approve any independent testing/inspection service proposed for use by Contractor prior to employment of such service. All tests required by the Contract shall be made promptly so as not to delay the Work. Contractor shall furnish three (3) copies of all resulting testing/inspection reports.

ARTICLE FOUR

CONTRACTOR'S PERFORMANCE OF THE WORK

4.1 General Obligations of Contractor.

4.1.1 Contractor shall complete all work in accordance with the Contract Documents and any subsequently executed Change Orders and written Field Directives. Contractor shall do all work and furnish all labor, materials, tools, appliances, equipment, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, all other facilities, and incidentals necessary to furnish, perform, test, start-up, and complete the Work within the time set forth in the Agreement, except as otherwise specifically expressed within the Contract Documents.

4.1.2 The right of general direction by District does not render Contractor an agent or employee of District; Contractor understands and acknowledges that Contractor's liability for any damages to persons or to public or private property arising from Contractor's execution of the Work shall not be lessened due to District general direction to Contractor.

4.1.3 Neither the presence of any District officer, director, agent, employee, consultant, or independent testing/inspection service hired by District, nor their general review or approval of any work shall relieve Contractor from its obligations to perform the Work in accordance with the Contract Documents.

4.1.4 *Superintendent*. Contractor shall submit the name, and the qualification resume of the competent superintendent and Project Manager who shall have the authority to represent and act for Contractor at the pre-construction meeting. The superintendent (or a competent assistant previously approved by District Representative) shall be on the Project site at all times while Work is in progress. The superintendent shall be changed only upon written consent of District Representative or if the superintendent ceases to be in Contractor's employ. Any replacement must be approved by District Representative. The superintendent, Project Manager and assistant shall be able to communicate with District Representative in English, as necessary for the safe and efficient execution of the Work.

4.1.5 *Pre-construction Meeting*. A pre-construction meeting attended by Contractor, District Representative, and others as appropriate, will be held within five (5) calendar days of *Notice of Award* to discuss the Work. All required documents, requests, and proposals must be submitted at or before this meeting.

4.1.6 *Review Work Site and Contract Documents*. Upon award of contract, Contractor shall again carefully compare work site conditions, all drawings, specifications, and other instructions and shall promptly report in writing to District Representative any error, inconsistency or omission at the pre-construction meeting.

4.1.7 *Monuments*. Contractor shall take reasonable measures to prevent dislocation or destruction of monuments before Contractor starts work. Contractor must protect benchmarks monuments and reference points from displacement or damage.

4.1.8 *Plans at Work Site*. Contractor shall at all times keep a complete and accurate set of the Agreement, and all Plans, Specifications, Addenda, Change Orders and shop drawings on the Work site (in good order) for use by District Representative.

4.1.9 *Daily Journal & Photo-Documentation.* Contractor shall maintain a daily journal of all activities on site, including but not limited to: deliveries to site; number of contractor personnel working on site; number of subcontractor personnel working on site; equipment operating on site; construction activities and work accomplished.

4.1.9.1 The journal shall include date and time stamped photo-documentation of the work described in the daily journal;

4.1.9.2 The daily journal shall commence on the date that the Contractor first starts work on site, including but not limited to brushing, clearing, mobilization, delivery of equipment or materials, etc. Following the first day of activity on site, Contractor shall log all work completed on a daily basis;
4.1.9.3 If no work is completed on site on a specific day, Contractor shall document "No Work on Site" in the daily journal for that date;
4.1.9.4 Contractor shall have daily journal with him/her at all times at the jobsite to ensure that work progress is being accurately documented as it is being completed;
4.1.9.5 District Representative may request to review daily journal at any time to confirm that Contractor is complying with daily journal requirements;
4.1.9.6 Two signed copies of the daily journal must be submitted with each Pay Application for the dates covered by the Pay Application. Pay Application will not be processed without submission of the daily journal.

4.2 Examination of Site and Contract Documents.
4.2.1 Examination of Site. By executing the Agreement, Contractor acknowledges having examined the Work site; compared the site with the Plans and Specifications; determined any site variation that affects the scope, cost and schedule of the Work; and investigated the conditions of existing clearances, restrictions, or limitations that affect access to the Work. Contractor's failure to do any and all of the above shall not become a basis for claim of additional monies or extension of time.
4.2.2 Transportation/Access. Contractor shall investigate the conditions of the existing public and private roads for clearances, restrictions, and other limitations to transportation, and the ingress/egress at the job site. The unavailability of transportation facilities or limitations thereon shall not become a basis for claims against District or extension of time for the completion of work.
4.2.3 *Examination of Contract Documents*. Contractor shall examine the Contract Documents to verify that there are no missing pages or sheets and shall obtain and examine any and all missing material prior to commencing the Work. District shall not allow any claim based on errors in the Contract Documents which Contractor has reason to recognize, unless Contractor gives prompt notice of the error to District Representative in writing.
4.2.4 *Contractor's Failure to Examine*. No allowance shall be made on behalf of Contractor due to neglect, failure or error in acquainting itself with the Project and existing conditions or any and all of the Contract Documents.
4.2.5 *Contractor's Notice to Subcontractors*. Contractor's failure to provide all subcontractors with all information received shall not become a basis for monetary claim, extension of time or change to contract requirements.

4.3 Permits and Regulations.
4.3.1 *Compliance with Regulatory Requirements*. Contractor is directed to review and comply with any and all regulatory requirements of all agencies and jurisdictions having authority over the Work.
4.3.2 Contractor shall be responsible for securing and paying all permits, fees and/or licenses necessary to complete the Work. A copy of all permits and agreements must be displayed at the Work site. Contractor shall give all notices, pay all fees, obtain and pay for all permits, licenses, inspections, and certificates required by any governmental authority having jurisdiction over any part of the Work, unless otherwise relieved of such obligation in the Contract Documents. Contractor shall comply with all applicable laws, ordinances, rules and regulations. Before District Representative issues the certificate for final payment, Contractor shall deliver to District

Representative all licenses, permits and certificates of inspection.

4.4 Subcontractors.

4.4.1 *Listing of Subcontractors*. Contractor has set forth in the Bid Form of the Agreement the name, address, phone number, type and cost of work, and proof of required license for each subcontractor who will perform work or render services in any amount exceeding one-half percent (1/2%) of the total bid according to provisions of the California Public Contract Code §4100 through §4113. Each subcontractor shall be licensed by the State of California Department of Consumer Affairs for the portion of work they perform in accordance with Contractor's License Law.

4.4.2 *Failure to Specify*. If Contractor fails to specify a subcontractor, Contractor must be fully qualified and licensed and shall perform that work. Contractor shall not sublet or subcontract any portion of work that was not designated to a subcontractor in the original bid. If Contractor subcontracts any portion of work after Award of Contract to an undesignated contractor, Contractor shall be subject to penalties according to the California Public Contract Code §4110.

4.4.3 *Substitution of Subcontractors.* Contractor shall not substitute any subcontractor for another listed in the original Bid Proposal without the written consent of District Representative. Consent may be granted in any of the following situations:

(a) Contractor demonstrates to District that the subcontractor listed was the result of an inadvertent clerical error, subject to the provisions of the California Public Contract Code §4107.5.

(b) The subcontractor listed refuses to execute a written contract with Contractor.

(c) The subcontractor listed is not licensed and in good standing pursuant to the provisions of California Business and Professions Code §7000 through § 7145.

(d) The subcontractor fails or refuses to meet bond requirements of Contractor.

(e) The subcontractor becomes bankrupt or insolvent.

(f) The subcontractor is substantially delaying or disrupting the progress of the Work.

(g) District Representative determines that work performed by the subcontractor is substantially unsatisfactory and not in accordance with the Contract Documents, or is failing or refusing to perform his subcontract.

(h) District determines that a listed subcontractor is not a responsible contractor.

(i) The listed subcontractor is ineligible to work on a public works Project pursuant to California Labor Code Section 1777.1 or Section 1777.7.

4.4.4 *Notice and Hearing*. Prior to substitution of a subcontractor, District Representative shall give written notice to the listed subcontractor of Contractor's request to substitute and the reasons for that request. Written notice shall be served by certified or registered mail to the last known address of the listed subcontractor. The subcontractor shall have five (5) working days to file with District written objections to the substitution. Failure to file written objections shall constitute the listed subcontractor's consent to substitution. If written objections are filed, District shall give five (5) working days' written notice to Contractor and subcontractor of a hearing by District on Contractor's request for substitution.

4.4.5 *Subcontractor Assignment*. Contractor shall not permit a subcontractor to assign, transfer or convey the performance of work to another subcontractor without the written consent of District Representative.

(a) Violation; Penalty. In accordance with California Public Contract Code §4110, District may consider the violation of any portion of this paragraph a breach of contract and cancel this Contract or penalize Contractor ten percent (10%) of the amount of the subcontract involved. Contractor shall be entitled to a public hearing as described above. District will give written

notice of the hearing five (5) days in advance. All recovered funds shall be paid to District's General Fund.

4.4.6 *Contractor's Responsibility for Subcontractors*. Contractor agrees to be fully responsible to District for the acts and omissions of any and all subcontractors and for persons either directly or indirectly employed by them. Contractor shall coordinate all subcontractors to complete all the Work in accordance with the Contract Documents.

4.4.7 *Non-Contractual Relationship*. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and District.

4.5 Joining, Cutting, Patching and Digging; Defects.

4.5.1 *Joining of Parts*. Contractor shall cut, fit or patch Contractor's work as required to make its several parts come together properly with the work of other contractors and shall do all that is necessary in the joining of all parts in a neat and workmanlike manner to the satisfaction of District Representative. Contractor shall not damage or endanger any portions of work fully or partially completed.

4.5.2 *Consent Required*. Contractor shall not cut, dig or otherwise alter the work of another contractor without the prior written consent of District Representative.

4.5.3 *Defects*. If Contractor's work depends upon the work of another contractor, Contractor shall inspect and promptly report to District Representative any defects that could prevent proper performance. Contractor's failure to inspect and report shall constitute acceptance of the other contractor's work. No claim by Contractor of prior defects affecting the Work will be considered after work has started. Contractor will make all corrections at own expense. Prior defects affecting Contractor's work discovered after starting shall be reported immediately to District Representative.

4.5.4 *Measurement of Work in Place*. Contractor shall measure work already in place and shall report promptly in writing to District Representative any discrepancy between existing work and the Plans and Specifications.

4.5.5 *Costs*. Any costs resulting from defective or out of sequence work shall be borne by Contractor.

4.6 Use of Premises.

4.6.1 *Physical Limits of Materials, Operations*. Contractor shall confine all machinery, tools and other apparatus, the storage of materials and the operations of Contractor's workers to limits indicated by law, ordinances, permits or directions of District Representative. All personal vehicles shall park within the project boundaries and not trespass onto adjoining properties.

4.6.2 *Temporary Storage*. Contractor shall not use the Project site or any area set aside as a temporary construction yard as a site for the temporary storage of equipment, appliances, vehicles, or other materials, that are not or will not be used in the Work.

4.6.3 *Dangerous Loads*. Contractor shall not load or permit any part of the Work to be loaded with a weight that will endanger its safety or the safety of any person or property.

4.6.4 *Signs and Advertising*. Contractor shall comply with and enforce District Representative's instructions regarding placement of signs and advertising on and about the Work site. Advertising signs or name labels of any description shall not be placed on or near the Work site without District Representative's prior written approval.

4.6.5 *District Occupancy Prior to Acceptance*. District reserves the right to occupy or use any part, parts, or the entirety of the Work when District Representative deems it safe. The exercising of this right shall in no way constitute an acceptance of any part of the Work, nor shall it in any way affect the dates and times when payments become due Contractor; nor shall it in any way

prejudice District's rights in the Contract. The Contract shall be deemed completed only when District Representative, in writing, accepts all the Work contracted for.
4.6.6 *Field Office.* If a job site office is used, District Representative must approve the facility and its location before installation. District makes no representations as to the feasibility of access to the Work area for a job site office or secured storage facility due to the nature of the site which may hinder or prevent such transportation.

4.7 Project Cleanliness.
4.7.1 *Requirements*. Contractor shall keep the Project and surrounding areas free from accumulations of waste material and rubbish generated by employees and subcontractors. Contractor shall remove all rubbish, tools, equipment and surplus materials leaving the area "broom clean" at the completion of the Work, unless a different nature of cleanup or repair is specified elsewhere in the Contract Documents. Trash and rubbish must be stored in animal-proof containers, transported daily from site and legally disposed of. Contaminated or dangerous materials must be removed and promptly disposed of if encountered. No materials may be burned, buried or otherwise disposed of on site. Tools, equipment, and site protections measured are to be removed when Work is completed and when authorized to do so by District Representative.
4.7.2 *Disputes.* If a dispute arises between Contractor herein and any other contractor(s) retained by District (excluding any subcontractor(s) of Contractor herein) as to responsibility for removal of rubbish or other waste, District may remove the rubbish or other waste and charge all or any portion of such costs to Contractor as District Representative determines to be reasonable.

4.8 As-Built Documents. Contractor shall maintain a complete and updated set of "As-Built" drawings and supplementary documents that shall be corrected daily and show every change from the original drawings and specifications, as well as the exact locations, sizes and kinds of equipment as actually installed. This set of drawings and documents shall be kept on site and shall be used as a record set. Updates must occur both on hard-copy and electronic version of "For Construction" documents.
4.8.1 These drawings shall also serve as work progress sheets, and neat and legible annotations shall be made daily as the Work proceeds, showing the Work as actually installed. These drawings shall be available at all times for inspection and shall be kept at the worksite in a location designated by District Representative.
4.8.2 Contractor will meet on a regular basis with District Representative to confirm the correctness and completeness of the "As Built" documents. Under no circumstances shall trenches be backfilled until District Representative has verified the "As Built" plans relating to such trenching. If, in the sole opinion of District Representative, Contractor fails to provide accurate and verifiable information, a survey crew may be retained by District at Contractor's sole expense.

4.9 Water and Air Pollution; Environmental Protection; Erosion Control.
4.9.1 *Water Pollution*. Contractor shall exercise every precaution to protect streams and bodies of water from pollution by fuels, oils, salts or other hazardous materials as defined herein. Contractor shall minimize muddying and silting of any stream or body of water. Contractor shall, at District Representative's direction, perform work in small units or use modified construction procedures when necessary, to provide effective water pollution control. Contractor shall prevent any construction equipment, material, and debris from falling, landing, or reaching any adjacent creek drainage. At the pre-construction meeting, Contractor shall submit to District Representative in writing, a program to control water pollution. Contractor shall provide, at no

cost to District, temporary dikes, basins, ditches, straw, seed, or other appropriate device, when, in the opinion of District Representative, they become necessary as a result of Contractor's operations. District Representative may require Contractor to revise Project operations and the Work Schedule at no additional cost to District if Contractor's water pollution control measures are ineffective.

4.9.2 *Dust Control*. Contractor shall control dust resulting from Contractor's performance of the Work either by applying water or a dust palliative without additional costs to District. Use temporary enclosures, coverings and water sprinkling, or combinations thereof, as necessary to limit dust to lowest practicable level, consistent with the Project's Erosion Control and Pollution Prevention Plan, except do not use water to the extent that it causes flooding, erosion, or contaminated runoff. District Representative has full authority to suspend Work wholly or in part should Contractor fail to perform to the satisfaction of District Representative.

4.9.3 *Sudden Oak Death (SOD) Precautions.* Prior to the start of construction work, the Construction Superintendent shall inform construction personnel that they are working in a potential SOD-infested area, the implications of the disease, and the need to prevent further disease spread. Non-English speaking personnel shall be provided the appropriate written or verbal translations. To the extent practical, avoid locating equipment and material near host plants and trees, especially if showing disease symptoms. Route all equipment away from host plants and trees, especially if they exhibit any disease symptoms. No plants, trees, soil, duff, or other natural on-site material shall be removed from the Preserve without prior approval from District Representative. Any cutting or chipping of on-site plant material shall be restricted to the Project area and the debris shall remain in the Project area. After completing any cutting or chipping of on-site plant material, ensure that the equipment is free from host debris by first removing any visible plant material that clings to the equipment and follow with the cutting or chipping of non-host material. Before any equipment or vehicles leave the Preserve, Contractor shall inspect the equipment and vehicles for host plant debris (leaves, twigs, and branches). Host plant debris must be removed from equipment and vehicles prior to their departure.

4.9.4 *Mud.* If conditions at the Work site are muddy due to dust suppression activities or summer rains, remove or wash off accumulations of soil, mud, and organic debris from shoes, boots, vehicles, and heavy equipment prior to exiting the Preserve. If an equipment power wash station is used, District Representative must first approve its location.

4.9.5 *Wildlife.* Construction workers shall be instructed not to disturb or feed wildlife.

4.9.6 *Noise*. District Representative shall decide on the adequacy of provision and maintenance of noise reduction equipment. When so instructed in writing by District Representative, Contractor shall immediately withdraw any item of plant or equipment from service and carry out all necessary additions, replacements or repairs to the noise reduction equipment to the satisfaction of District Representative.

4.9.7 *Pollution Prevention.* All equipment shall be in proper working order, with no known leaks. All leakage shall be cleaned up properly. Equipment shall be cleaned of all excess dirt or soil materials prior to departing District property. All leakage shall be cleaned up properly as set forth in the Erosion Control and Pollution Prevention Plan if one has been prepared for the project. Equipment shall be cleaned of all excess dirt or soil materials prior to departing District property.

4.10 Protection of Historic Resources and Human Remains. Contractor shall, during all work, be alert for indicators of historic resources (such as bivalve shells or fragments, stone tools, old china objects or fragments, old glass objects or fragments, old foundations and old privy deposits) and human remains. If any such indicators are uncovered, all work within fifty

(50) feet shall be halted and District Representative immediately notified. District will have the find evaluated by the proper authorities or professionals. Only the balance of that workday shall be compensated by District if Contractor cannot perform work elsewhere on the Project. Recommendations from the qualified authorities or professionals may result in a change of Work and a Change Order may be issued.

4.11 Hazardous Materials.

4.11.1 *Definition*. As used herein, hazardous materials shall include all items listed in any statute, ordinance or publication defining hazardous materials including, but not limited to, common household items containing substances now or subsequently listed as a hazardous material or substance, chemicals, drugs, any materials used for laboratory analysis, nuclear and/or radioactive materials, toxic substances, hazardous substances, hazardous wastes, contaminated or polluting substances, materials or waste toxic, caustic, corrosive, gaseous or flammable substances that may cause injury, illness or death to living organisms.

4.11.2 *Approval*. Contractor shall not use any hazardous material in connection with this Project without the prior written approval of District Representative. Ten (10) working days prior to using a hazardous material, Contractor shall submit to District Representative complete Material Safety Data Sheet (MSDS) information, product specifications, and a document stating the application rate and method and including the name of the manufacturer's local representative and emergency telephone numbers. District Representative's response to Contractor's request for approval of hazardous materials use shall not affect Contractor's obligation to comply with the provisions of this section.

4.11.3 *Application*. In using hazardous materials, Contractor shall:

(a) Notify District Representative of the application schedule at least five (5) working days in advance.

(b) Comply with all applicable federal, state, and local laws, regulations, and ordinances relating to the use and disposal of hazardous materials and containers, environmental protection, industrial hygiene, worker and public safety.

(c) Supply protective clothing or equipment as required by applicable federal or state law for all persons handling hazardous materials, and for District Representative as required for inspection of the Work.

(d) Be responsible for the notification of all concerned parties adjacent to or effected by said hazardous material and as directed by District Representative.

4.11.4 *Special Situations*. In the event Contractor encounters material on the site reasonably believed to be asbestos, polychlorinated biphenyl (PCB) or any other hazardous or toxic substance, Contractor shall immediately stop Work in the areas affected and report the condition to District Representative. If in fact the material is asbestos, polychlorinated biphenyl (PCB) or any other hazardous or toxic substance that has not been rendered harmless, the Work in the affected area shall not be resumed except by written agreement between District Representative and Contractor. The Work in the affected area otherwise shall only be resumed when asbestos, polychlorinated biphenyls (PCBs) and other hazardous or toxic substances have been removed or rendered harmless.

4.11.5 For Projects where scope of work includes Hazardous Materials Abatement and/or Remediation, refer to Project Drawings and Specifications for Hazardous Material requirements.

4.12 Safety.

4.12.1 *Responsibility for Safety*. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs. All work shall conform to the requirements of

the California Administrative Code, Title 8, Industrial Relations, Division of Industrial Safety. Contractor shall be solely responsible for responding to, and the final satisfaction of any and all claims of personal injury or property damage.

4.12.2 *Safety Equipment and Workers*. Typical natural hazards on District lands include poison oak and other poisonous plants, poisonous insects and spiders, ticks, rattlesnakes, rabid animals, thorny plants, heat stroke, and rough terrain. All job site personnel should be able to recognize these hazards and to handle accidents involving them. Contractor shall take all reasonable measures as required by existing conditions and performance of the Contract to protect the public and their property. Contractor shall provide adequate barricades, fences, signs, tarps, warning lights, watchpersons, flag persons, etc., to protect the public and their property. Safety devices and workers shall comply with the current State of California "Manual for Warning Signs, Lights and Devices for Use in Performing Work Upon Highways", as a minimum standard. All lighting shall be electric powered and left on from sunset to sunrise.

4.12.3 *Trench and Excavation Safety*. As required by the California Labor Code §6705, whenever any portion of the Work involves excavating or trenching five feet or deeper, Contractor shall submit for acceptance by District a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made, to protect Contractor's workers, District personnel, and the public at large. If the plan varies from standard shoring systems established by the Construction Safety Orders of the Division of Industrial Safety, a registered civil or structural engineer employed by Contractor shall prepare the plan. All costs for trenching, excavation safety, including engineering, shall be included within the Contract Bid. Contractor shall submit a shoring plan for District's review no later than the pre-construction meeting. Contractor is solely for the adequacy of this plan. All trenching or excavation greater than five (5) feet deep below ground surface shall meet the provisions of Public Contracts Code §7104 as may be amended from time to time, which provides as follows:

(a) Contractor shall promptly, and before the following conditions are disturbed, notify District, in writing, of any:

4.12.3.a.1 Material that Contractor believes may be material that is hazardous waste, as defines in Health and Safety Code Section 25117, and may be required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

4.12.3.a.2 Subsurface or latent physical conditions at the site differing from those indicated.

4.12.3.a.3 Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

(b) District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work shall issue a change order under the procedures described in the Contract.

(c) In the event that a dispute arises between District and Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for, performance of any part of the Work, Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. Contractor shall retain any and all rights provided either by Contract or by law that pertains to the resolution of disputes and protests between the contracting parties.

4.12.4 *Use of Equipment*. No equipment shall move onto the Project without approval from District Representative. All equipment shall remain within the Project boundaries as set forth by

District Representative and/or Contract Documents.
4.12.5 *Unauthorized Vehicles*. When required by this Contract or District Representative, Contractor shall take measures to prevent unauthorized vehicular traffic.
4.12.6 *Material and Equipment Transportation*. Trucks hauling material or equipment shall not exceed vehicle or posted load and speed limits.

4.13 Time Limits on Work.
4.13.1 *Work Hours*. No Work or equipment shall be started on a Work Day before 7 a.m., nor continue beyond 5 p.m., except when expressly permitted by the Contract Documents, agreed upon at the pre-construction meeting, or otherwise approved in writing by District Representative. Work outside of these hours, on weekends or on Legal Holidays, shall be subject to a fine of One Thousand Dollars ($1,000.00) per day as liquidated damages, the exact amount of the actual damages being difficult to calculate, and the parties hereby agree that this is a fair and reasonable estimate of the actual damages suffered by District and its constituents and which shall be levied at the sole discretion of District Representative. Contractor may request permission to work on a Saturday, Sunday, or Legal Holiday, or outside normal working hours by notifying District Representative at least two (2) Working Days in advance. Contractor shall only be permitted to Work outside normal working hours at such times and on such days as are previously authorized by District Representative in writing.
4.13.2 *Extensions, Delays, Suspension of Work*. District Representative shall have sole discretion in the approval or denial of Contract time extensions. Contractor may make written request to District Representative for an extension of time to complete the Contract promptly following an occurrence of any one or more of the following:
(a) Delay due to work by District or another contractor.
(b) Delay due to difficulties in securing all required permits.
(c) Labor dispute beyond Contractor's control that affects work progress.
(d) A natural disaster that District Representative concludes substantially damages completed work or stored material (provided Contractor's neglect did not contribute to the damage).
(e) Unusual Inclement Conditions. Contractor shall submit the accumulated record mean values from climatological data filed by the U. S. Department of Commerce as part of Contractor's claim for time extension due to inclement conditions, if an extended inclement weather season causes contract work delay.
4.13.3 *Liquidated Damages for Delay*. If Contractor fails to complete the work within the specified time plus any extensions thereof, Contractor shall become liable to District, as liquidated damages, the sum of $1,000.00 for each calendar day beyond the time specified above, the actual damage incurred being difficult to calculate and the parties hereby agree that this is a fair and reasonable approximation and not to be construed as a penalty. Nothing herein shall be construed to preclude District from recovery of damages for causes other than for delay by Contractor. Any money due Contractor may be retained by District to cover liquidated damages. Should retained money not be sufficient to cover damages, District shall have the right to recover the balance from Contractor or its sureties.
4.13.4 *Authorized Suspension*. Should District Representative authorize a work suspension, the suspension time shall be added to the Contract time. Work suspended by District shall not be deemed a waiver of District's right to damages for non-completion.
4.13.5 *Delay Caused by District*. In the event District delays Contractor in the Work, Contractor's compensation shall be limited solely to an extension of time. Contractor agrees that in no event shall Contractor be entitled to a monetary payment over and beyond that specified in the Contract plus approved change orders. However, if District causes the delay, and the delay is

unreasonable under the circumstances and not within the contemplation of the parties, this subsection shall not preclude the recovery of compensation when Contractor would otherwise be entitled to such payment.

4.13.6 *Additional Work to Correct Delays*. If, in the opinion of District Representative, Contractor is not proceeding with the Work as scheduled, upon written direction from District Representative, Contractor shall work (at no additional cost to District) such overtime, additional shifts, Saturdays, Sundays or Legal Holidays required to correct delays. Contractor shall, by the diligent pursuit of the Work, ensure that the Work is completed within the Contract time.

4.14 Employees, Work Day, Apprenticeship, Non-Discrimination and Wages.

4.14.1 *Skilled Workers.* Contractor and all subcontractors shall only employ workers suitably skilled in the Work.

4.14.2 *Character of Workers*. Anyone employed on the Project by Contractor, or any subcontractor, who in the opinion of District Representative is incompetent, disorderly, or otherwise acts improperly, after written notification, shall be dismissed from the Project and not further employed on any part of the Work.

4.14.3 *Lawful Working Day*. Work performed by workers more than eight (8) hours during any one (1) calendar day and more than forty (40) hours in any one (1) calendar week may be permitted pursuant to the overtime provisions of Labor Code Section 1815 and then only upon such terms, conditions and requirements as provided and fixed by law. As provided in California Labor Code §1813, Contractor shall forfeit twenty-five dollars ($25.00) for each worker employed in the execution of the Contract by Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work in violation of Labor Code Sections 1810 through 1815.

4.14.4 *Apprenticeship Standards*. Contractor shall comply fully with the requirements of California Labor Code §1777.5 regarding employment of registered apprentices. If Contractor willfully fails to comply with this code section, Contractor may be denied the right to bid on any District contract for a period of one (1) year from the date of non-compliance determined by the California Division of Apprenticeship Standards. When District receives from the Division notice that Contractor is not in compliance with apprenticeship standards, District shall withhold from Contract payments the amount of the civil penalty imposed by the Division, which funds may be released to Contractor upon order of the Administrator or upon completion of the Contract.

4.14.5 *Non-Discrimination*. Contractor and its subcontractors will comply with all applicable equal employment opportunity and affirmative action laws throughout the term of this Agreement. Contractor hereby certifies that it will not unlawfully discriminate in its employment with regard to race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, sex, sexual preference, or age; that all federal, state and local directives and executive orders regarding non-discrimination in employment will be complied with; and that the principle of equal opportunity in employment will be demonstrated positively and aggressively. Contractor further certifies that it shall require the compliance of its subcontractors on the Work with all of the provisions of this paragraph. Contractor hereby acknowledges its understanding that this Contract may be canceled, terminated or suspended in whole or in part and Contractor and/or its subcontractors declared ineligible for future contracts with District, in the event Contractor and/or its subcontractors are found in non-compliance with the terms hereof.

4.14.6 *Wages*. As required by law, Contractor shall pay all workers California Prevailing Wages for each trade or classification on the job during the term of this Agreement. These rates

include, but are not limited to, employer payments for health and welfare, pension, vacation, travel time, subsistence pay and for apprenticeship and training obligations. The current issue of the Director of the Department of Industrial Relations for the State of California GENERAL PREVAILING WAGE RATES for straight time, overtime, Saturday, Sunday, and Legal Holidays is herein incorporated as part of this Contract. Any and all revisions to the GENERAL PREVAILING WAGE RATES that take effect during the Contract shall be adopted as part of this Contract. Contractor shall post Prevailing Wage Rates on job site. A copy of the GENERAL PREVAILING WAGE RATES is available for review at the office of District Representative. Copies of the prevailing wage rates are on file at District's principal office. For those crafts or job classifications requiring special prevailing wage determinations, please contact the Division of Labor Statistics and Research, Prevailing Wage Unit, P.O. Box 603, San Francisco, CA 94101, (415) 703-4281. District will not recognize any claim for additional compensation because of payment by Contractor of any wage above the GENERAL PREVAILING WAGE RATES. The possibility of wage increases is an element to be considered by Contractor in determining its bid, and may not under any circumstance form the basis of a claim against District.

4.14.7 *Labor Code §1861*. Contractor has executed the affidavit, attached hereto and incorporated herein as Exhibit 3, pursuant to Labor Code §1861.

4.14.8 *Holidays*. Holiday wage rates shall apply to holidays recognized in the collective bargaining agreement of the particular craft or classification concerned.

4.14.9 *Contractor and Subcontractors Compliance*. Contractor and each subcontractor shall pay general prevailing per diem wages (including holiday and overtime pay) to all of their workers on the Project. As of March 1, 2015, contractors and subcontractors must be registered with the California Department of Industrial Relations (DIR) to maintain eligibility to work on public works projects (Cal. Lab. Code §§ 1725.5, 1771.1). Work performed on the Project is subject to compliance monitoring and enforcement by the DIR. Contractor is solely responsible for posting Job Site Notices in compliance with the California Labor Code and Title 8 California Code of Regulations §16451.

4.14.10*Payroll Record Requirements*. Contractor and each subcontractor shall keep accurate payroll records showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed on the Project pursuant to California Labor Code §1776. Payroll records shall be available for inspection at all reasonable hours by District Representative. Contractor shall make payroll records available pursuant to California Labor Code §1776. If a complaint is filed with District or the Division of Labor Standards Enforcement alleging that Contractor or subcontractor has paid less than prevailing wage on the Project, District shall withhold from progress payments to Contractor an amount equal to one hundred and twenty-five percent (125%) of the amount claimed until the allegation is settled.

4.15 Work Schedule.

At least three (3) days prior to the Pre-Construction Conference to be scheduled by District, Contractor shall provide three hard copies of a detailed critical path network schedule for performance of the Work, generated on a commonly used professional scheduling software program approved by District Representative. This schedule shall incorporate all Subcontractor Work and other provisions necessary to bring the Work to Substantial Completion and Final Completion and Acceptance within the Contract Time. Schedule shall be itemized in sufficient detail to identify and show all administrative, engineering, permitting, submittal, procurement

fabrication, site mobilization, inspections, testing, sampling, equipment erection and field construction activities required for completion of the Work. Schedule shall detail all items of work as described in the bid schedule and shall show the dates of start and completion for each item. Any required permits shall be obtained or permit application(s) shall be submitted within five (5) working days from the date of issuance of a written *Notice to Proceed*. The Contractor shall submit to the District Representative a monthly update to the Construction Schedule with each Application for Payment. The monthly update shall be in the form of a Summary Bar Chart and shall reflect the actual activity and progress of all Work through the preceding month. The Monthly Updates shall identify all actual start dates and completion dates and shall include a graphical representation of the interim progress of all activities started, completed, or in progress since the date of the previous Monthly Update. The Monthly Update shall include any changes, clarifications, or corrections recommended by the District Representative. District will make no progress payments to Contractor until District Representative has approved the Construction Schedule. Failure to make Construction Schedule adjustments shall be cause for District to delay progress payments. Construction Schedule changes shall not affect the Completion Date.

4.16 Submittals.

4.16.1 The following terms shall have the following meanings:

(a) "Product Data" are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for a portion of the Work.

(b) "Shop Drawings" are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor of Subcontractor to illustrate some portion of the work.

(c) "Samples" or "Mock Ups" are physical examples which illustrate materials equipment or workmanship and establish standards by which the work will be judged.

(d) "Submittals" shall include without limitation, Product Data, Shop Drawings, Samples, coordination drawings, certificates, manufacturers' descriptive literature, materials safety data sheets, brochures, pamphlets, catalogue cuts, calculations, reports, color charts, and other descriptive data defining the article, material, equipment, device or assembly proposed for incorporation into the Work.

4.16.2 Within 20 days of execution of the Agreement, Contractor shall prepare a schedule for submission of all required Submittals (the "Submittal Schedule"). The Submittal Schedule shall identify any Submittals that are on the critical path of the construction schedule and provide sufficient time to order, test, procure, deliver, assemble and install the material and equipment in strict accordance with the Construction Schedule. The Submittal Schedule shall ensure sufficient time for District review, comment and resubmittal, if required.

4.16.3 All Submittals shall be dated and properly identified by name of Project and name and address of Contractor. In addition, each Submittal shall be referenced to Drawing Details number(s) and/or Specification Section and paragraph number(s). Submittals without such identification will be returned without review.

4.16.4 Prior to submitting a Submittal to the District Representative, Contractor shall thoroughly review and approve the Submittal for compliance with the Contract Documents. By reviewing and approving all Samples and Shop Drawings, Contractor thereby certifies that it had determined and verified all field measurements, materials, catalogue numbers, and similar data, and that it has checked and coordinated each Shop Drawing and Sample with the requirements of the Work and the Contract Documents. Submittals without Contractors stamp and certification, and Submittals which in the opinion of the District Representative are incomplete or not in

compliance with the Contract Documents, will be returned to the Contractor without review for resubmission.
4.16.5 Contractor shall provide District Representative with six (6) copies of all Submittals. If both Shop Drawings and Samples or Product Data are required for the same item, District Representative may require both to be submitted before approving either. No Submittal review comments or acceptance, on the part of the District's review thereof, shall constitute an authorization for any increase in Contract Price. Upon review, the Submittal shall be stamped as follows (or stamped using reasonably equivalent language acceptable to the District Representative:

(a) "Reviewed – No Exceptions Taken": No corrections or resubmissions are required. Contractor may proceed with the fabrication of construction;
(b) "Reviewed – Make Corrections Noted": Resubmission is not required. Contractor may proceed with fabrication or construction on the condition that correction noted are incorporated into the Work. If Contractor cannot comply or disagrees with the corrections noted, it shall revise the Submittal and resubmit before proceeding with the fabrication or construction.
(c) "Review – Revise and Resubmit": Resubmission is required. Fabrications or construction may not proceed; any fabrication or construction shall be at Contractor's risk. Contractor shall revise the Submittal as indicated and resubmit.
(d) "Rejected": Resubmission is required. Fabrications or construction may not proceed; any fabrication or construction shall be at Contractor's risk. Contractor shall revise the Submittal in accordance with the Contract Documents and resubmit. Review cannot proceed because minimum requirements for Submittal have not been met.
4.16.6 After review, Contractor shall maintain a log of all Submittals marked "Reviewed – No Exceptions Taken" and "Reviewed – Make Corrections Noted" at the Contractors field office on site. Approved mock-ups if any, shall remain as the standard for acceptance of the Work.
4.16.7 Submittals shall be reviewed with reasonable promptness, considering the complexity of each Submittal and the timing of other Submittals delivered by the Contractor. Contractor shall allow at least three (3) weeks to process Submittals, and at least four (4) weeks to process complex Submittals. These periods of time do not allow for resubmittals, if required. Contractor acknowledges that certain Submittals may require additional time.
4.16.8 Submittals shall be reviewed for their general characteristics and general design only. District review shall not in any way release Contractor from his duty to comply with the requirements in the Contract Documents or from his responsibility to ensure the proper fit, construction sequences, dimensions and quantities.

4.17 Materials.
4.17.1 *Quality*. All materials furnished by Contractor shall be new and meet all standards of quality and workmanship of their kind unless otherwise specified in the Contract Documents. Materials specified as recycled in the Contract Documents must meet appropriate California Department of Transportation ("Caltrans") specifications as described. All materials are at any time subject to inspection, sampling, testing, approval or rejection by District Representative. When required by District Representative, Contractor shall furnish acceptable documented evidence of the kind and quality of materials used. The words "or equal" in the Plans and Specifications mean "or equal in the opinion of District Representative".
4.17.2 *Substitutions*. District Representative's approval of a substitute material shall not relieve Contractor of responsibility for total compliance with the Plans and Specifications. Contractor shall pay all costs for modifications resulting from the approved substitution of material. There

shall be no cost to District resulting from the use of any substitute material(s) by Contractor.
4.17.3 *Substitution Request*. Request for a material substitution shall be submitted promptly to District Representative in writing at least ten (10) working days prior to the day approval is required so as not to delay the Work.
4.17.4 *Materials List*. When requested by District Representative, Contractor shall submit at least five (5) copies of catalog cuts, engineering data, and other information regarding materials that are proposed for the Work. The materials list submitted shall include a description of the materials and their suppliers. No progress payment shall be made before District Representative reviews and accepts the materials list.
4.17.5 *Unavailable Or Late Materials*. It is the responsibility of Contractor to order and schedule delivery of materials in time to avoid construction delays. If any item is unavailable or will be delivered late, Contractor shall immediately notify District Representative. Contractor must substantiate that materials were ordered in a timely manner. District Representative may grant a contract time extension or consider a suitable material substitution for continuing the Work.

4.18 Public Convenience.
4.18.1 Public Convenience. Contractor shall conduct the Work so as to ensure the least possible obstruction to traffic or inconvenience to the general public.
4.18.2 *Road and Trail Closures.* Contractor shall not obstruct roads or trails that are to remain open during construction and shall allow unencumbered access through Preserve gate entrances. Contractor shall not close or obstruct driveways, trails, or other public passageways without permission from District Representative or other authorities having jurisdiction.
4.18.3 *Failure to Provide for Safety*. If in the opinion of District Representative, Contractor fails to adequately provide for safety, District Representative may suspend construction within the area; or order and place any additional warning devices, barriers, or protective equipment deemed necessary; or do both. District shall not assume Contractor's responsibilities by this action and does not thereby release Contractor's obligations. Contractor will be liable to, and promptly reimburse District for, all costs District incurs in acting under this paragraph in an amount equal to twice District's expenses and costs in acting pursuant to this paragraph, as liquidated damages, the extent and amount of actual damage to District being difficult to precisely calculate and the parties agree that such measure of damages is a fair and reasonable estimation thereof. This action shall not become a basis for any claim for time or money against District.

4.19 Fire Hazards and Preventions.
4.19.1 Contractor is responsible for any fire ignited by Contractor's employees, subcontractors, or equipment. Employees shall not be allowed to start fires. No open flames are permitted.
4.19.2 Contractor shall take necessary precautions to guard against and eliminate fire hazards that may cause damage to the Work, building materials, equipment, public, and private property, including grassland, brush, and trees.
4.19.3 Flammable materials shall not be poured into drain lines and shall be disposed of only in a manner approved by the Fire Marshal's office and District Representative.
4.19.4 Fire hydrants shall be kept accessible to fire-fighting equipment at all times.
4.19.5 No smoking is allowed on the Work site or otherwise within a District Preserve.
4.19.6 For emergency response in the event of fire, Contractor shall contact both Mountain View Dispatch at (650) 968-4411, and the California Department of Forestry at (831) 335-9113 in San Mateo County and Santa Cruz County or at (408) 779-4111 in Santa Clara County, and

any other emergency response agencies identified to be a responder to the Work.

4.20 Emergencies. In an emergency affecting the safety of life, the Work or adjoining property, Contractor shall take all necessary and proper steps to prevent any loss, injury or death. Contractor shall make every effort to communicate with District Representative and may be guided by the directions and/or advice of District Representative. If the character of the emergency is such as to require action within a short time or circumstances otherwise render communication with District impractical, Contractor shall act independently and upon its own. Contractor's emergency acts will be subject to the direction and control of District as soon as it is practical.

4.21 Utilities.

4.21.1 *Existing Utilities*. Contractor's attention is directed to the existence of utilities shown or not shown on the Plans. The location of known utilities shown on the Plans is approximate. It is Contractor's responsibility to investigate and locate existing utilities. Contractor shall call Underground Service Alert (USA North) (1-800-227-2600) for assistance. Contractor will immediately report to District Representative any utility that varies significantly from the Plans.

4.21.2 *Utilities Identified in Plans and Specifications*. When it is necessary for Contractor to remove, relocate or protect any utility that is identified in Plans and Specifications to execute this Contract, Contractor shall remove, relocate, or protect that utility or notify the owner and make arrangements for coordinating the removal, relocation or protection of that utility with his work. There shall be no claim for additional compensation or time by Contractor for this work. Contractor shall repair all areas surrounding utility work to District Representative's and utility owner's satisfaction according to California Government Code §4215.

4.21.3 *Utilities Not Identified in Plans and Specifications*. When any utility on the Project must be removed, relocated, protected or repaired by Contractor, and the utility is not identified in the Plans and Specifications, District shall compensate Contractor for the cost of such utility work. District shall compensate Contractor for equipment idled by work on such unidentified utilities. Contractor shall use reasonable care in his Work to prevent damage to any unknown utility. District shall not charge Contractor for delay of Work due to any unidentified utility. Contractor shall notify District Representative and the utility owner, in writing, whenever Contractor discovers an unidentified utility subject to California Government Code §4215.

4.21.4 *Right to Enter Reserved*. District and any and all utility companies have the right to enter the Project to make repairs and changes that become necessary in the performance of this Contract.

4.21.5 *Certificate of Satisfaction*. Contractor shall, at Contract completion, produce written certification provided by any utility affected by Contractor's work stating that the utility is satisfied with Contractor's work.

4.21.6 *Temporary Utilities and Facilities*. Unless otherwise stated in the Contract Documents, Contractor shall provide all temporary utilities and sanitary facilities except where restrooms are made available onsite by District. District Representative must approve all temporary utilities and sanitary facilities before installation. Contractor shall immediately remove such temporary items upon completion of Contract or upon the direction of District Representative.

4.21.7 *Cellular Communication*. The Project location may be remote, with limited or no cell phone service.

4.22 Protection of Work and Property. Contractor shall protect from damage or loss, Work and any existing District, private, or other public improvements or resources including

vegetation, pathways, roadways, structures and utilities not designated for removal or alteration. Contractor shall repair or provide replacement for any such damage or loss to the satisfaction of District Representative, all at no cost to District. When Contractor is working in or around existing vegetation, Contractor shall not disturb such and shall take adequate measures to preserve and protect all vegetation that is to remain. Particular care shall be taken not to debark trees, break limbs, or damage root systems.

ARTICLE FIVE

INSURANCE, BONDS AND INDEMNIFICATIONS

5.1 General Insurance Requirements.

5.1.1 Contractor shall provide, and keep in full force and effect during the Term of this Agreement, at Contractor's sole cost and expense, policies of insurance with companies licensed to do business in the State of California that are acceptable to District for the Coverages as more particularly set forth below. Contractor shall keep all required policies in full force and effect until final acceptance of the Work by District.

5.1.2 Contractor shall, within five (5) calendar days after *Notice of Award*, supply District with an acceptable Certificate of Insurance. An authorized insurance agent or broker must complete, execute and provide District with a Certificate of Insurance (ACORD 25-S, or a successor or comparable form, subject to prior approval by District) before a *Notice to Proceed* may issue. District reserves the right to cancel the contract if these requirements are not met within 30 calendar days of the *Notice of Award*.

5.1.3 The General and Automobile Liability policies must be endorsed to name District as an additional insured and must be on a primary non-contributing basis in relationship to any other insurance available to District. All policies taken out by Contractor insuring work and materials supplied must list District as an additional insured and be payable to Contractor and District. All policies shall contain a provision that they shall not be canceled or materially changed without thirty (30) calendar days' prior written notice to District. No cancellation provision in any insurance policy shall be construed in derogation of the continuous duty of Contractor to furnish the required insurance during the term of the Agreement.

5.2 Specific Insurance Requirements.

5.2.1 *Workers' Compensation Employer's Liability* coverage as required by statute, in full compliance with California Labor Code §3700, and containing a waiver of subrogation in favor of District. Contractor hereby acknowledges having read and understood the provisions of the California Labor Code §3700, which require every employer to be insured against liability for workers' compensation or that they undertake self-insurance in accordance with the provisions of that code, and Contractor agrees to comply with such provisions before commencing the Work. Acknowledgment shall be in the form attached hereto and incorporated herein as Exhibit 3.

5.2.2 *Comprehensive or Commercial General Liability*, including coverage for Bodily Injury and Property Damage in the amount of $2,000,000.00 per occurrence/$2,000,000.00 aggregate.

5.2.3 *Business Automobile Liability* coverage including owned, non-owned and hired vehicles in an amount of no less than $1,000,000.00 per occurrence.

5.2.4 *Subcontractor(s) Insurance Requirements*. Contractor shall either require each subcontractor to procure and maintain during the life of its subcontract all insurance of the type and in the amounts specified above or insure the activities of subcontractor(s) under its own policy or policies.

5.3 Guarantee Bonds.

5.3.1 *Performance and Payment Bonds*. Contractor shall furnish District a Performance Bond in the amount of the Contract price, guaranteeing the faithful performance of the Contract, and a Payment Bond in the amount of the Contract price, guaranteeing the payment of claims of subcontractors, suppliers of materials or labor, and others. Bonds shall be in the forms attached hereto and incorporated herein as Exhibits 1 and 2, with admitted Sureties approved by District. Contractor shall pre-pay all bond premiums.

5.3.2 *Approval of Sureties*. Any admitted surety company which at the time of execution of this Contract is listed in the latest published U. S. Treasury Department list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies", is hereby deemed approved.

5.3.3 *Substitution of Securities.* The Contractor may elect to substitute securities for monies withheld by the District to ensure the performance of the Contractor. The evaluation, handling, and deposition of substituted securities shall be as set forth in the California Public Contract Code §22300.

5.4 Contractor's Indemnification of District.

5.4.1 *Indemnity*. Contractor agrees to indemnify, hold harmless, defend, and protect District, its officers, directors, agents and employees from any and all claims, losses, damages, demands, liabilities, suits, costs, expenses (including all reasonable attorney's fees), penalties, judgments or obligations whatsoever arising out of or in connection with any injury, death, or damage to any person or property or pecuniary or monetary loss that results from, arises out of, or in any way relates to the activities of Contractor both on and off the Project, including but not limited to claims related to the presence, use or disposal of hazardous materials, except for injury or damage resulting from the sole negligence or willful misconduct of District.

5.4.2 *Claim.* In the event a Contractor becomes aware that a claim has been, or is likely to be, made against District, its officers, directors, agents or employees, or they or District is named a co-defendant in any action concerning the Contract, Contractor shall immediately notify District. District may retain legal counsel at Contractor's sole expense and Contractor shall reimburse District for all legal expenses, including reasonable attorney's fees, spent in representing District.

5.4.3 *Apportionment of Liability.* In the event that a judge in a court of competent jurisdiction makes an apportionment of liability between District and Contractor, neither District nor Contractor shall request that a jury determine apportionment of liability. Contractor shall indemnify and hold harmless District as set forth above, unless the court determines that the injury or damage resulted from the sole negligence or the intentional and willful misconduct of District.

5.4.4 *Waiver.* Contractor hereby waives all claims and recourse against District, including the right of contribution for loss or damage to property, and hereby releases District from any and all liability related to or in any way connected to Contractor's activities or Contractor's use of the Project site, premises or facilities.

5.4.5 *Contractor Responsibility.* Contractor and its subcontractors shall have sole responsibility for the safety of their equipment, property and personnel (including, but not limited to, its employees, agents, and officers) from any and all injuries, deaths or damages.

5.4.6 *Mutual Responsibility Of Contractors.* If Contractor causes damage to the work or others, or willfully or negligently delays another contractor or subcontractor in the performance of other work, Contractor is hereby obliged to attempt to settle such claim with such contractor or subcontractor by agreement. If a contractor or subcontractor serves written notice on District of Contractor's failure to meet this obligation or to settle the claim by agreement, District shall

notify Contractor in writing of the pending claim. Contractor shall defend itself (and District if included in claim) at Contractor's sole expense, including the payment of District's attorney fees. Contractor shall pay all costs, expenses and liabilities incurred by District as a result of any judgment in favor of another contractor.

5.5 Assumption of Risk.
5.5.1 *Injury, Damage to Work.* Contractor assumes all risks of injury or damage to the Work and materials arising from fire, storm, vandalism, theft or other causes prior to the acceptance of the Work. Contractor shall repair and/or replace any Work or materials damaged or destroyed, from any cause, to the reasonable satisfaction of District Representative and at no cost to District
5.5.2 *Exception*. Contractor shall not assume risk of injury or damage to work when damage exceeding five percent (5%) of the total Contract amount is caused by an Act of God, as defined in Public Contracts Code Section 7105, provided that the Work damaged was built in accordance with acceptable and applicable building standards and the Plans and Specifications. In such event, District may terminate this Contract upon reasonable notice to Contractor and upon payment of any amount due Contractor.

ARTICLE SIX

PAYMENT AND COMPLETION

6.1 Schedule of Values. Contractor shall submit to District Representative a "Schedule of Values", which shall be consistent with information shown in the Construction Schedule and provide a breakdown of the total Contract Sum by assigning dollar values to applicable network activities. The assigned network activity costs, when added to Contractor's overhead costs, profit, cost of bonds, insurance, etc., shall equal the total Contract Sum. The Schedule of Values, when approved by District Representative, shall be the basis for determining the value of Work performed for the purpose of executing monthly payment requests.

6.2 Application for Payment.
6.2.1 On or about the last day of each month in which Work is performed, Contractor shall submit three (3) copies of an Application for Payment to the District Representative supported by such data substantiating Contractor's right to payment as District Representative may require (such as copies of requisitions or invoices from subcontractors) and reflecting the retention provided elsewhere in the Contract Documents. Absent written direction from the District Representative to the contrary, each Application for Payment shall be in the form of a notarized AIA Document G702, Application and Certification for payment and (where applicable) supported by AIA Document G703, Continuation Sheet. The Application for Payment shall be accompanied by:
(a) lien waivers and releases conforming to the requirements of the California Civil Code Section 3262, conditioned only upon the receipt of the payment applied for from Contractor and each Subcontractor performing the Work which is the subject of the Application;
(b) unconditional lien waivers and releases, conforming to the requirements of the California Civil Code Section 3262, from Contractor and each Subcontractor performing the Work for which payment was made pursuant to the Application for the Payment covering Work for the month one month prior to the pending Application for Payment;
(c) such evidence as the District Representative may from time to time request that each Subcontractor has received the funds allocated to it in any previous Applications for Payment;

provided however, that the District Representative shall have no duty to verify that any Subcontractors have been paid;
(d) invoices, receipts, vouchers and other reasonable evidence substantiating the costs of the Changes in the Work included in the Application, if any;
(e) a separate written certification by Contractor that there is no known basis for the filing of any Liens against the Site or any other property of the District.
6.2.2 Contractor also shall certify the amounts previously paid by District to Contractor, the amounts previously paid to Subcontractors and the amount currently due to Contractor, with the amounts, in each case, broken down by trades. The Application for Payment shall constitute a representation from the Contractor to the District that the Work has progressed to the point indicated in the Application, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to the payment in the amount requested.
6.2.3 When Contractor submits an Application for Payment, it shall be reviewed by District Representative as soon as possible to determine if it is a proper payment request. At the District Representative's request, Contractor shall attend monthly payment meetings to review Application for Payment. If District Representative determines an Application for Payment is not proper, it shall be returned to Contractor as soon as practicable, but no later than seven (7) days after receipt, and accompanied by a document stating the reasons the request is not proper. Upon receipt of a properly submitted and undisputed request, District Representative shall authorize payment to Contractor for the amount District Representative agrees is properly due within thirty (30) days of receipt of such proper request. Payment requests shall be submitted on District forms.
6.2.4 Monthly Payment Not Acceptance of Work. Monthly or partial payments shall not be considered as acceptance by District of the whole or any part of the Work done up to that payment or relieve Contractor of any of its obligations.
6.2.5 5% Retention. Following approval by District Representative of Contractor's Application for Payment, District shall pay the Contractor the approved amount; provided however, that except as to Contractor's General Conditions Costs (for which there will be no retention) a 5% retention shall be withheld from each progress payment. The retention will be paid to Contractor upon satisfaction of all the conditions to final payment set forth herein.
6.2.6 Substitute Securities. Contractor may elect to substitute securities for monies withheld by District to ensure the performance of Contractor. The evaluation, handling, and deposition of substituted securities shall be as set forth in the California Public Contract Code §22300.
6.2.7 Final Retention Payment. After acceptance of the Work, Contractor shall submit to District Representative a request for the retained funds. The retained funds of the total Contract price shall be paid (except as otherwise provided in the Contract Documents) forty (40) calendar days after the filing date of the *Notice of Completion* and the receipt of all unconditional waivers and lien releases from subcontractors and suppliers. In the event of a dispute between District and Contractor, District may withhold from the Final Payment an amount not to exceed one-hundred-fifty percent (150%) percent of the disputed amount.
6.2.8 Payments Withheld, Protection of Loss to District. District Representative may withhold or nullify the whole or part of any progress payment as set out in the Contract Documents, including but not limited to payments withheld, to protect District from loss on account of:
(a) Defective work not remedied.
(b) Third party claims filed or reasonable evidence indicating probable filing of claims.
(c) Failure of Contractor to make payments properly owed subcontractors for materials, equipment or labor.
(d) Reasonable evidence that the Contract cannot be completed for the unpaid balance.

(e) Damage to District or to another contractor.
1. Default of Contractor in the performance of terms of the Contract.
2. Violation by Contractor of the apprenticeship requirements or the prevailing wage rate.
3. Reasonable evidence that the Work will not be completed within the Contract time.

6.2.9 *Evidence of Payments*. Contractor agrees that upon request of District Representative Contractor shall submit a sworn statement setting forth the Work done or material furnished by subcontractors and suppliers, and the amount due and to become due to each. Before the final payment Contractor shall, if requested, submit to District Representative a complete set of unconditional lien releases or vouchers showing payments made for materials and labor used in the Work.

6.2.10 *Releases; Receipts*. When required, Contractor shall deliver a copy of receipts to District Representative and an affidavit that the receipts include all labor and material for which a claim could be filed. Neither the final payment nor the retained percentages will be due Contractor before all required receipts are received. If any subcontractor refuses to furnish a receipt in full, Contractor may furnish a bond satisfactory to District that indemnifies District against any claim, cost or damage, including all legal fees. Contractor shall refund to District all monies that District may be compelled to discharge for any unsatisfied claim, including all costs and reasonable attorney's fees.

6.2.11 No payment request will be processed until District Representative verifies that the "As Built" documents are current and correct by initialing and dating said documents.

6.3 Claims.

6.3.1 Claim by Subcontractor, Supplier, Worker. Any subcontractor, supplier of material or labor, worker or anyone having any claim against Contractor for work done or material furnished on the Work may give notice of such claim to District, who may withhold up to one-hundred twenty-five percent (125%) percent of the claim from payments due Contractor until the claim is settled. The provisions of this paragraph shall not lessen or diminish the right or duty of District to withhold payments under the provisions of the laws of the State of California.

6.3.2 Claims Resolution. Claims between Contractor and District arising from contracts valued at $375,000.00 or less, shall be governed by the provision of the California Public Contract Code §20104 et seq. which provides special rules for meet and confer, mediation, and arbitration, and those valued in excess of $375,000.00 shall be resolved by binding arbitration.

6.3.3 Third Party Claims. District shall have the authority to settle, pay or compromise third party claims related to the Contract Documents or the activities of Contractor related to the Project. District shall notify Contractor of District's receipt of any such third party claim within twenty (20) days of receipt.

6.4 Final Inspection and Acceptance of Work.

6.4.1 When the Work is complete, Contractor shall request from District Representative a final inspection of the Work. District shall make the final inspection within ten (10) calendar days of the request. If District determines that the Work has been completed and is acceptable, District Representative shall formally accept the Work in writing. Upon acceptance, Contractor shall be relieved of maintaining and protecting the Work unless specified otherwise. If District determines that the Work is not complete or rejects the Work, Contractor shall be notified in writing of deficiencies and Contractor shall again initiate the procedure for final inspection after all such deficiencies are corrected.

6.4.2 At the final inspection, the Work may be substantially completed and accepted with a "minor" punch list as determined by District Representative. The punch list items are to be

completed within the sixty (60) day retention period, otherwise Contractor waives any and all rights to the retention monies withheld by District. District Representative may hire another contractor or utilize District crews to complete the Work. All costs, including administrative costs, will be charged against the monies withheld and shall be deducted from the contract price.
6.4.3 Following final inspection by District Representative and the completion of all punch list items, District Representative will file a *Notice of Completion* for the project.
6.4.4 Before the date of the final inspection, the corrected and completed information shall be transferred to a clean full-sized copy, scanned and submitted to District Representative on CD, or other media approved by the District Representative, for review. Final payment shall be withheld until the "As-Built" documents are accepted.

6.5 Guarantee; Correction of Work After Final Payment.
6.5.1 In addition to any guarantees required by the Plans and Specifications, Contractor guarantees all construction work and materials furnished under this Contract against defects for one (1) year from the date of final acceptance. Contractor shall be liable for all damages and income lost resulting from defects pertaining to the construction work and materials furnished under the Contract. Contractor shall, within seven (7) calendar days from receipt of written notice, repair and/or replace any defects (ordinary wear and tear excepted) and any resulting damage at Contractor's sole expense. In the event Contractor fails to remedy any defects within seven (7) calendar days from receipt of written notice, District may have defects remedied at Contractor's expense. Contractor shall pay District for all costs, including an administrative fee of fifteen percent (15%) of that cost, which the parties hereto agree is a fair and reasonable estimate of the costs likely to arise from such remedial work.
6.5.2 Nothing in this Contract shall relieve Contractor from responsibility for latent defects, departures from the Contract, fraud or gross mistakes and damage resulting from any of the above.
6.5.3 Guarantees shall be timely delivered to District in substantially the same form as the following, on Contractor's own letterhead:

"GUARANTY-WARRANTY FOR _____ "

We hereby warrant and guaranty that the _____ installed in the _____ has been done in accordance with the Plans and Specifications and that the Work as installed will fulfill the requirements of the guaranty-warranty included in these specifications.

We agree to reimburse District for any income lost and to repair or replace any or all of our work together with any other work which may be displaced by so doing, that may prove to be defective in workmanship or material within one (1) year from the date of acceptance of the above-named Project by District, without any expense whatsoever to District, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the abovementioned conditions within seven (7) calendar days after being notified in writing by District, we, collectively and separately, do hereby authorize District to have such defects repaired and made good at our expense, and will honor and pay all costs and charges, including District's administrative fee of fifteen percent (15%) of the total cost, thereof upon demand.

Signed: _____ Date: _____
Subcontractor

Countersigned: _____ Date: _____
Contractor

ARTICLE SEVEN

CHANGES IN THE WORK

7.1 Change Orders.

7.1.1 *District Right to Require Changes*. The District reserves the right to make such alterations, deviations, additions to, or deletions from, the Plans and Specifications, including the right to increase or decrease the quantity of any item or portion of the work, or to delete any item or portion of the work, as may be deemed by the District Representative to be necessary or advisable, and to require such extra work as may be determined by the District Representative to be required for the proper completion or construction of the whole Work. If District Representative determines that a change ordered by District caused an increase or decrease in Contractor's costs or time required for completing the Contract, appropriate adjustments to the Contract price and/or time shall be made. Contractor shall not be entitled to any compensation for extra work or time to finish the Contract without a written Change Order from District Representative. Failure to agree on an adjustment of the Contract price or time extension shall not excuse Contractor from proceeding with the Work as changed.

7.1.2 *Form of Change Order.* The Contractor or District Representative may request changes to the work. Once proposed changes have been reviewed and approved, the Contractor shall submit a Change Order. Proposed Change Order Requests and Change Orders shall be completed using the forms attached hereto and incorporated herein as Exhibits 4 and 5. Once Change Order is approved by the District Representative, payment in accordance with the provisions as to compensation set forth therein shall constitute full compensation for all work included therein or required thereby. Any such changes will be set forth in a Change Order, in the form attached hereto and incorporated herein as Exhibit 5, which specifies, in addition to the Work to be done in connection with the change made, adjustment of contract time, if any, and the basis or amount of any additional compensation for such Work. No Change Order shall be effective until approved in writing as set forth herein by the District Representative. Upon receipt of an approved Change Order, the Contractor shall proceed with the ordered Work. If ordered in writing by the District Representative, the Contractor shall proceed with the Work so ordered prior to actual receipt of an approved Change Order. In such cases, the District Representative will, as soon as practicable, issue an approved Change Order for such work and the provisions hereof regarding "Procedure and Protest" shall be fully applicable to such subsequently issued Change Order. An approved Change Order shall supersede a proposed, but unapproved, Change Order covering the same Work.

7.1.3 When the compensation for an item of work is subject to adjustment under these provisions, the Contractor shall, upon request, furnish the District Representative with adequately detailed cost data for such item of work. If the Contractor requests an adjustment in compensation for an item of work as provided, such cost data shall be submitted with his request.

7.1.4 *Procedure and Protest.* A Change Order approved by the District Representative may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in an approved Change Order that he has not executed, he shall submit a written protest to the District Representative within fifteen (15) days after the receipt of such approved Change Order. An un-protested approved Change Order will be considered an executed Change Order as that term is used herein.

(a) The protest shall state the points of disagreement, and, if possible, the contract specification references, quantities, and costs involved. If a written protest is not submitted, payment will be made as set forth in the approved Change Order and such payment shall constitute full compensation for all work included therein or required thereby.

(b) Where the protest concerning an approved Change Order relates to compensation, the compensation payable for all Work specified or required by said Change Order to which such protest relates will be determined as provided herein. The Contractor shall keep full and complete records of the cost of such Work and shall permit the District Representative to have such access thereto as may be necessary to assist in the determination of the compensation payable for such Work.

(c) Where the protest concerning an approved Change Order relates to the adjustment of contract time for the completion of the work, the time to be allowed thereof will be determined as provided for in Paragraph 4.13.3, "*Liquidated Damages for Delay"*.

7.1.5 *Eliminated Items.* Should any contract item of the Work be eliminated in its entirety, in the absence of an executed Change Order covering such elimination, payment will be made to the Contractor for actual costs incurred in connection with such eliminated contract item if incurred prior to the date of notification in writing by the District Representative of such elimination. If acceptable material is ordered by the Contractor for the eliminated item prior to the date of notification of such elimination by the District Representative, and if orders for such material cannot be canceled, it will be paid for at the actual cost to the Contractor. In such case, the material paid for shall become the property of the District and the actual cost of any further handling by Contractor will be reimbursed. If the material is returnable to the vendor, and if the District Representative so directs, the material shall be returned and the Contractor will be paid for the actual cost of charges made by the vendor for returning the material and the actual cost of handling such returned material reimbursed. The actual costs or charges to be paid by the District to the Contractor as provided for herein will be computed in the same manner as if the Work were to be paid for on a force account basis.

7.2 Changes in Character of Work. If an ordered change in the Plans or Specifications materially changes the character of the Work of a contract item from that on which the Contractor based his bid price, and if the change increases or decreases the actual unit cost of such changed item as compared to the actual or estimated actual unit cost of performing the Work of said item in accordance with the Plans and Specifications originally applicable thereto, in the absence of an executed contract change order specifying the compensation payable, an adjustment in compensation thereof will be made in accordance with the following:

7.2.1 The basis of such adjustment in compensation will be the difference between the actual unit cost to perform the Work of said item or portion thereof involved in the change as originally planned and the actual unit cost of performing the Work of said item or portion thereof involved in the change, as changed. Actual unit costs will be determined by the District Representative in the same manner as if the Work were to be paid for on a force account basis; or such adjustment will be as agreed to by the Contractor and the District Representative. Any such adjustment will apply only to the portion of the Work of said item actually changed in character. At the option of

the District Representative, the Work of said item or portion of item that is changed in character will be paid for by force account.
7.2.2 If the compensation for an item of Work is adjusted under this Section, the costs recognized in determining such adjustment shall be excluded from consideration in making an adjustment for such item of work under the provisions of the paragraph titled "Increased or Decreased Quantities."
7.2.3 Failure of the District Representative to recognize a change in character of the Work at the time the approved contract change order is issued shall not be construed as relieving the Contractor of the duty and responsibility of filing a written protest within the fifteen (15) day limit as provided in the paragraph titled "Procedure and Protest."

7.3 Extra Work. New and unforeseen Work will be classed as Extra Work when determined by the District Representative that such Work is not covered by any of the various items for which there is a bid price or by combinations of such items. In the event portions of such Work are determined by the District Representative to be covered by some of the various items for which there is a bid price or combinations of such items, the remaining portion of such Work will be classed as Extra Work. Extra Work also includes Work specifically designated as Extra Work in the Plans or Specifications. The Contractor shall do such Extra Work and furnish labor, material, and equipment thereof upon receipt of an approved contract Change Order or other written order of the District Representative, and in the absence of such approved contract Change Order or other written order of the District Representative, he shall not be entitled to payment for such Extra Work. Payment for Extra Work required to be performed pursuant to the provisions in this Section, in the absence of an executed contract Change Order, will be made by force account; or as agreed to by the Contractor and the District Representative.

7.4 Contract Price Adjustments. Contract price adjustments for Work covered by an authorized Change Order shall be made as follows:
7.4.1 Compensation shall be computed on the basis of one or more of the following:
7.4.1.1 Unit prices, as shown on the Bid Proposal; or
7.4.1.2 Lump sum, as agreed upon by District and Contractor based on the estimated cost of the extra Work, plus a “fixed fee”, as follows:
(a) The estimated cost is the sum of the following:
(b) Labor - Gross wages or salaries (including authorized overtime) of Contractor and/or subcontractor employees directly employed on the Extra Work.
(c) Labor Fringe Benefits - Additional direct labor expenses of workers (i.e., health & welfare, pension, vacation/holidays and training, and all benefits required by collective bargaining agreements).
(d) Labor Surcharge - Additional Social Security and unemployment taxes as required by State and Federal laws (maximum 11.95% allowed).
(e) Materials - Contractor furnished materials permanently incorporated by the Extra Work (including sales tax). Contractor shall not gain from District furnished materials.
(f) Miscellaneous - Specialized tools, appliances, implements, utilities, royalties, permits, inspections, fees, etc., exclusive to the Extra Work.
(g) Equipment - On site equipment and rental equipment used in the Extra Work.
(h) Bonds - Costs to cover additional payment and performance bond charges (maximum 1% allowed).
7.4.1.3 The "fixed fee" shall be a percentage of the estimated costs and shall constitute full compensation for all costs and expenses not listed above. These charges for overhead and profit

shall not exceed the following:
(a) Twenty percent (20%) of the estimated cost of labor.
(b) Fifteen percent (15%) of the estimated cost of materials and miscellaneous costs.
(c) Ten percent (10%) of the estimated cost of owned or rented equipment.
7.4.1.4 The limits upon overhead and profit shall be as follows:
(a) Overhead and profit for Contractor or any subcontractor who has the Work performed by a subcontractor or second tier subcontractor shall not exceed five percent (5%) of the extra work cost.
(b) Overhead and profit for all contract tiers shall never exceed fifteen percent (15%) of the actual extra work.
(c) The responsibility of distributing Extra Work overhead and profit among contractor tiers rest solely with Contractor.
7.4.1.5 Time and Materials, as observed and agreed upon, on a daily basis by District Representative and Contractor for labor, materials and equipment used to accomplish the Extra Work. A daily log of such shall be signed by both parties and will be the basis for a subsequent Change Order. District Representative's determination of allowable costs shall be final and binding.
7.4.1.6 For Work deleted, the reduction in the Contract price shall be computed as follows:
(a) Unit price(s).
(b) A lump sum agreed upon by Contractor and District Representative based on the estimated cost of the deleted Work. No fixed fee shall be added to the estimated cost.
(c) If the parties are unable to agree on the reduction in the Contract price, District Representative shall make a final and binding determination of the reduction in price based upon the estimated cost savings to Contractor.

7.5 Contract Time Adjustments. Adjustments in time allowed for completion of the Work due to change orders shall be made by in consultation between the parties. If the parties are unable to agree on the time extension or reduction, District Representative shall make a final and binding determination of the time extension or reduction allowed for the change.

7.6 Claims for Extras. If Contractor claims that any instructions received from District involve extra cost or time, Contractor shall give District Representative written claim for Extra Work before further proceeding with the Work. No oral statements of any person whosoever shall in any manner or degree modify or otherwise affect the terms of this Contract.

ARTICLE EIGHT

TERMINATION OF THE CONTRACT

8.1 Termination for Default and Acts of Nature.
8.1.1 *Grounds*. District may terminate this Contract for any of the following causes of Default or Acts of Nature:
(a) Contractor breaches any provision of the Contract.
(b) Contractor makes an assignment to creditors.
(c) Contractor files for bankruptcy.
(d) A receiver is appointed due to Contractor's insolvency.
(e) In the sole opinion of District Representative, Contractor fails to supply adequate or proper

workers, materials, tools or equipment.
(f) Contractor disregards written instructions from District Representative.
(g) In the sole opinion of District Representative, Contractor refuses or fails to prosecute the Work with the diligence that assures completion of Work within the contracted time period.
(h) The Work is damaged by Act of God as provided for herein.
8.1.2 *Notice*. District shall give Contractor and its sureties written notice when grounds for termination by Default exist. The notice shall set forth the nature of the Default and the time allowed for correction thereof. Contractor's right to do the Work shall automatically terminate if the Default is not corrected within the set time.
8.1.3 *District's Remedies*. Upon termination, District may either require Contractor's sureties to complete the Work or take over the Work and/or employ another contractor to complete the Work.
8.1.4 *Payment after Termination*. If District terminates Contractor for Default, Contractor shall not receive any payment before the entire Work is complete and accepted by District Representative. District may assume and finish the Work or hire another contractor to finish the Work. District will pay Contractor any monies of the Contract (less retention) that remain after deducting for all damages and the full cost of finishing the Work plus liquidated damages of ten percent (10%) of said cost, the actual damages to District being difficult to fully ascertain, and the parties hereby agree that this is a fair and reasonable estimation thereof. Contractor and/or Contractor's sureties shall be liable to District for all damages and costs, plus the additional ten percent (10%) of damages and costs exceeding the Contract price.
8.1.5 *No Waiver*. Actions pursuant to this paragraph shall not waive, prejudice, or in any way diminish or limit such other rights or remedies as District may have in law or equity.

8.2 Contractor's Abandonment. Contractor's abandonment or failure to supply sufficient material or workers to conduct the Work for a period of more than three (3) Working Days after receipt of written notification from District of such failure shall be grounds for termination of Contractor's control of the Work. District may thereafter assume control of the Work and charge Contractor any and all costs and expenses for the finishing of the Work. The withholding of payments, the application of such to the completion of the Work, the payment of liquidated damages and penalties, and any further payment due Contractor shall be as set forth herein.

8.3 Abandonment.
8.3.1 *District's Right*. District has the right to abandon or indefinitely postpone any part or the entirety of the Contract at any time. District Representative will give Contractor written notice of abandonment specifying the extent and date of termination.
8.3.2 *Contractor's Obligation*. Unless otherwise directed in writing by District Representative, Contractor shall after receipt of Notice of Abandonment:
(a) Stop work under the Contract to the extent and date specified;
(b) Place no further orders for materials, services, or facilities except as required to complete the Work not abandoned;
(c) Terminate and settle all orders and subcontracts that relate to the Work abandoned;
(d) Settle all outstanding liabilities and claims arising out of abandonment to the satisfaction of District Representative;
(e) Transfer title to District and deliver as directed by District Representative: all fabricated or un-fabricated parts, works in process or complete, supplies, and all other materials produced or acquired in connection with the Work abandoned; and complete or partly complete plans, drawings, information, and all other property required to be furnished to District;

(f) Complete the Work not abandoned;
(g) Protect and preserve property related to this Contract in the possession of Contractor which District has or may acquire; and
(h) Submit an application for final payment to District Representative.
8.3.3 *Payment.* District Representative shall issue payment to Contractor for all work performed and materials provided plus any retention withheld up to the effective date of abandonment. Payment shall constitute the full amount due Contractor by District.

Exhibit 1
LABOR AND MATERIALS PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: That_____ as Principal, hereinafter called Contractor, and _____ as Surety or Sureties, hereinafter called Surety, are held firmly bound unto the Midpeninsula Regional Open Space District, hereinafter called Obligee, for the use and benefit of all persons and laborers of every class performing any work or labor upon or bestowing skill or other necessary services or furnishing materials, provisions, provender or other supplies to be used or consumed in, or furnishing equipment or power contributing to the work described in the agreement hereinafter mentioned, or in any alteration, modification or extension thereof, which persons and laborers are hereinafter called Claimants, in the amount of (spell amount)_____ ($), for which payment, well and truly to be made, Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, a certain written Agreement, dated _____, 20___was made and executed by and between the Obligee, as Owner, and Contractor, which agreement is hereinafter called the Contract and is by reference made a part hereof.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall promptly make payment to all Claimants for all labor and material used or reasonably required for use in the performance of the Contract, or any alteration, modification or extension thereof, whether the Contract, or any alteration, modification or extension thereof, is determined to be void, voidable, or otherwise, or for any amount due under the Unemployment Insurance Act of the State of California with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the California Franchise Tax Board from the wages of employees of the Contractor and/or any and all subcontractors pursuant to California Revenue and Taxation Code Section 18806 with respect to such work or labor, then this obligation shall be void; otherwise, it shall be and remain in full force and effect.

The Contractor and Surety hereby jointly and severally agree with the Obligee that every Claimant who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last said Claimant's work or labor was done or performed or materials were furnished by such Claimant, may sue on this bond for the use of such Claimant, prosecute the suit to final judgment for such sum or sums as may be justly due Claimant, and have execution thereon. The Obligee shall not be liable for payment of any costs or expenses of any such suit. No suit or action shall be commenced hereunder by any Claimant:

1. Unless Claimant, other than a Claimant having a direct contract with the Contractor, shall have given written notice to any two of the following: The Contractor, the Obligee or the Surety, within ninety (90) days after such Claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials where furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered or certified mail, postage prepaid, in an envelope addressed to the Contractor, Obligee, or Surety, at any place where its office is regularly maintained for the transaction of business, or by personal service.

2. After the expiration of seven months from the date of recordation of a Notice of Completion or Notice of Cessation if such notice is recorded pursuant to Civil Code Sections 3092 or 3093; or, if no such Notice of Completion or Notice of Cessation is recorded, after nine months from the date of completion or cessation of the work.

The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith herewith, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claims for the amount of such lien be presented under and against this bond.
It is further expressly covenanted and agreed that in the event that more than one Surety is obligated hereunder, then, in that event, the co-Sureties bind themselves in the above stated sum only to the extent of the amount set forth

opposite each Surety's name in Appendix A to this bond, which Appendix A is attached hereto and by this reference made a part hereof.

IN WITNESS WHEREOF, the Contractor and the Surety or Sureties have hereunto signed their names this _____day of _____, 20___.

_____	_____
Contractor Name	Surety
_____	_____
Contractor Signature	Attorney-in-Fact

Exhibit 2
PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: That_____ as Principal, hereinafter called Contractor, and _____ as Surety of Sureties, hereinafter called Surety, are held firmly bound unto the Midpeninsula Regional Open Space District, as Obligee, herein after called District, in the sum of _____ ($_____), for which payment Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, a certain written Agreement, dated _____, 20___, was made and executed by and between the District, as Owner and Contractor, which agreement is hereinafter called the Contract and is by reference made a part hereof.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall well and faithfully keep and perform all the covenants and agreements of Contract, and all alterations, modifications, and extensions thereof, by the Contractor to be kept and performed, and shall fully complete all of the work described in the Contract, and all alterations, modifications, and extensions thereof, and shall save and hold harmless the district from any and all loss of damage arising out of the failure of the Contractor and/or any and all subcontractors, to fulfill the Contract, and all alterations, modifications and extensions thereof, and shall fully reimburse and pay to the District all outlay and costs which the District may incur in making good any default of the Contractor and/or subcontractors, and in replacing and/or making good any defective material or faulty material or workmanship in the work of the contractor and/or any and all subcontractors, which may be discovered within one year subsequent to the completion and acceptance of the work provided for in the contract, then the above obligation shall be void; otherwise, it shall be and remain in full force and effect.

It is expressly covenanted and agreed by and between the Contractor and the Surety that the liability of the Contractor and the Surety shall at all ties, and under all circumstances, be co-extensive, and that the Surety shall not be discharged, released or exonerated from liability under this bond, in whole or in part, by an alteration and/or modification of the contract, whether notice hereof is given the Surety or not, and that the surety shall be bound thereby, and also bound by any departure or deviation on the part of the District from the terms of the Contract.

It is further expressly covenanted and agreed that in the event that more than one Surety is obligated hereunder, then, in that event, the co-Sureties, bind themselves in the above stated sum “jointly and severally” as well as “severally” only for the purpose of allowing a joint action or actions against any or all of them, and for all other purposes each Surety binds itself, jointly and severally with the Contractors for the payment of such above stated sum only to the extend of the amount set forth opposite the Surety’s name in Appendix A to the bond, which Appendix A is attached hereto and by this reference made a part hereof.

No change or alteration or modification of the Contract or of the work required thereunder shall release or exonerate any Surety or Sureties on the bond. This bond shall remain in full force and effect notwithstanding that the contract or any applicable law or statute of the State of California shall be held to be invalid.

IN WITNESS WHEREOF, the Contractor and the Surety or Sureties have hereunto signed their names this

_____ day of _____, 20___.

_____	_____
Contractor	Surety
_____	_____
Signature	Attorney-in-Fact

Exhibit 3
WORKERS' COMPENSATION CERTIFICATE
Labor Code Section 1861

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

_____
Signature

_____
Date

Exhibit 4
PROPOSED CHANGE ORDER REQUEST TEMPLATE

Proposed Change Order No._____

Project _____

Contactor _____ ***Date of Issue*** _____

The following Change is being considered for the Project. Contractor shall quote on this "Proposed Change Order" form, a proposed amendment to the Contract Price and to the Contract Term which would be required if the District were to order the proposed Change. **THIS DOCUMENT IS NOT AN ORDER FOR CHANGES TO THE CONTRACT.**

Describe Change here and "as per attached description" if necessary.

_____
District Representative

Exhibit 5
CHANGE ORDER TEMPLATE

Change Order No. ___

Project _____

Purchase Order No. _____

Contactor _____ ***Date of Issue*** _____

Contractor is directed to, and hereby agrees to, proceed promptly with the specific changes to the Work attached hereto and incorporated herein, in conformity with the Contract Documents:

The ADDITIONAL CHARGE or DEDUCTION (circle one) for the above work is	$	
The original Contract Sum was	$	
Net change by previous Change Orders	$	
The Contract Sum prior to this Change Order was	$	
The Contract Sum will be (increased) (decreased) (unchanged) by	$	
The new Contract Sum including this Change Order will be	$	
The Contract Time will be (increased) (decreased) (unchanged) by		cal.days
The Completion Date as of the date of this Change Order is		

_____ Date: _____
Contractor

_____ Date: _____
District Representative

D.3 SUPPLEMENTAL CONDITIONS
Of the Agreement

Bear Creek Redwoods Public Access Project

Bear Creek Redwoods Open Space Preserve
Santa Clara County, California

Date: March 7, 2018

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SUPPLEMENTAL CONDITIONS
Of the Agreement

Bear Creek Redwoods Public Access Project

ARTICLE ONE

GENERAL PROJECT INFORMATION

A. General

These Supplemental Conditions provide project-specific supplementary information and Supplemental Conditions to the General Conditions of the Agreement. These Supplemental Conditions are Contract Documents and address site specific factors relevant to execution of the Work for the Bear Creek Redwoods Public Access Project ("Project"). These Supplemental Conditions shall supersede any conflicting General Conditions. Where a portion of the General Conditions is altered by these Supplemental Conditions, the unaltered portions of the General Conditions shall remain in effect. Under no circumstances does the information herein override any of the Terms and Conditions set forth in the Agreement, nor alleviate the Contractor from executing the work in strict conformance with the Contract Documents.

B. Project Description

The purpose of this project is to provide construction services for the installation of public access improvement projects within the Bear Creek Redwoods Open Space Preserve ("Preserve"), as fully described within the Contract Documents. Refer to Location Map, Exhibit 6. Protected species are active in this region. The District will provide the contractor training on site to help the contractor avoid any potential interaction with protected species, as further described below in Article Four, paragraph J.

C. Site Information

Environmental Compliance The potential environmental impacts for the proposed work within the Public Access Project were evaluated in the Draft Environmental Impact Report (DEIR) for the Bear Creek Redwoods Preserve Plan prepared under California Environmental Quality Act (CEQA). Refer to Exhibit 7 for the Summary of Impacts and Mitigation Measures from the DEIR. The Contractor will be required to complete all work in strict compliance with the DEIR Mitigation Measures. No change orders will be considered by the District for minor work stoppages necessary to remove species. The contractor should incorporate the costs of any delays into the base bid.

Site Utilities: There are no live electrical services at the project site. Water is available for contractor use at Midpen gate BC01. Contractor shall supply and install a water meter and submit usage to the District at the end of each month. The Contractor shall be responsible for providing all water on site for dust control. The Contractor shall provide temporary bathroom facilities throughout the project duration for each work area. Contractor shall be responsible for providing any temporary electrical service. There is no LAN line telephone service at the site. Cellular service may be limited, dependent upon location on site and contractor's cellular service provider.

Access: Access to all work areas is most directly available from Midpen gate BC12 directly from Hwy 17 south. See Exhibit 6 for details. The work sites are accessible for car and pickup trucks via Bear Creek Road through gate BC04; however, trailers greater than 30' in length are not allowed on Bear Creek Road.

The Webb Creek Bridge site is accessed from Midpen gate BC09, approximately one mile up Bear Creek Road from the parking area site. Site access is an unimproved dirt road with steep grades.

The retaining wall work site and Road 300 are accessed through Midpen gate BC05 from Bear Creek Road off Highway 17.

Road 304 is accessed directly from Bear Creek Road approximately ½ mile up the road from BC09.

All construction traffic exiting gate BC12 onto southbound Hwy 17 must use Summit Road to turnaround for northbound access. No vehicles associated with the project may turn left prior to Summit Road.

The contractor is responsible for site security at all times and must ensure the public does not access the site through any of the access gates. This could require staffing the gates during deliveries.

ARTICLE TWO

CONTRACT DOCUMENTS

A. Supplemental Conditions.

All conditions set forth herein, and all Exhibits attached hereto, are part of the Contract Documents.

ARTICLE THREE

DISTRICT GENERAL REQUIREMENTS

A. District Representative: The District Representative designated for all correspondence and coordination regarding this Contract is the District Project Manager, Matt Brunnings, 330 Distel Circle, Los Altos CA. 650-691-1200.

B. Public Involvement. The Contractor is not required to communicate with the public. The Contractor shall not discuss the work with the public except when coordinated and approved by the District Representative. Although there is a public trail nearby, the public is not allowed within the work site. The Contractor shall conduct operations in a manner such that public access is not facilitated. Should the public enter the site or attempt to access the site, Contractor shall immediately notify District Dispatch, and the District Representative.

C. Communications. The Contractor shall not make available, or publicly disclose, any data or report unless provided herein or specifically authorized by the District Representative. If any person or entity requests information from the Contractor about the subject of this scope of work or work being conducted hereunder, the Contractor shall refer them to the District Representative. All reports and other information generated under this scope of work shall become the property of the District and distribution to any other source by the Contractor is prohibited unless authorized by the District Representative.

D. District, Inspections and Monitoring. District will be providing environmental monitoring on site as further described below in Article Four paragraph J. Contractor shall provide access to, and coordinate with all District consultants, monitors and inspectors.

ARTICLE FOUR

CONTRACTOR'S PERFORMANCE OF THE WORK

A. Emergency Contact Information. In the event of an emergency, Contractor shall dial 911 or the 24-hour ranger dispatch number at 650-968-4411. Note that cell phone reception may be limited in the Preserve.

B. Noise Control. Contractor shall be aware that they are working in an area that is extremely quiet. Noise travels far due to no background noises, and can appear amplified. Contractor shall adhere to local noise ordinance requirements.

C. Herbicide. No herbicide use is permitted for this Project.

D. Access. Access to construction site is along narrow mountainous windy roads, as described in Article One, paragraph C. Contractor shall ensure he/she has confirmed that all materials & equipment planned for use on the project can be transported safely to the site, and that all permits, safety procedures, and regulatory compliance has been met for transport of material and equipment to the site.

E. Site Access– Emergency response. Contractor shall ensure their site logistics plans, project execution plans, and all their operations on site take into account the need for emergency response access to the site.

F. Site Security - Trespassing & Vandalism. Contractor shall be responsible for adequately securing all their materials and equipment on site. The District assumes no responsibility for any loss or damage to Contractor property.

G. Fire Prevention – The site is surrounded by open space lands that have the potential to be a wildfire hazard. Contractor shall not engage in any activities that pose a fire threat. In addition, if requested, Contractor shall agree to meet with responding fire agencies (Cal Fire) to ensure they have incorporated all appropriate fire prevention measures (locations of fire extinguishers; activities requiring fire watch, etc.). ***No smoking is allowed*** on site, nor on any of the District preserve lands surrounding the site.

H. Working Hours. Regular working hours shall consist of a 10-hour period, between 07:00 and 17:00, Monday through Friday, excluding Government holidays. The County of Santa Clara requires a start time no earlier than 07:00. The Contractor may arrive on site earlier, set up, and prepare for work, but the actual start of work at the site cannot commence until 07:00 hours.

I. Contractor Personnel, Subcontractors, Vendors, Deliveries (personnel). All personnel entering or leaving the site shall adhere to the following:

i. Contractor shall have a responsible, single point of contact for the project at all times. This person needs to be onsite at least three (3) days per week and be able to represent the contractor on issues that arise during construction. This person shall be designated at the start of the project and any replacement needs to be approved by the District.
ii. All personnel shall be made aware of site access conditions and abide with all applicable vehicle operation and safety requirements.
iii. Any traffic accidents shall be reported immediately.
iv. **All personnel who will be working at or accessing the site must attend a Worker Education Seminar, which will be delivered onsite by qualified biologists.** The District will coordinate with contractor to schedule the worker education seminar.
    a. Any personnel who have not attended a worker training seminar cannot access the site unless they are escorted by another personnel who has attended the worker training seminar. No one can do any work on site without receive the Worker Training Seminar,

J. Mitigation Monitoring and Reporting Program (MMRP) (See Exhibit #7)

i. Contractor is responsible for conducting all Work in compliance with the MMRP.
ii. Contractors' schedule shall incorporate all regulatory coordination and permitting, District inspections, site assessments, sampling and clearances as described in the MMRP. Contractor should be aware that some work (cutting trees for example) may be restricted at certain times of year, and the construction schedule shall incorporate these constraints. District will not entertain claims for time or cost associated with Contractors failure to address environmental constraints in the development of the Project Schedule.
iii. Any changes to the Project Schedule must be provided to the District as soon as possible and no more than four (4) hours after conditions require a change to insure the District is able to reschedule any additional monitoring, testing and/or inspection.

iv. The District Representative will coordinate closely with Contractor to provide MMRP-required inspections and pre-Work assessments and clearances.

v. The District is the "lead" agency for monitoring compliance with the MMRP.

K. Permitting Requirements. Nothing within these Supplemental Conditions shall relieve the Contractor of the responsibility to comply with applicable laws and regulations. The District will obtain applicable building permits and the Contractor shall obtain and pay for all other permits, licenses, approvals, and/or certificates required, or necessary to accomplish the work.

i. The Contractor shall submit the Waste Stream Diversion report (and tags) to Santa Clara County upon final inspection from the County and before submitting the final payment application.

L. Storm Water Compliance / SWPPP. The District shall develop and provide a SWPPP plan for the project. The Contractor is responsible for maintaining all Storm Water Pollution Prevention Plan measures, as required to ensure address drainage and erosion control. Contractor shall comply with all best management practices for storm water pollution prevention and drainage and erosion control measures. For erosion control measures associated with site work, refer to SWPPP provided by District.

M. District Construction & Demolition Waste Stream Diversion Policy (C&D WSD). The District has a C&D WSD Policy (Policy). The District Representative is responsible for ensuring that the demolition work is implemented in conformance with the Policy.

i. Waste-Stream Diversion:

The Contractor shall prepare a waste-stream diversion plan describing how all non-hazardous demolished materials will be handled. Waste-stream diversion plan (WSDP) shall list all materials that will be sent to the landfill, with an explanation of why they cannot be recycled or salvaged. Contractor shall provide receipts for all materials disposed of offsite including a certified recycling center or salvage company. Contractor is required to recycle 100% of all concrete, non-treated wood, steel, metal, and cabling. The Contractor shall submit the Waste Stream Diversion report (and tags) to Santa Clara County upon final inspection from the County and before submitting the final payment application.

N. Schedule. Contractors Schedule shall include Permitting, Submittals, and all Mitigation Monitoring Reporting requirements.

O. Meetings. The Contractor's Superintendent and/or Project Manager shall facilitate weekly Progress Update Meetings with the District Representative and District's consultants either on-site or via teleconference. Meetings shall address the following:

i. **Safety** – Contractor shall document any and all safety incidents or "near misses". Contractor shall review work that is planned to occur over the next three weeks, and prepare and discuss the proposed safety,

ii. **MMRP –** Updates regarding the mitigation requirements and monitoring.

iii. **Schedule** – Contractor shall provide an updated construction schedule that includes:

a. Overall project schedule
b. Current week
c. Two following weeks
d. Major deliveries
e. Current and potential delays
f. Inspections by District, County, or others

iv. **Work Progress** – Discuss work progress, monitoring requirements, RFI's and Change Proposals.

v. **RFIs** – Meeting attendees shall review status of any pending RFI's. The contractor shall designate which work area each RFI refers to with the letter corresponding to that work area.

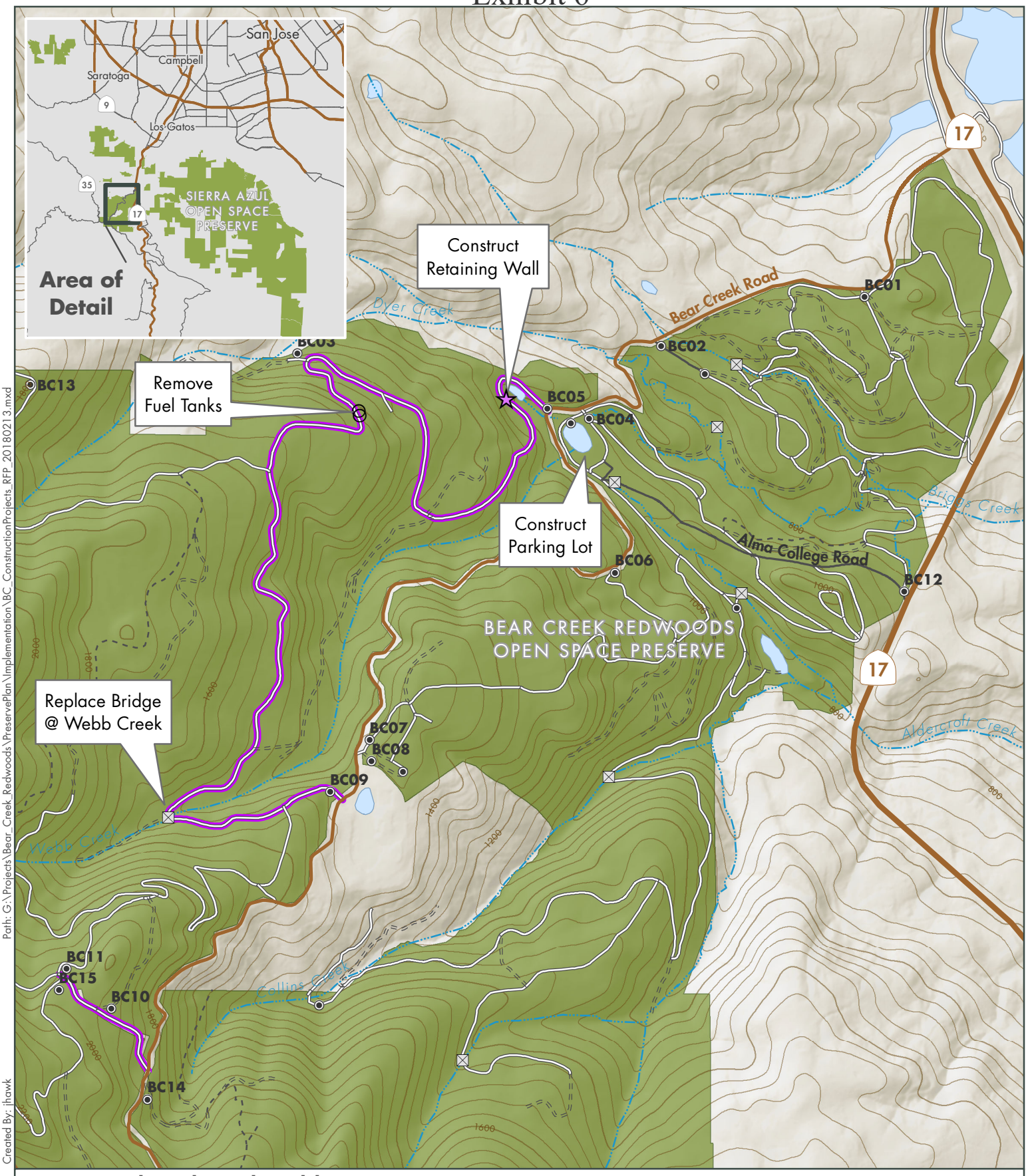
P. **Traffic Control.** The traffic control bid item includes all flaggers, signage and traffic control items required to provide safe passage through the work area for public traffic as well as safe entry and exit of the site for all construction traffic. All traffic control plans for work on Bear Creek Road must be approved by Santa Clara County. The preparation and implementation of these plans is covered under the traffic control bid item.

Q. **Phytophthora Contamination Prevention Requirements:**

i. All construction traffic shall pass through a construction entrance / exit that includes rumble strips / large angular rock ***and*** a tire wash. The tire wash may be manned or automated. All soil must be off tires prior to entrance and exit from the site.

ii. All footwear of personnel on site must be cleaned prior to and after accessing the project site. This may be accomplished with the use of a footbath mat or similar product: Either chlorine bleach or non-evaporating disinfectants are used in these footbaths and the solution is changed weekly or as needed. Chemical strips are available to test if disinfectants are still effective. Caution should be taken if footbaths and solutions are transported to avoid spills. Disinfecting footbaths and sponge mats for disinfecting shoes are available for purchase at Gemplers.com, sanistride.com, and nelsonjameson.com. At least one footbath will be required at each work area.

Exhibit 6



Bear Creek Redwoods Public Access Project

- Existing Paved Road
- Existing Unpaved Road
- Existing Trail
- Existing Unmaintained Road
- Improve Existing Road / Trail for Increased Use
- Gate
- Existing Bridge/Puncheon
- Abandoned Fuel Tank

Midpeninsula Regional Open Space District *(MROSD)*
February 2018

Miles
0 0.125 0.25

While the District strives to use the best available digital data, these data do not represent a legal survey and are merely a graphic illustration of geographic features.

Exhibit 7

1 INTRODUCTION

1.1 MITIGATION MONITORING AND REPORTING PLAN

In compliance with the State CEQA Guidelines §15097 (a), when significant effects are identified in an Environmental Impact Report (EIR) or negative declaration, the Lead Agency is required to adopt a program for reporting or monitoring mitigation measures that were adopted or made conditions of approval for the proposed project. This Mitigation Monitoring and Reporting Plan (MMRP) has been developed for the Bear Creek Redwoods Preserve Plan project, consistent with the requirements of §15097. The intent of the MMRP is to prescribe and enforce a means for properly and successfully implementing the mitigation measures identified within the EIR for this project. Unless otherwise noted, the applicant shall be responsible for complying with and paying for all mitigation measures identified herein.

1.2 COMPLIANCE CHECKLIST

The intent of the MMRP is to ensure the effective implementation and enforcement of adopted mitigation measures and permit conditions. The MMRP is intended to be used by Midpeninsula Regional Open Space District (MROSD) staff and mitigation monitoring personnel to ensure compliance with mitigation measures during project implementation. Mitigation measures identified in this MMRP were developed in the EIR prepared for the proposed project. The MMRP will provide for monitoring of construction activities as necessary and in-the-field identification and resolution of environmental concerns.

Monitoring and documenting the implementation of mitigation measures will be coordinated by MROSD. The table attached to this report identifies the mitigation measure, the responsible agency for the monitoring action, and timing of the monitoring action. MROSD will be responsible for fully understanding and effectively implementing the mitigation measures contained within the MMRP and for ensuring compliance.

1.2.1 Mitigation Monitoring and Reporting Plan

The following table indicates the mitigation measure number, the mitigation measure text, the monitoring agency, implementation timing, and an area to record monitoring compliance. Note that changes made since the Draft EIR was released to the public are identified using ~~strikethrough~~ text for deleted text and double-underline text for added text.

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
4.3 Biological Resources				
Mitigation Measure 4.3-2: Implement measures to protect bat colonies.	To mitigate for activities requiring removal of roosting bats from buildings, pre-construction surveys for roosting bats within areas of potential disturbance in the Preserve will be conducted by a qualified biologist. Surveys will consist of a daytime pedestrian survey looking for evidence of bat use (e.g., guano) and/or an evening emergence survey to note the presence or absence of bats. The type of survey will depend on the condition of the buildings. If no bat roosts are found, then no further study is required. If evidence of bat use is observed, the number and species of bats using the roost will be determined. Bat detectors may be used to supplement survey efforts, but are not required. If roosts of Townsend's big-eared bats, pallid bats, or western red bats are determined to be present and must be removed, the bats will be excluded from the roosting site before the facility is removed. A program addressing compensation, exclusion methods, and roost removal procedures will be developed in consultation with CDFW before implementation. Exclusion methods may include use of one-way doors at roost entrances (bats may leave but not reenter), or sealing roost entrances when the site can be confirmed to contain no bats. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing young). The loss of each roost (if any) will be replaced in coordination with CDFW and may include construction and installation of bat boxes or other structures suitable to the bat species and colony size excluded from the original roosting site. Roost replacement will be implemented before bats are excluded from the original roost sites. MROSD has successfully constructed bat boxes elsewhere that have subsequently been occupied by bats. Once the replacement roosts are constructed and it is confirmed that bats are not present in the original roost site, the structures may be removed or sealed. To mitigate for removal of large trees during the April through August nursery season to tree roosting bats: ◢ Avoid removal of trees greater than 16 inches in diameter at breast height (dbh) during the April through August nursery season when possible. ◢ If removal of trees greater than 16 inches dbh during the April through August nursery season cannot be avoided, a qualified biologist will conduct surveys for roosting bats where suitable large trees are to be removed. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats (e.g., guano), and if determined necessary, evening emergence surveys to note the presence or absence of bats. If evidence of roosting bats is found, the number and species of roosting bats will be determined. If no evidence of bat roosts is found, then no further study will be required.	MROSD CDFW, as appropriate	Prior to demolition of structures and removal of large trees	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
	If bat roosting sites are located in trees to be removed during the nursery season, no nursey sites will be disturbed until a qualified biologist confirms that there are no lactating females and that young are fully independent of flight and thermoregulation. If a non-nursery bat roost is to be removed, a roost removal plan shall be prepared and submitted to CDFW. The roost removal plan will describe the method of exclusion of bats from the roost. Possible methods include installation of one-way doors or sealing roost entrances for bats that roost within tree cavities. Netting or other methods may be used to prevent bats from roosting within vegetation. No bats will be excluded until the plan is approved by CDFW and alternative roosting habitat is available. The bats will be excluded from the roosting site before the site is closed.			
Mitigation Measure 4.3-3a: Implement measures to protect special-status amphibians and western pond turtle.	MROSD shall implement the following measures during construction within suitable habitat for special-status amphibians: ◢ Construction within or adjacent to waterways will be avoided during the breeding season for California red-legged frog and foothill yellow-legged frog (November – March) and western pond turtle (May – mid-July). If construction cannot be avoided within or adjacent to waterways during the breeding season, a qualified biologist shall conduct a pre-activity survey for California red-legged frog, foothill yellow-legged frog, Santa Cruz black salamander, California giant salamander, and western pond turtle prior to implementing actions that include ground disturbance, vegetation removal, or other activities within or adjacent to potential habitat that could otherwise harm California red-legged frog, foothill yellow-legged frog, Santa Cruz black salamander, California giant salamander, or western pond turtle. A qualified biologist shall inspect the work area while vegetation and debris is removed during the initial phase of construction. Because Santa Cruz black salamander lay and brood eggs below ground, prior to ground disturbance, rocks, logs, and other debris shall be turned over and visually inspected. If no California red-legged frog, foothill yellow-legged frog, Santa Cruz black salamander, California giant salamander, or western pond turtle are observed during either the pre-activity survey or during removal of vegetation and debris, then work may proceed without a qualified biologist present. If any of these sensitive species are observed at any time before or during construction within the work area by anyone involved in the project, work shall cease and USFWS and/or CDFW shall be contacted. Measures to avoid and minimize disturbance to sensitive reptiles and amphibians shall be implemented and may include delaying the disturbance until after eggs or larvae have metamorphosed, redesigning the project footprint to avoid the species, moving individuals to areas of suitable habitat outside of the disturbance area, or other feasible measures acceptable to the wildlife agencies. ◢ <u>The loss of western pond turtle breeding habitat due to development of the Alma College parking area will be replaced at a 1:1 ratio. If it is determined that the full</u>	MROSD CDFW, as appropriate USFWS, as appropriate	Prior to and during construction	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
	amount of replacement breeding habitat cannot all feasibly be located at Upper Lake, the remainder of the replacement breeding habitat will be located at Lower Lake, which also supports western pond turtle. The replacement breeding habitat will be located within 300 feet of the pond's ordinary high water mark and will be designed to avoid adverse effects to native plant communities and other sensitive species habitat. The replacement habitat will be located away from areas that attract concentrated visitor use, or trail use will be limited as necessary during breeding periods. Design of the replacement breeding habitat, as well as a maintenance and monitoring plan to control encroachment of brush, invasive species, and manage visitor access, will be prepared by a qualified biologist in consultation with the CDFW. The maintenance and monitoring plan will also include baseline population surveys and ongoing population and breeding habitat monitoring.			
Mitigation Measure 4.3-3b: Implement measures to protect nesting birds.	To minimize potential disturbance to nesting birds, project activities shall occur during the non-breeding season (September 16 through February 14), unless it is not feasible to do so, in which case the following measures shall be applied: ◢ During trail construction, road improvements, and other construction activities, removal of trees greater than 6 inches dbh shall be limited to the greatest degree possible. ◢ If construction activity is scheduled to occur during the nesting season (February 15 to September 15), a qualified biologist shall conduct pre-construction surveys to identify active nests that could be affected by construction. The surveys shall be conducted before the approval of grading and/or improvement plans and no less than 14 days and no more than 30 days before the beginning of construction in a particular area. If no nests are found, no further measures are needed. ◢ If active nests are found, impacts on nesting birds shall be avoided by establishment of appropriate buffers around the nests. No project activity shall commence within the buffer area until a qualified biologist confirms that any young have fledged or the nest is no longer active. A 500-foot buffer for large raptors such as buteos, 250-foot buffer for small raptors such as accipiters, and 250-foot for passerines are generally adequate to protect them from disturbance, but the size of the buffer may be adjusted by a qualified biologist in consultation with CDFW depending on site-specific conditions. For trail construction, use of non-power hand-tools may be permitted within the buffer area if the behavior of the nesting birds would not be altered as a result of the construction. Monitoring of the nest by a qualified biologist during and after construction activities will be required if the activity has potential to adversely affect the nest.	MROSD CDFW, as appropriate	Prior to and during construction	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
Mitigation Measure 4.3-3c: Implement measures to protect San Francisco dusky-footed woodrat.	To minimize potential disturbance to San Francisco dusky-footed woodrat, the following measures will be implemented: ◢ Prior to removal of any buildings or vegetation within riparian, oak woodland, montane hardwood, or coastal scrub, redwood or Douglas fir forests, a qualified biologist will conduct a survey for woodrat nests within the area to be disturbed. If no woodrat nests are found, no further measures are necessary. ◢ If woodrat nests are found, they should be avoided if possible and a minimum buffer of 10 feet shall be established around the nest(s). This buffer may be adjusted in consultation with CDFW. ◢ If the nests cannot be avoided, MROSD will consult with CDFW in areas where removal of San Francisco dusky-footed woodrat nests is required. Consultation will occur prior to removal of the nests. Actions needed to protect woodrat nests will be determined in consultation with CDFW and may include the live capture and relocation of woodrats to suitable adjacent habitats and removal of nesting sites. Trapping activities will occur prior to April and after July each year to prevent impacts to woodrats rearing young or young woodrats. Nest middens will be dismantled by hand under the supervision of a biologist. Nest material will be moved to suitable adjacent areas that will not be disturbed. As woodrats exhibit high site fidelity, buildings with previous woodrat nests will be regularly inspected for potential intrusion to prevent infestation.	MROSD CDFW, as appropriate	Prior to and during vegetation or structure removal, as specified	
Mitigation Measure 4.3-3d: Implement measures to protect ringtail.	If any trees that are 6 inches or greater in dbh need to be removed, MROSD and its contractors shall implement the following measures to protect ringtail: ◢ A qualified biologist will conduct pre-construction surveys to identify any potential ringtail den sites. If no den sites are identified, no further measures are needed. ◢ If a ringtail den site is identified, it will not be removed from May through August. The den site may be removed or sealed from September through April. A qualified biologist will verify the den is not occupied immediately prior to removing or sealing the den.	MROSD	Prior to removal of trees 6 inches dbh or greater	
Mitigation Measure 4.3-4: Avoid and minimize impacts to sensitive natural communities and compensate for loss of riparian and wetland habitats.	MROSD will seek to avoid wetland impacts through siting, design, and other avoidance measures. However, if avoidance is not possible, MROSD will review its Routine Maintenance Agreements with CDFW and the RWQCB to determine if the proposed activities are covered by these permits. If so, MROSD will comply with the terms of these existing agreements. If MROSD determines that one or more activities are not covered by existing permits, a jurisdictional wetland delineation will be conducted by a qualified wetland specialist for sensitive areas that cannot be avoided. The preliminary delineation shall be submitted to USACE for verification. The wetlands may be subject to CDFW regulation under Section 1602 of	MROSD CDFW, as appropriate RWQCB, as appropriate	Prior to ground disturbing activities near wetlands or other jurisdictional waters	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
	the Fish and Game Code. No grading, fill, or other ground disturbing activities shall occur until all required permits, regulatory approvals, and permit conditions for effects on wetland habitats are secured. If the wetlands are determined to be subject to USACE jurisdiction, the project may qualify for use of a Nationwide Permit if certain criteria are met. For those wetlands that cannot be avoided, MROSD shall commit to replace, restore, or enhance on a "no net loss" basis (in accordance with USACE, RWQCB, and CDFW) the acreage of all wetlands and other waters of the United States that would be removed, lost, and/or degraded with project implementation. Wetland habitat shall be restored, enhanced, and/or replaced at an acreage and location and by methods agreeable to USACE, RWQCB, and CDFW, as appropriate, depending on agency jurisdiction, and as determined during the permitting processes.	USACE, as appropriate		
Mitigation Measure 4.3-7: Remove and replace trees consistent with the Santa Clara County Tree Preservation and Removal Ordinance (County Code, Sections C16.1 to C16.17).	MROSD will comply with the requirements of the Santa Clara County Tree Preservation and Removal Ordinance as applied to parcels greater than 3 acres in lands zoned HS and as applied to trees located within County right-of-way. For removal of large ~~oak~~ trees, MROSD will replace each of the redwood trees and two oak trees ~~removed at a 3:1 ratio with 15-gallon trees, in-kind, or other ratio~~ as approved by the County and in compliance with current best management practices to prevent the spread of soil pathogens. MROSD will maintain each of the replacement trees.	MROSD Santa Clara County	Prior to removal of large trees	
4.4 Cultural Resources				
Mitigation Measure 4.4-2: Document historic buildings prior to removal.	The Preserve Plan includes documentation of buildings before demolition; however, because the buildings are considered historical resources, a higher level of documentation is necessary. MROSD will complete documentation of the classroom building, 1950 library, utility garage, and 1934 library, prior to any construction/demolition work initiated at these buildings. Documentation shall consist of a written history of the property and drawings and photographs, as described below. ◢ Written History. The Knapp Architects report, *Alma College Conditions Assessment Project Phase I: Assessment of Existing Conditions*, shall be used for the written history of each building. The report shall be reproduced on archival bond paper. ◢ Drawings and Photographs. An architectural historian (or historical architect, as appropriate) shall conduct research into the availability of plans and drawings of the classroom building, 1950 library, utility garage, and 1934 library as the buildings currently exist.	MROSD	Prior to demolition of identified structures	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
	◤ Drawings: select existing drawings, where available, may be photographed with large-format negatives or photographically reproduced on Mylar in accordance with the U.S. Copyright Act, as amended. ◤ Photographs: photographs with large-format negatives of exterior and interior views, or historic views where available and produced in accordance with the U.S. Copyright Act, as amended The documentation shall be prepared by an architectural historian, or historical architect as appropriate, meeting the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Professional Qualification Standards. The documentation shall be submitted to the Santa Clara County Library and the Jesuit Archives in Berkeley.			
Mitigation Measure 4.4-4: Halt ground-disturbing activity.	If human remains are encountered, all work within 100 feet of the remains will cease immediately. MROSD will contact the Santa Clara County coroner to evaluate the remains and follow the procedures and protocols set forth in §15064.5(e) of the CEQA Guidelines. No further disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains will occur until the County Coroner has made a determination of origin and disposition, which will be made within two working days from the time the Coroner is notified of the discovery, pursuant to State Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98. If the remains are determined to be Native American, the Coroner will notify NAHC within 24 hours, which will determine and notify the Most Likely Descendant (MLD). The MLD may recommend within 48 hours of their notification by the NAHC the means of treating or disposing of, with appropriate dignity, the human remains and grave goods. In the event of difficulty locating a MLD or failure of the MLD to make a timely recommendation, the human remains and grave goods shall be reburied with appropriate dignity on the property in a location not subject to further subsurface disturbance.	MROSD County Coroner, as appropriate NAHC, as appropriate	During construction	
4.7 Hazards and Hazardous Materials				
Mitigation Measure 4.7-2a: Conduct a hazardous materials survey and limited Phase II investigation.	An in-depth hazardous materials survey shall be conducted to further assess the presence of hazardous materials onsite and to provide an inventory of equipment containing hazardous materials that will need to be removed and appropriately disposed. Before initiation of grading or other groundwork, MROSD will conduct focused soil sampling at the former Alma College site. This investigation will follow the American Society for Testing and Materials standards for preparation of a Phase II ESA and/or other appropriate testing guidelines. Specifically, soil and groundwater samples shall be collected in the areas of former structures near	MROSD	Prior to initiating grading or other groundwork near the former Alma College site	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
	the rear entrance to the former Alma College site (e.g., print shop, machine shop, landfill at village site, storage) and analyzed for petroleum hydrocarbons, VOCs, and priority pollutant metals. Based on the results and recommendations of the ESA-level investigation described above, MROSD shall prepare a work plan that identifies any necessary remediation activities, including excavation and removal of on-site contaminated soils, and redistribution of clean fill material on the project site. The plan shall include measures that ensure the safe transport, use, and disposal of contaminated soil removed from the site and will be implemented under the oversight of applicable regulatory agencies. These measures may include: soil profiling and identification of appropriate landfill facilities for contaminated materials and onsite application locations for other soils, plans for stockpile of soil that segregates clean and potentially contaminated materials, preparation of a health and safety plan for protection of workers, and preparation of a transportation plan that identifies approved haul routes for transport of contaminated materials.			
Mitigation Measure 4.7-2b: Conduct a geophysical survey in the suspected locations of USTs.	A geophysical survey shall be conducted at the former Alma College site to confirm the presence or absence of additional underground structures and to determine the extent of associated piping, primarily in the suspected locations of additional USTs (south of the dormitory/plant building, downslope from the pool/Roman Plunge, and south of the former main house). Soil and/or groundwater sampling shall be conducted in the vicinity of these structures and piping to determine whether there is potential subsurface contamination. Soil and groundwater samples shall be analyzed for petroleum hydrocarbons, volatile organic compounds (VOCs), and priority pollutant metals. If the results indicate that contamination exists at levels above regulatory action standards, the site will be remediated in accordance with recommendations made by applicable regulatory agencies, including Santa Clara County DEH, RWQCB, and DTSC. The agencies involved shall depend on the type and extent of contamination.	MROSD Santa Clara County DEH, as appropriate RWQCB, as appropriate DTSC, as appropriate	Prior to ground disturbance at the former Alma College site	
Mitigation Measure 4.7-c: Notify Santa Clara County Department of Environmental Health before conducting earth work near the former Alma College underground storage tank.	MROSD shall identify the location of the former Alma College UST on maps used for planning facilities on the project site. If any earthwork or water wells are proposed on, or in the immediate vicinity of, the UST site, MROSD shall notify the Santa Clara County DEH before grading or evacuation of the site, or the installation of water wells. MROSD shall implement any actions identified by Santa Clara County DEH to mitigate the disturbance of remedial contamination. These actions may include additional sampling or preparation of a health risk assessment.	MROSD Santa Clara County DEH, as appropriate	Prior to any earthwork in the vicinity of a UST (if identified in previous mitigation measures)	

Mitigation Monitoring and Reporting Plan

Mitigation Measure	Measure Description	Monitoring Agency	Implementation Schedule	Monitoring Compliance Record (Name/Date)
Mitigation Measure 4.7-2d: Conduct sediment and surface water sampling in Mud Lake	Before opening the site to public access, MROSD shall conduct sediment and surface water sampling to determine whether historical chemical use in the lake has resulted in residual impacts. Sediment and surface water should be analyzed for petroleum hydrocarbons, VOCs, and pesticides. MROSD will coordinate with Santa Clara County DEH to determine what, if any, further actions are necessary based on the results of the water and soil sample analyses. Recommended actions may include localized removal of materials, in situ remediation actions, and limitations on public access to the site.	MROSD Santa Clara County DEH, as appropriate	Prior to opening the site to public access	
Mitigation Measure 4.7-2e: Prepare a hazardous materials contingency plan.	A hazardous materials contingency plan shall be prepared before the initiation of ground disturbing activities that describes the actions that would be taken if evidence of contaminated soil or groundwater is encountered during construction. The contingency plan shall identify conditions that could indicate potential hazardous materials contamination, including soil discoloration, petroleum or chemical odors, presence of USTs, or buried building material. The plan, and obligations to abide by and implement the plan, shall be incorporated into the construction and contract specifications of the project. If at any time during the course of constructing the proposed project evidence of soil and/or groundwater contamination with hazardous material is encountered, MROSD shall immediately stop the project and contact the CUPA. The project shall remain stopped until there is resolution of the contamination problem (through such mechanisms as soil or groundwater sampling and remediation if potentially hazardous materials are detected above threshold levels) to the satisfaction of the CUPA and RWQCB.	MROSD Santa Clara County DEH (CUPA), as appropriate RWQCB, as appropriate	Prior to initiating ground disturbing activities and during construction	
4.8 Hydrology and Water Quality				
Mitigation 4.8-5: Conduct a geologic and geotechnical investigation of the dam located on Aldercroft Creek.	Within the first five years of implementing the Preserve Plan, MROSD will conduct an in-depth geologic and geotechnical investigation of the dam at the southern end of Alma Lake on Aldercroft Creek that is suspected of being located on a trace of the San Andreas Fault. Upgrade or removal of the dam will be completed according to recommendations of the investigations, and, if necessary, use of trails in the potentially affected areas downstream of the dam will be restricted until the recommendations have been fulfilled.	MROSD	Within the first five years of implementing the Preserve Plan	

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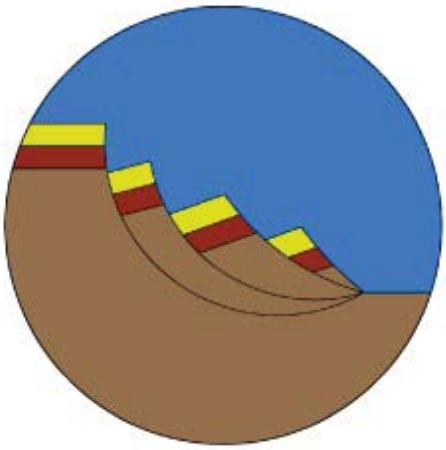
GEOTECHNICAL INVESTIGATION

Bear Creek Redwoods Roads and Trails - MP204
Los Gatos, Santa Clara County, California

Submitted to:

Waterways Consulting, Inc.
509A Swift Street
Santa Cruz, California 95060

ATTN: Matt Weld, PE



Prepared by:

CMAG ENGINEERING, INC.

Project No. 16-120-SCL
July 6, 2016

CMAG ENGINEERING, INC.

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July 6, 2016
Project No. 16-120-SCL

Waterways Consulting, Inc.
509A Swift Street
Santa Cruz, California 95060

Attn: Matt Weld, PE

SUBJECT: **GEOTECHNICAL INVESTIGATION**
Bear Creek Redwoods Roads and Trails
Soldier Pile Retaining Wall - MP204
Los Gatos, Santa Clara County, California

Dear Mr. Weld:

In accordance with your authorization, we have completed a geotechnical investigation for the subject project. This report summarizes the findings, conclusions, and recommendations from our field exploration, laboratory testing, and engineering analysis. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

CMAG ENGINEERING, INC.

Adrian L. Garner, PE, GE
Principal Engineer
C 66087, GE 2814
Expires 6/30/18

Distribution: Addressee (4 Hard Copies; Electronic Copy)

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1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed retaining wall for the repair of a shallow slope failure at MP204 in the Bear Creek Redwood Open Space Preserve in Los Gatos, Santa Clara County, California.

The purpose of our investigation was to provide information regarding the surface and subsurface soil and bedrock conditions, and based on our findings, provide geotechnical design parameters and recommendations to develop a preliminary design for the proposed retaining wall. Conclusions and recommendations related to retaining wall foundations, lateral earth pressures, backdrains, and a preliminary design are presented herein.

1.1 Terms of Reference

CMAG Engineering, Inc.'s (CMAG) scope of work for this phase of the project included site reconnaissance, subsurface exploration, soil and bedrock sampling, laboratory testing, engineering analyses, and preparation of this report.

CMAG Engineering, Inc. has been retained by Waterways Consulting, Inc. to provide geotechnical recommendations for the design and construction of a retaining wall to repair a shallow slope failure at MP204.

The recommendations contained in this report are subject to the limitations presented in Section 7.0 of this report.

1.2 Site Location

The project site is located on the north side of Bear Creek Road, and the west side of Mud Lake in the Bear Creek Redwood Open Space Preserve in Los Gatos, Santa Clara County, California. The site location is shown on the Site Location Map, Appendix A, Figure A-1.

1.3 Surface Conditions

The site is situated on a slope that descends steeply to the northeast, towards Mud Lake. The failure has occurred on the outboard edge of a road/trail at MP204. A corrugated metal culvert crosses the road at the site and has contributed to the failure of the outboard edge of the road. See Appendix A, Figure A-2 for a site map that includes topographic contours of the failure and surrounding area.

2.0 PROJECT DESCRIPTION

The project consists of constructing a retaining wall to support the outboard edge of the road and regain a portion of the shoulder that has been lost due to the failure. A new culvert is also proposed to replace the existing culvert. The new culvert is proposed to discharge further downslope that the existing culvert. The proposed wall consists of a soldier pile wall, constructed with drilled, cast-in-place concrete shafts, steel I-beams, and wood wall lagging.

3.0 FIELD EXPLORATION AND LABORATORY TESTING PROGRAMS

Our field exploration program included drilling, logging, and interval sampling of 2 borings on May 26, 2016 (Borings B-6 and B-7). The borings were advanced to depths of 28.5+ feet and 14.5+ feet below existing grades. Details of the field exploration program, including the Boring Logs, Figures A-4 and A-5, are presented in Appendix A.

Representative samples obtained during the field investigation were taken to the laboratory for testing to determine physical and engineering properties. Details of the laboratory testing program are presented in Appendix B. Test results are presented on the Boring Logs and in Appendix B.

4.0 SUBSURFACE CONDITIONS AND EARTH MATERIALS

4.1 General

The geologic map of Santa Clara County (Dibblee, 2007) depicts the subject property as underlain by the Butano Formation (Tbu; Eocene) consisting of sandstone and shale.

Two borings were advanced in the vicinity of the proposed retaining wall. The subsurface profile encountered in our field exploration consisted of artificial fill overlying sandstone bedrock within the depths explored. Complete subsurface profiles are presented on the Boring Logs, Appendix A, Figures A-4 and A-5. The boring locations are shown on the Boring Location Plan, Figure A-2. A cross section has been constructed based on the results of our field exploration. The cross section is presented on Figure A-2.

4.2 Artificial Fill - af

Fill consisting of silty sand and clasts of sandstone bedrock were encountered in Borings B-6 and B-7. The fill was very loose to loose with a maximum thickness of approximately 6.5 feet encountered in Boring B-7. The bedrock clasts were generally weakly to strongly cemented.

4.3 Butano Formation - Tbu

The bedrock generally consisted of dense to very dense, weakly to strongly cemented sandstone. The sandstone increased in relative density with depth. The rock is classified as very weak rock within the depths explored, however, auger and sampler refusal was encountered in Boring B-6 at a depth of approximately 28 feet below existing grade.

4.4 Groundwater

Groundwater was not encountered during our field exploration.

It should be noted that groundwater conditions, perched or regional, may vary with location and may fluctuate with variations in rainfall, runoff, irrigation, and other changes to the conditions existing at the time our field investigation was performed.

5.0 DISCUSSIONS AND CONCLUSIONS

The subsurface profile encountered in our field exploration consisted of loose to very loose fill overlying dense to very dense sandstone bedrock within the depths explored. The bedrock is cemented and increases in relative density with depth. Auger and sampler refusal was encountered in Boring B-6 at a depth of approximately 28 feet below existing grade.

6.0 RECOMMENDATIONS

6.1 General

Based on the results of our field investigation, laboratory testing, and engineering analysis, it is our opinion that a soldier pile retaining wall is a suitable retaining wall, from a geotechnical standpoint, to support the outboard edge of the road and regain the portion of the shoulder that has been lost due to the failure.

Waterways Consulting, Inc. has prepared a preliminary layout of the wall and based on that layout, has established preliminary wall heights. Based on the preliminary layout, two wall heights are proposed, a height of approximately 11.5 feet and a height of approximately 6.5 feet. A preliminary detail for the retaining wall is presented on Plate 1. The following sections present geotechnical recommendations for the design and construction of the wall.

6.2 Drilled, Cast-In-Place Concrete Shafts

The minimum recommended shaft diameter is 24 inches. The drilled, cast-in-place concrete shafts, should have a minimum embedment depth as outlined in Table 1.

Table 1. Drilled, Cast-In-Place Concrete Shaft Embedment Depths

Max Retained Wall Height (ft)	Minimum Embedment Depth (ft)
6.5	12
11.5	16

The estimated allowable downward axial shaft capacities for 24 inch diameter, drilled, cast-in-place, concrete shafts are presented in Table 2. The downward capacity includes the weight of the shaft.

Table 2. 18 Inch Diameter Drilled, Cast-In-Place Concrete Shaft Axial Capacities

Depth Below Wall (ft)	Allowable Downward Capacity (Kips)
12	35
16	48

A passive pressure of 400 psft/ft (equivalent fluid pressure) acting over a plane 2 times the shaft diameter, may be assumed for design purposes. Neglect passive pressure in the top 2 feet.

Difficult drilling conditions should be anticipated. The bedrock is cemented and is generally dense to very dense. Drilling equipment capable of excavating through rock should be anticipated for the construction of this project.

The drilled excavations for the cast-in-place concrete shafts should be clean, dry, and free of debris or loose soil. The drilled excavations should not deviate more than 1 percent from vertical.

Based on the results of our field exploration, caving is not anticipated during the excavation of the drilled, cast-in-place concrete shafts. If the contractor chooses to use casing, it must be pulled during the concrete pour. It must be pulled slowly with a minimum of 4 feet of casing remaining embedded within the concrete at all times. If the bottom of the holes are unable to be cleaned with conventional drilling

and hand equipment, a bucket auger should be utilized to clean the bottom of the shafts and remove all loose slough.

It is not anticipated that groundwater will present a problem during construction. However, if drilled during or shortly after the rainy season, groundwater may present a problem. If groundwater is encountered within the shafts and is unable to be pumped from the drilled excavation, a tremie will be required. The tremie must be placed to the bottom of the drilled excavation to remove all groundwater. The end of the tube must remain embedded a minimum of 4 feet into the concrete at all times. The concrete and steel design of the drilled, cast-in-place concrete shaft should be such that a tremie can be easily placed down the center of the excavation.

For drilled, cast-in-place concrete shaft depths in excess of 8 feet, concrete should be placed via a tremie. The end of the tube must remain embedded a minimum of 4 feet into the concrete at all times.

All shaft construction must be observed by the Geotechnical Engineer before steel reinforcement is placed and concrete is poured.

6.3 Lateral Earth Pressures

The following parameters for the backfill material may be used to calculate the lateral earth pressures for the retaining wall. The values presented in Table 3 are based on using the on-site sandstone, pulverized, and placed as engineered backfill. We recommend that saturated unit weights be used for the design, however, we also recommend that a backdrain be constructed behind the wall per Section 6.5.

Table 3. Geotechnical Parameters for Calculation of Lateral Earth Pressures

Active Earth Pressure K_a	Saturated Unit Weight γ_s (pcf)	Effective Friction Angle Φ' (degrees)
0.27	130	35

A surcharge pressure of 200 psf should be applied to the top of the retaining wall due to traffic loading.

6.4 Backfill

Backfill should be placed under engineering control. Backfill should be compacted to a minimum of 90 percent relative compaction and a maximum of 92 percent relative compaction, however, precautions should be taken to ensure that heavy

compaction equipment is not used immediately adjacent to walls, so as to prevent undue pressures against, and movement of, the walls.

Fill should be compacted by mechanical means in uniform horizontal loose lifts not exceeding 8 inches in thickness. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557. **The Geotechnical Engineer should observe the placement of backfill.**

The on-site soil/bedrock may be used as engineered fill. Bedrock will require pulverizing prior to use as engineered fill to meet the requirements of this section. Note: If this work is done during or soon after the rainy season, or in the spring, the soil may require significant drying prior to use as engineered fill. The fill should be verified by a representative of CMAG in the field during grading operations. All soils, both existing on-site and imported, to be used as fill, should contain less than 3 percent organics and be free of debris and gravel over 2.5 inches in maximum dimension.

6.5 Backfill Drainage

A backdrain should be provided in the backfill. Backdrains should consist of 4 inch diameter SDR 35 PVC perforated pipe or equivalent, embedded in Caltrans Class 1, Type A permeable drain rock.

The drain should be a minimum of 18 inches in width and should extend to within 12 inches from the surface. The upper 12 inches should be capped with native soils. Mirafi 180N or approved equivalent should be placed between the surface cap and the drain rock. Mirafi 180N should also be placed between the drain rock and the wood lagging. The pipe should be 4+ inches above the trench bottom; a gradient of 2+ percent being provided to the pipe and trench bottom; discharging into suitably protected outlets. See Plate 1 for the standard detail for the backdrain.

Perforations in backdrains are recommended as follows: 1/2 inch diameter, in 2 rows at the ends of a 120 degree arc, at 5 inch centers in each row, staggered between rows, placed downward.

An unobstructed outlet should be provided at the lower end of each segment of backdrain. The outlet should consist of an unperforated pipe of the same diameter, connected to the perforated pipe and extended to a protected outlet at a lower elevation on a continuous gradient of at least 1 percent.

6.6 Temporary Cut Slope

We recommend that the temporary cut slope for the construction of the retaining wall be no greater than **0.75:1 H:V** (horizontal to vertical). The excavation is considered a **temporary** excavation only. The excavation may be open without shoring for a **maximum of 30 days**. The excavation slopes must be **sprinkled with water** periodically to prevent drying and raveling of surficial soil. **A representative of our firm should be present during the excavation to observe the stability of the excavation slopes and to verify the slope angle.** A representative of our firm should visit the site a minimum of once a week after the excavation to observe the moisture condition of the soil and the stability of the excavation slopes. If any tension cracks occur at the top of the excavation during construction, our firm should be notified immediately. All work within the excavation should stop until a representative of our firm is present at the site.

6.7 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans, Foundation Plans and design loads should be reviewed by CMAG prior to submitting the plans and contract bidding. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

6.8 Observation and Testing

If additional construction is required for this project, field observation and testing must be provided by a representative of CMAG to enable them to form an opinion regarding the adequacy of the site preparation, the adequacy of fill materials, and the extent to which the earthwork is performed in accordance with the geotechnical conditions present, the requirements of the regulating agencies, the project specifications, and the recommendations presented in this report. Any earthwork performed in connection with the subject project without the full knowledge of, and not under the direct observation of CMAG will render the recommendations of this report invalid.

CMAG should be notified **at least 5 working days** prior to any site clearing or other earthwork operations on the subject project in order to observe the stripping and disposal of unsuitable materials and to ensure coordination with the grading contractor. During this period, a preconstruction meeting should be held on the site to discuss project specifications, observation and testing requirements and responsibilities, and scheduling.

7.0 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory testing, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the borings drilled during our field investigation. Variation in soil, geologic, and groundwater conditions can vary significantly between sample locations. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer and the Geologist, and revised recommendations be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The scope of our services mutually agreed upon did not include any environmental assessment or study for the presence of hazardous to toxic materials in the soil, surface water, or air, on or below or around the site. CMAG is not a mold prevention consultant; none of our services performed in connection with the proposed project are for the purpose of mold prevention. Proper implementation of the recommendations conveyed in our reports will not itself be sufficient to prevent mold from growing in or on the structures involved.

REFERENCES

American Society of Civil Engineers (2010). *Minimum Design Loads for Buildings and Other Structures*. ASCE Standard 7-10.

ASTM International (2014). *Annual Book of ASTM Standards, Section Four, Construction*. Volume 4.08, Soil and Rock (I): D 420 - D 5876.

Dibblee, T.W. Jr. (2007). *Geologic Map of the Castle Rock Quadrangle, Santa Clara and Santa Cruz Counties, California*. Santa Barbara Museum of Natural History, Dibblee Geology Center Map #DF-352, Scale 1:24000.

International Code Council (2013). *California Building Code.* Volume 2.

APPENDIX A

FIELD EXPLORATION PROGRAM

Field Exploration Procedures	Page A-1
Site Location Map	Figure A-1
Boring Location Plan and Cross Section A-A’	Figure A-2
Key to the Logs	Figures A-3.0 through A-3.2
Logs of the Borings	Figures A-4 and A-5

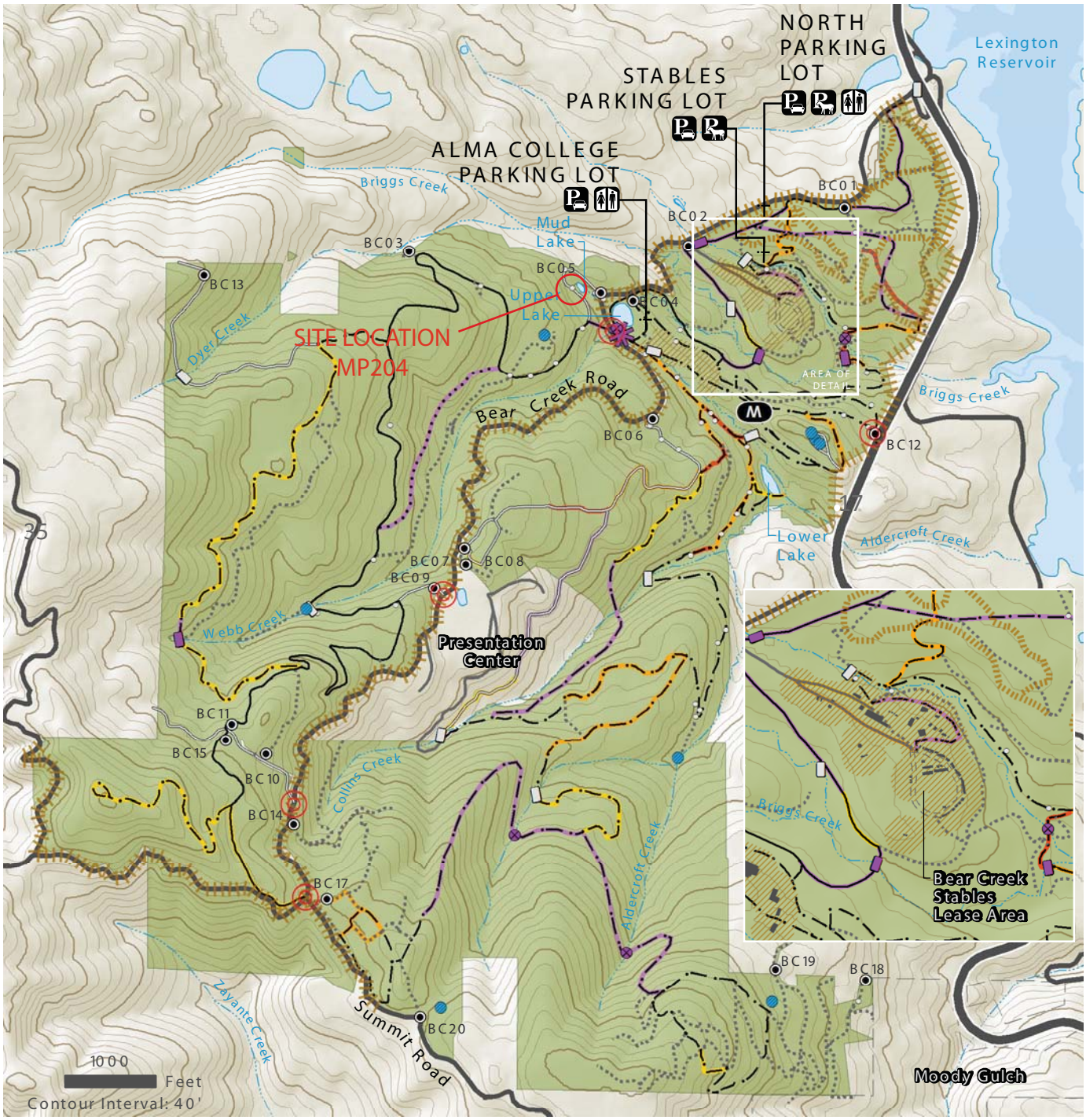
FIELD EXPLORATION PROCEDURES

Subsurface conditions were explored by drilling 2 borings to depths of 28.5± feet and 14.5± feet below the existing grades. The borings were drilled with a track mounted drill rig equipped with 6 inch diameter solid stem augers. The Key to The Logs and the Logs of the Borings are included in Appendix A, Figures A-3 through A-5. The approximate location of the borings are shown on the Boring Location Plan, Figure A-2.

The earth materials encountered in the borings were continuously logged in the field by a representative of CMAG. Bulk and relatively undisturbed samples for identification and laboratory testing were obtained in the field. These samples were classified based on field observations and laboratory tests. The soil classification is in accordance with the Unified Soil Classification System (Figure A-3.0). Rock descriptions are based on the classification systems outlined on Figures A-3.1 and A-3.2.

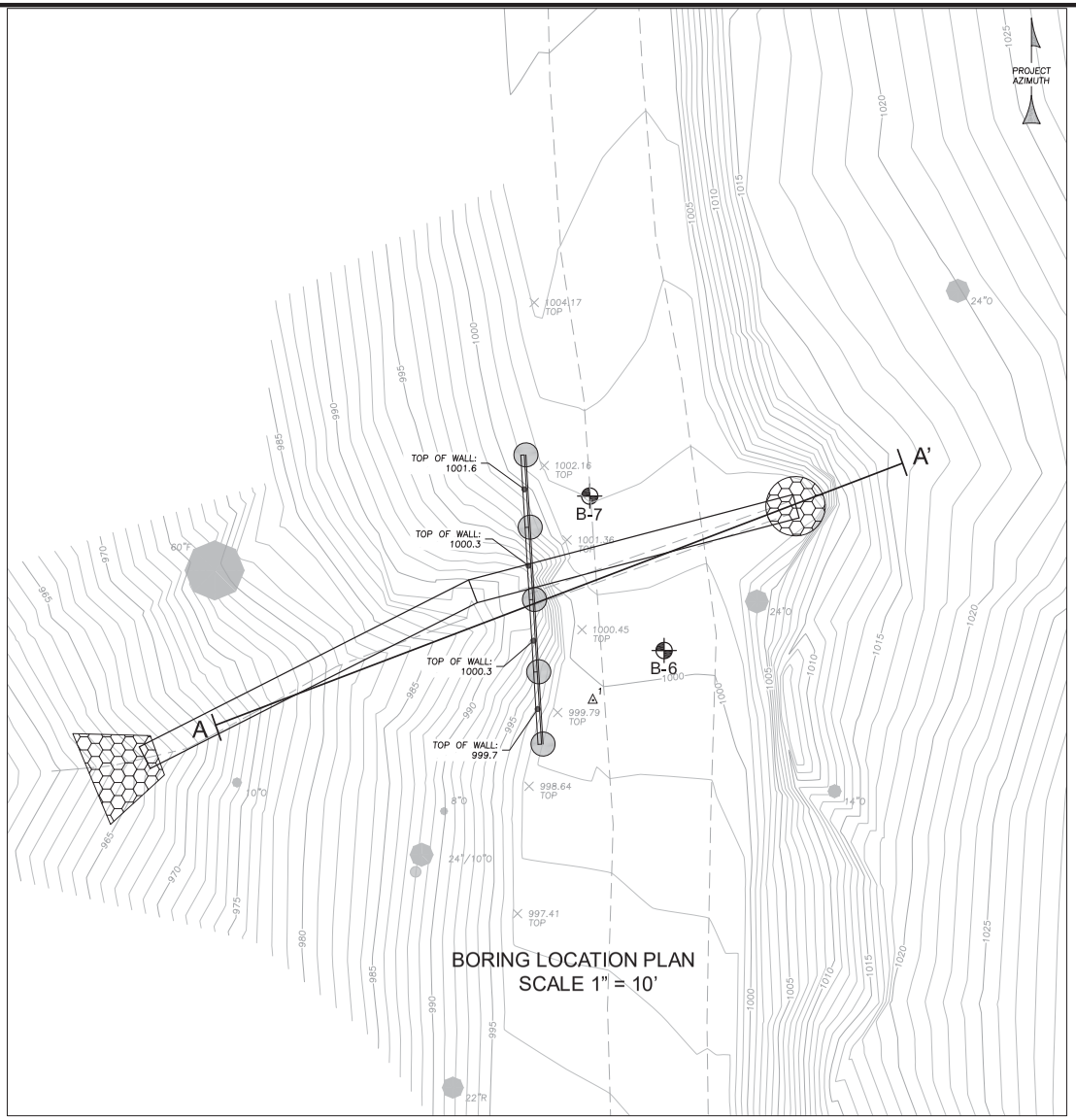
Representative samples were obtained by means of a drive sampler, the hammer weight and drop being 140 lb and 30 inches, respectively. These samples were recovered using a 3 inch outside diameter Modified California Sampler or a 2 inch outside diameter Terzaghi Sampler. The number of blows required to drive the samplers 12 inches are indicated on the Boring Logs. The penetration test data for the Terzaghi driven samples has been presented as N_{60} values. The N_{60} values are also indicated on the Boring Logs.

A representative cross section was obtained for the site. See Cross Section A-A', Figure A-2. For an explanation of the symbols and units on the cross section, see Section 4.0 of the report.



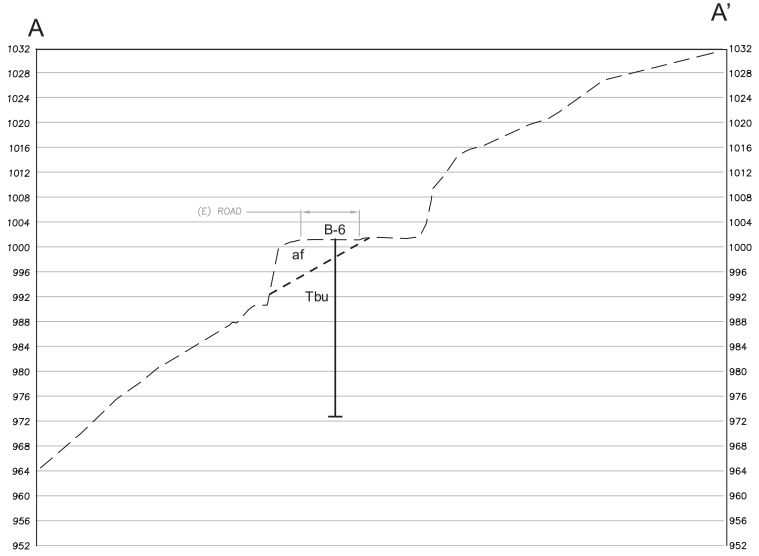
BASEMAP: *Maintenance & Operations Plan*. Figure 3-7.

CMAG ENGINEERING	SITE LOCATION MAP	FIGURE
	Bear Creek Redwoods Roads and Trails - MP204	A-1



BORING LOCATION PLAN
SCALE 1" = 10'

CROSS SECTION A-A'
SCALE 1" = 20' H:V



EXPLANATION OF SYMBOLS

B-1 APPROXIMATE LOCATION OF BORING

A A' LOCATION OF CROSS SECTION

BASEMAP: Waterways Consulting, Inc. (July 6, 2016). *MP 204, SITE PLAN AND SECTIONS, BEAR CREEK REDWOODS ROADS AND TRAILS INVENTORY UPDATE.* SHEET C1, Orlginal Scale 1" = 5'.

181/280

CMAG ENGINEERING	BORING LOCATION PLAN and CROSS SECTION A-A'	FIGURE
	Bear Creek Redwoods Roads and Trails - MP204	A-2

KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
No. 200	No. 40	No. 10	No. 4	3/4 in.	3 in.	12 in.	

US STANDARD SIEVE SIZE

RELATIVE DENSITY	
SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY	
SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION
DRY
MOIST
WET

BEDROCK
(GROUP SYMBOL)
Brackets Denote Bedrock

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

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FIGURE
A-3.0

KEY TO THE LOGS

WEATHERING

FRESH: Body of rock is not oxidized or discolored; fracture surfaces are not oxidized or discolored; no seperation of grain boundaries; no change of texture and no solutioning. Hammer rings when crystalline rocks are struck.

SLIGHTLY WEATHERED: Discoloration or oxidation is limited to surface of, or short distance from fractures; some feldspar crystals are dull; fracture surfaces have minor to complete discoloration or oxidation; no visual separation of grain boundaries; texture preserved and minor leaching of soluble minerals may be present. Hammer rings when crystalline rocs are struck, body of rock is not weakend by weathering.

MODERATELY WEATHERED: Discoloration or oxidation extends from fractures, usually throughout body of rock; ferromagnesian minerals are "rusty", feldspar crystalsare "cloudy"; all fracture surfaces are discolored or oxidized; partial opening of grain boundaries visible; texture generally preserved but soluble minerals may be mostly leached. Hammer does not ring when rock is struck, body of rock is slightly weakened.

INTENSELY WEATHERED: Body of rock is discolored or oxidized throughout; all feldspars and ferromagnesian minerals are altered to clay to some extent. All fracture surfaces are discolored or oxidized, surfaces friable; partial separation of grain boundaries, rock is friable; in situ disaggregation of granitics common in semi-arid regions; texture altered and leaching of soluble minerals may be complete. Rock has dull sound when struck with hammer; rock is weakened., usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness.

DECOMPOSED: Body of rock is discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and ferromagnesian minerals are completely altered to clay; complete seperation of grain boundaries (disaggregated), partial or complete remnant rock structure may be preserved, but resembles a soil.

CLASSIFICATION OF ROCK AND SOIL STRENGTHS (ISRM, 1981)

GRADE	DESCRIPTION	FIELD IDENTIFICATION
R6	Extremely strong rock	Specimen can only be chipped with geological hammer.
R5	Very strong rock	Specimen requires many blows of geological hammer to fracture it.
R4	Strong rock	Specimen requires more than one blow of geological hammer to fracture it.
R3	Medium strong rock	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer.
R2	Weak rock	Can be peeled with a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.
R1	Very weak rock	Crumbles under firm blows with point of geological hammer and can be peeled by pocket knife.
R0	Extremely weak rock	Indented by thumbnail.
S6	Hard Clay	Indented with difficulty by thumbnail.
S5	Very stiff clay	Readily indented by thumbnail.
S4	Stiff clay	Readily indented by thumb but penetrated only with great difficulty.
S3	Firm clay	Can be penetrated several inches by thumb with moderate effort.
S2	Soft clay	Easily penetrated several inches by thumb.
S1	Very soft clay	Easily penetrated several inches by fist.

KEY TO THE LOGS

CEMENTATION

Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

BEDDING SIZE

Thinly laminated	<0.1 inch
Thickly laminated	0.1 to 0.4 inches
Very thinly bedded	0.4 to 1 inches
Thinly bedded	1 to 4 inches
Medium bedded	4 inches to 1 foot
Thickly bedded	1 to 3 feet
Very thickly bedded	>3 feet
Massive	No observable bedding

FRACTURE DENSITY

Unfractured	No Observed Fractures
Very Slightly Fractured	>3 feet
Slightly Fractured	1 to 3 feet
Moderately Fractured	0.33 to 1 foot
Intensely Fractured	0.1 to 0.33 feet
Very Intensely Fractured	<0.1 feet

FRACTURE SPACING

Extremely widely spaced	>10 feet
Very widely spaced	3 to 10 feet
Widely spaced	1 to 3 feet
Moderately spaced	0.3 to 1 foot
Closely spaced	0.1 to 0.3 feet
Very closely spaced	<0.1 feet

FRACTURE CONTINUITY

Discontinuous	<3 feet
Slightly continuous	3 to 10 feet
Moderately continuous	10 to 30 feet
Highly continuous	30 to 100 feet
Very continuous	>100 feet

FRACTURE IN-FILLING THICKNESS

Clean	No film coating
Very thin	<0.003 feet
Moderately thin	0.003 to 0.01 feet
Thin	0.01 to 0.03 feet
Moderately thick	0.03 to 0.1 feet
Thick	> 0.1 feet

LOG OF EXPLORATORY BORING

Project No.:	16-120-SCL	Boring:	B-6
Project:	Bear Creek Redwood Roads and Trails	Location:	MP204 - See Figure A-2, Boring Location Plan
	Santa Clara County, California	Elevation:	
Date:	May 26, 2015	Method of Drilling:	Track Mounted Drill Rig, 6in. Solid Stem
Logged By:	ALG		Auger, 140lb. Safety Hammer

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Groundwater | S 3" Shelby Tube

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	SM			**af:** Dark Yellowish Brown Silty SAND with Clasts of Yellowish Brown Sandstone. Loose, Moist, Non Plastic. Sand - Fine Grained.	9	6		10.2	
5	(SM)			**Tbu:** Dark Yellowish Brown SANDSTONE. Medium Dense, Moist. Silty Sand. Sand - Fine to Medium Grained. Non to Strongly Cemented. R0 to R1.	10		113.3	6.7	c' = 290psf
					16	12		6.5	Φ' = 41°
10	(SM)			Material Consistent - Dense.	61	47		7.1	
15	(SM)			Light Olive Brown SANDSTONE. Dense, Moist. Silty Sand. Sand - Fine to Medium Grained. Non to Strongly Cemented. R0 to R1.	58	49		6.1	
20	(SP-SM)			Light Olive Brown SANDSTONE. Very Dense, Moist. Poorly Graded SAND with Silt. Sand - Fine to Medium Grained. Strongly Cemented. R1.	100+	100+		5.1	
25	(SP-SM)			Material Consistent.	100+	100+		5.0	
				Very Hard Drilling - Auger Refusal at 28'.					
	(SP-SM)			Sampler Refusal.	100+	100+			
30				Boring Terminated at 28.5± ft. Groundwater Not Encountered. Boring Backfilled With Cuttings.					
35									

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FIGURE A-4

LOG OF EXPLORATORY BORING

Project No.:	16-120-SCL	Boring:	B-7
Project:	Bear Creek Redwood Roads and Trails	Location:	MP204 - See Figure A-2, Boring Location Plan
	Santa Clara County, California	Elevation:	
Date:	May 26, 2015	Method of Drilling:	Track Mounted Drill Rig, 6in. Solid Stem
Logged By:	ALG		Auger, 140lb. Safety Hammer

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Groundwater | S 3" Shelby Tube

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	SM/ (SM)			**af:** Yellowish Brown Silty SAND with Clasts of Yellowish Brown Sandstone. Very Loose to Loose, Moist, Non Plastic.	12	8		5.9	
				Sand - Fine to Medium Grained. Clasts > 12".	7			5.1	
				Clasts vary from Weakly to Strongly Cemented. R0 to R1.					
5					3	2		6.6	
	(SP-SM)			**Tbu:** Dark Yellowish Brown and Gray SANDSTONE. Medium Dense to Dense, Moist. Poorly Graded Sand with Silt. Sand - Fine to Medium Grained. Non to Strongly R0 to R1.	11	8		5.4	
					44	34		5.6	
10									
	(SP-SM)			Material Consistent - Very Dense.	100+	100+		5.8	
15				Boring Terminated at 14± ft. Groundwater Not Encountered. Boring Backfilled With Cuttings.					
20									
25									
30									
35									

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FIGURE A-5

APPENDIX B

LABORATORY TESTING PROGRAM

Laboratory Testing Procedures	Page B-1
Direct Shear Test Results	Figure B-1

LABORATORY TESTING PROCEDURES

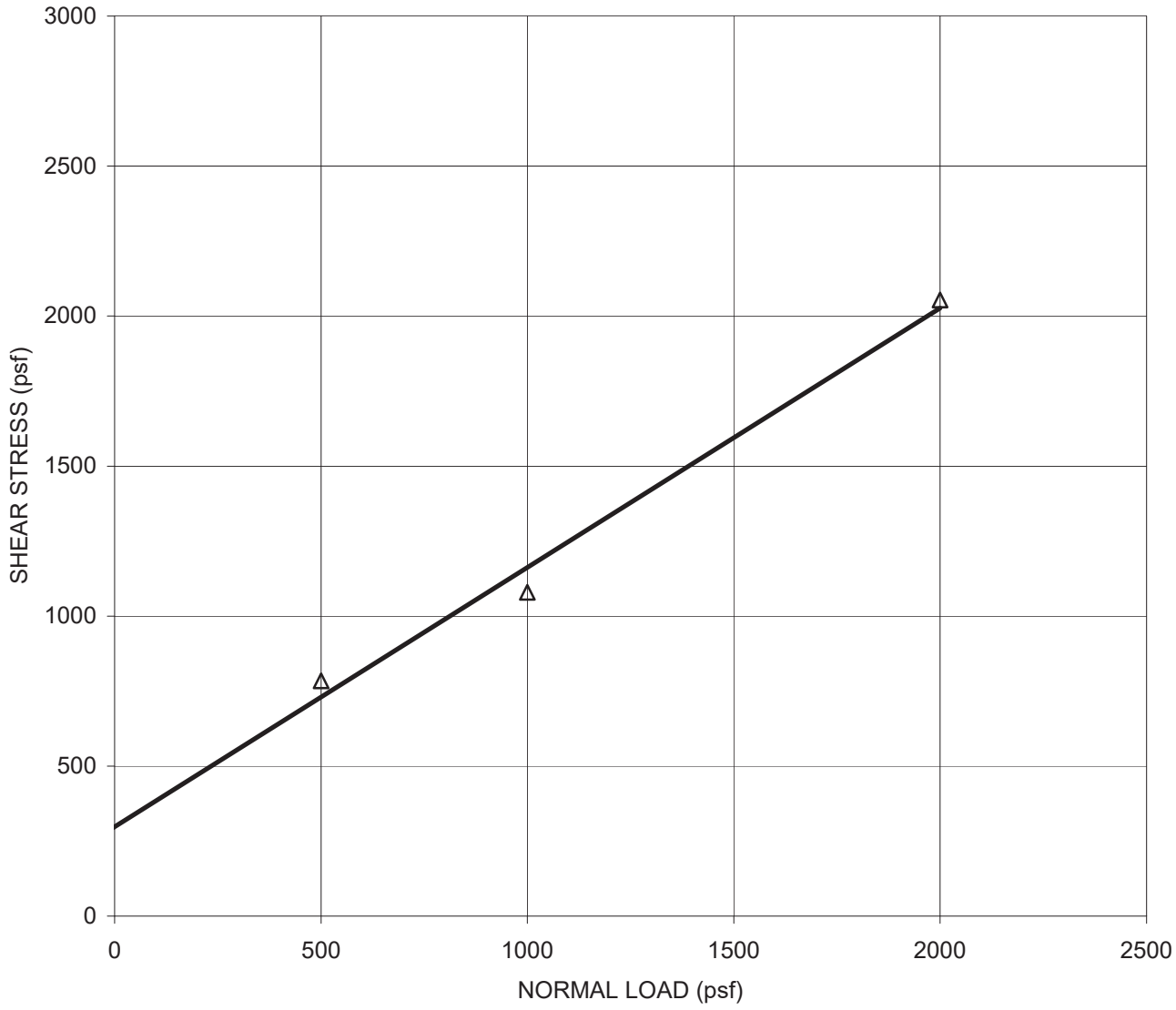
Classification

Soils were classified according to the Unified Soil Classification System in accordance with ASTM D 2487 and D 2488. See Figure A-3.0. Rock descriptions were based on the classification systems outlined in Figures A-3.0 through A-3.2. Moisture content and dry density determinations were made for representative, relatively undisturbed samples of the underlying soil and rock. Results of moisture-density determinations, together with classifications, are shown on the Boring Logs, Figures A-4 and A-5.

Direct Shear

A consolidated drained direct shear test was performed in accordance with ASTM D 3080 on a representative, relatively undisturbed sample of the on-site bedrock. To simulate possible adverse field conditions the samples were saturated prior to shearing. A saturating device was used which permitted the samples to absorb moisture while preventing volume change. The direct shear test results are presented on the Boring logs, Figure A-4 and on Figure B-1.

BORING:	B-6		COHESION (psf)	FRICTION ANGLE
DEPTH (ft):	4			
SOIL TYPE (USCS):	(SM)	PEAK	290	41
		ULTIMATE		
MOISTURE: **SATURATED**		TEST TYPE: **CONSOLIDATED - DRAINED**		



CMAG ENGINEERING	**DIRECT SHEAR TEST RESULTS**	FIGURE
	Bear Creek Redwoods Roads and Trails - MP204	B-1

GEOTECHNICAL INVESTIGATION
DESIGN PHASE

FOR
ALMA COLLEGE PARKING AREA AND TRAILHEAD
SANTA CLARA COUNTY, CALIFORNIA

PREPARED FOR
HARRIS DESIGN
PROJECT NO. 16-136-SCL

PREPARED BY

BUTANO GEOTECHNICAL ENGINEERING, INC.
JULY 2017

BUTANO GEOTECHNICAL ENGINEERING, INC.
231 GREEN VALLEY ROAD, SUITE E, FREEDOM, CALIFORNIA 95019
PHONE: 831.724.2612
WWW.BUTANOGEOTECH.COM

July 7, 2017
Project No. 16-136-SCL

Harris Design
755 Folger Avenue
Berkeley, CA 94710

SUBJECT: **GEOTECHNICAL INVESTIGATION - DESIGN PHASE**
Proposed Parking Lot and Subway Crossing
Alma College- Bear Creek Open Space Preserve
Los Gatos, Santa Clara County, California

Dear Mr. Harris:

In accordance with your authorization, we have completed a geotechnical investigation for the subject project. This report summarizes the findings, conclusions, and recommendations from our field exploration, laboratory testing, and engineering analysis. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

BUTANO GEOTECHNICAL ENGINEERING, INC.

Greg Bloom, PE, GE
Principal Engineer
R.C.E. 58819

Appendices:
1. Appendix A Figures and Standard Details
2. Appendix B Field Exploration Program
3. Appendix C Laboratory Testing Program
4. Appendix D Percolation Testing Program

Distribution: (4) Addressee

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed parking lot and subway at the Alma College site within the Bear Creek Open Space Preserve in unincorporated Los Gatos, Santa Clara County, California.

The purpose of our investigation is to provide preliminary geotechnical design parameters and recommendations for the construction of the proposed parking lot, subway crossing of Bear Creek Road, and associated improvements. Conclusions and recommendations related to site grading, drainage, retaining walls, foundations, and pavement are presented herein.

Anticipated construction consists of a subway crossing at Bear Creek Road and a parking lot.

This work included site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analyses, and preparation of this report.

The recommendations contained in this report are subject to the limitations presented in Section 8.0 of this report. The Association of Engineering Firms Practicing the Geosciences has produced a pamphlet for your information titled *Important Information About Your Geotechnical Report*. This pamphlet has been included with the copies of your report.

2.0 FIELD EXPLORATION AND LABORATORY TESTING PROGRAMS

Our field exploration program included drilling, logging, and interval sampling of five borings on May 30, 2017 with track mounted hollow stem augers. The borings were advanced to depths of 6 ½ to 31 ½ feet below existing grade. Details of the field exploration program, including the Boring Logs and the Key to the Logs, are presented in Appendix B, Figures B-4 through B-9.

Representative samples obtained during the field investigation were taken to the laboratory for testing. Laboratory tests were used to determine physical and engineering properties of the in-situ soils. Details of the laboratory testing program are presented in Appendix C. Test results are presented on the Boring Logs and in Appendix C.

3.0 SITE AND PROJECT DESCRIPTION

3.1 Location

The project site is located west of Highway 17 in unincorporated Los Gatos, Santa Cruz County, California. The site location is shown on the Site Location Plan, Appendix B, Figure B-1.

3.2 Surface Conditions

The Alma College site is located within the Santa Cruz Mountains. The college site was developed over 100 years ago and the natural terrain has been significantly altered with the development. This has included grading to create the ponds, infilling and culverting a portion of Webb Creek, and construction of Bear Creek Road.

The terrain consists of mild, east facing slopes. Webb Creek flows under Bear Creek Road via a 5 feet diameter corrugated metal culvert. The flow remains in a buried culvert past Bear Creek Road and releases approximately 400 to 500 feet southeast of the inlet back into the creek. The area between the inlet and release point has been infilled.

Webb Creek was infilled and a portion of Bear Creek Road was constructed above it. It appears that the road south of Bear Creek was created by cutting and filling the slope which has resulted in a slope below Bear Creek Road (this slope is located above the project). This slope consists of fill in its upper portion and cut in the lower portion.

The site is vegetated with grasses and scattered trees.

3.3 Subsurface Conditions

A total of five borings were advanced for the project in the area of the proposed construction. The earth materials encountered at the site consist of alluvium associated with Webb Creek, non-engineered fill associated with the infilling of Webb Creek at the Bear Creek crossing and within Alma College before the culverts outlet, and the underlying bedrock (San Lorenzo Formation siltstone).

B1 encountered approximately 5 feet of stiff lean clay with gravel (non-engineered fill?) overlying loose clayey sand with siltstone clasts from a depth of

5 to 8 feet. Very dense siltstone was encountered from a depth of 8 feet to the bottom of the boring at 11 feet.

Borings B2, B3, and B5 were drilled within the alluvial deposits associated with Webb Creek. B2 encountered approximately 4 feet of non-engineered fill overlying alluvial soil. The non-engineered fill consists of 1 ½ feet of silty sand overlying stiff lean to fat clay with granitic gravels up to 3 inches in diameter. The alluvium consists of very loose to medium dense clayey sand with siltstone clasts. Some organics were observed within the alluvium. Very dense siltstone was encountered at a depth of 18 ½ feet to the bottom of the boring at 25 feet.

Boring B5 was drilled on the upstream side of Bear Creek Road at the top of the creek bank. The upper 3 feet of soil consists of loose clayey sand with gravel (non-engineered fill). Alluvial deposits consisting of firm to stiff sandy lean clay and very loose clayey sand was encountered to a depth of 19 feet. Intensely weathered siltstone (very stiff sandy lean clay) was encountered at a depth of 19 feet and became less weathered and very dense from a depth of 22 feet to the bottom of the boring at 26 ½ feet.

B4 encountered stiff sandy lean clay with gravel from the surface to the bottom of the boring at 6 ½ feet.

Groundwater was not encountered in any of the borings. Groundwater conditions will vary seasonally.

Complete soil profiles are presented on the Boring Logs, Appendix B, Figures B-4 through B-9. The boring locations are shown on the Boring Site Plans, Figures B-2 and B-3.

4.0 PROJECT DESCRIPTION

Anticipated construction consists of a parking lot and upgrading the Webb Creek crossing under Bear Creek Road to allow for passage of water and a subway crossing for pedestrian traffic. It is our understanding that the culvert will be replaced along its present alignment.

Collected water from the paved areas will be retained and detained on-site.

5.0 GEOTECHNICAL HAZARDS

5.1 General

In our opinion the geotechnical hazards that could potentially affect the proposed project are:

- Intense seismic shaking
- Collateral seismic hazards
- Landsliding
- Faulting

5.1.1 Intense Seismic Shaking

The hazard of intense seismic shaking is present throughout central California. Intense seismic shaking may occur at the site during the design lifetime of the proposed structure from an earthquake along one of the regions many faults. Generally, the intensity of shaking will increase the closer the site is to the epicenter of an earthquake, however, seismic shaking is a complex phenomenon and may be modified by local topography and soil conditions. The transmission of earthquake vibrations from the ground into the structure may cause structural damage.

The County of Santa Clara has adopted the seismic provisions set forth in the 2016 California Building Code to address seismic shaking. The seismic provisions in the 2016 CBC are minimum load requirements for the seismic design for the proposed structure. The provisions set forth in the 2016 CBC will not prevent structural and nonstructural damage from direct fault ground surface rupture, coseismic ground cracking, liquefaction and lateral spreading, seismically induced differential compaction, seismically induced landsliding, or seismically induced inundation.

Table 1 has been constructed based on the 2016 CBC requirements for the seismic design of the proposed structure. The Site Class has been determined based on our field investigation and laboratory testing.

Table 1. Seismic Design Parameters

S_S	S_1	Site Class	F_a	F_v	S_{MS}	S_{M1}	S_{DS}	S_{D1}	Risk Category	Seismic Design Category
2.582	1.240	D	1.0	1.5	2.582	1.860	1.721	1.240	II	E

5.1.2 Collateral Seismic Hazards

In addition to intense seismic shaking, other seismic hazards that may have an adverse affect to the site and/or the structure are: fault ground surface rupture, coseismic ground cracking, seismically induced liquefaction and lateral spreading, seismically induced differential compaction, seismically induced landsliding, and seismically induced inundation (tsunami and seiche). It is our opinion that the potential for collateral seismic hazards to affect the site and to damage the proposed improvements is low except for landsliding and faulting

5.1.3 Faulting

The project site is located within the Alquist-Prieto Fault Zone associated with the San Andreas Fault. Our scope of work did not include a faulting study. It is our understanding that faulting studies are in progress for some of the Alma College structures.

5.1.3 Landsliding

The project site is located within a large mapped landslide (see Figure B-11). An analysis of the risk of this landslide activating and affecting the proposed improvements is beyond our scope of work.

6.0 DISCUSSIONS AND CONCLUSIONS

The site is underlain by alluvium, bedrock, and fill associated with the infilling of Webb Creek and the construction of Bear Creek Road. The site may be at risk to faulting and landslide hazards which have not been investigated by our firm. At this time these risks are indeterminate. The client must be willing to accept these risks to continue with this project.

The site has been graded as part of past development of the site. Much of this work was performed well over 100 years ago and is not well documented. Past grading included the construction of the pond, infilling and culverting Webb Creek, construction of Bear Creek Road, and grading for the buildings.

7.0 RECOMMENDATIONS

7.1 General

Based on the results of our field investigation, laboratory testing, and engineering analysis it is our opinion that from the geotechnical standpoint, the subject site will be suitable for the proposed construction.

7.2 Site Grading

7.2.1 Site Clearing

The site should be cleared of loose soil, organics, and debris within the project limits. This grading should include over-excavation of non-engineered fill associated with the infilling of Webb Creek through the project boundaries. The exact limits of the old creek channel are not known, but we provide a reasonable estimate based on the creek width and location above and below the culvert (Figure B-10).

7.2.2 Preparation of On-Site Soils

Areas to receive fill should be scarified, moisture conditioned, and compacted to a minimum of 90 percent relative compaction.

Paved Areas

The upper 6 inches of subgrade and aggregate baserock should be compacted to a minimum of 95 percent relative compaction. This should extend a minimum of 2 feet laterally of all paved areas.

Site Grading-General

The on-site soil may be re-used as engineered fill once it is processed to remove the majority of deleterious material, processed, and moisture conditioned.

Imported fill material should be approved by a representative of Butano Geotechnical Engineering, Inc. prior to importing. Imported fill should be

primarily granular with no material greater than 2½ inches in diameter and no more than 20 percent of the material passing the #200 sieve. The fines fraction of the fill should not consist of expansive material. The Geotechnical Engineer should be notified not less than 5 working days in advance of placing any fill or base course material proposed for import. Each proposed source of import material should be sampled, tested, and approved by the Geotechnical Engineer prior to delivery of any soils imported for use on the site.

Engineered fill should be compacted to a minimum of 90 percent relative compaction per ASTM1557.

Any surface or subsurface obstruction, or questionable material encountered during grading, should be brought immediately to the attention of the Geotechnical Engineer for proper processing as required.

7.2.3 Cut and Fill Slopes

Permanent cut and fill slopes should be sloped no steeper than a 2:1 (H:V) gradient. Fill slopes should be keyed and benched into the hillside. A typical keying and benching detail is attached in Appendix A, Figure A-3. Disturbed slopes should be covered with erosion resistant material.

Temporary cut-slopes may be graded at a 1: 1 (H:V) slope during dry conditions to a height of 10 feet.

7.2.4 Excavating Conditions

The on-site soil may be excavated with standard earthwork equipment. The underlying bedrock will require rock teeth to drill through.

7.2.5 Surface Drainage

Positive drainage should be maintained away from the structures at a minimum gradient of 2 percent for 5 feet. If this is not feasible the water should be directed away from the foundation into a swale.

7.2.6 Utility Trenches

Bedding material should consist of sand with a SE not less than 30 which may then be jetted. The thickness of sand bedding above and below utilities should comply with local building codes.

The on-site native soils may be utilized for trench backfill. Imported fill should be free of organic material and rocks over 2.5 inches in diameter.

If sand is used, a 3 foot concrete plug should be placed in each trench where it passes under the exterior footings.

Backfill of all exterior and interior trenches should be placed in thin lifts not to exceed 8 inches and mechanically compacted to achieve a relative compaction of not less than 95 percent in paved areas and 90 percent in other areas per ASTM D1557. Care should be taken not to damage utility lines.

Utility trenches that are parallel to the sides of a building should be placed so that they do not extend below a line sloping down and away at an inclination of 2:1 H:V from the bottom outside edge of all footings.

Trenches should be capped with 1 1/2 feet of relatively impermeable material. Import material must be approved by the Geotechnical Engineer prior to its use.

Trenches must be shored as required by the local regulatory agency, the State of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

7.3 Foundations (Subway Crossing)

7.3.1 Drilled Piers

A drilled pier foundation may be used to support the proposed undercrossing of Bear Creek Road

The drilled piers should be a minimum of 18 inches in diameter and have a minimum embedment depth of **3 feet** into the underlying siltstone bedrock. Shafts should be spaced no closer than 3 diameters center to center.

An allowable end bearing capacity of 20,000 psf may be assumed for drilled piers. A 1/3 increase for short term loads may be assumed.

An allowable passive resistance of 175 psf/ft over 1 ½ pier diameters may be assumed below a depth of 2 feet.. The drilled excavations for the cast-

in-place concrete shafts should be clean, dry and free of debris or loose soil. The drilled excavations should not deviate more than 1 percent from vertical.

For drilled, cast-in-place concrete shaft depths in excess of 8 feet, concrete should be placed via a tremie. The end of the tube must remain embedded a minimum of 4 feet into the concrete at all times.

Depending on the time of year that the drilling occurs there is the potential for collapse of the piers due to groundwater intrusion. Casing and/or drilling fluid may be required to keep the hole open.

All shaft construction must be observed and approved by the Geotechnical Engineer. Any shafts constructed without the full knowledge and continuous observation of Butano Geotechnical Engineering, Inc. will render the recommendations of this report invalid.

7.3.2 Helical Piers

Helix anchors may be used to support both vertical and lateral loads. Battered anchors may be used to resist lateral loads.

The minimum recommended embedment depth for the helix plate (on a multi plated helix anchor) is 12 inches into the underlying siltstone.

An allowable bearing/pull-out capacity of 20,000 psf may be used to determine the number and size of the helix plates that will be needed for each anchor to achieve the required minimum service load. The total allowable bearing/pull-out capacity of each anchor is calculated by summing up the bearing/pull-out capacity of each helix plate on the anchor. These capacities do not include the weight of the shaft. Allowable capacities may be increased by one-third for short term loading.

The minimum recommended helix depth to diameter ratio is 5. Individual helix plates attached to a multi-plate anchor should be spaced no closer than 3 diameters. Anchors should be placed no closer than 5 diameters center-to-center, with the diameter of the largest helix plate being used to determine the spacing.

Rotational resistance encountered by an anchor when being screwed into the soil defined as installation torque. The monitoring of installation torque during installation is recommended. Installation torque should not exceed the anchor rating. Installation torque has been empirically related to pull-

out capacity. A minimum bearing/pull-out capacity to installation torque ratio of 10 is generally recommended, and this ratio is subject to verification in the field.

Installation tolerances should be within 2±% with regards to plumbness and to within 2± inches in location. We recommend that all helix anchors be protected with galvanized coating. In general, installation procedures should be per the manufacturer's specifications.

All anchor installation must be continually observed and approved by the Geotechnical Engineer. Any anchors installed without the full knowledge and continuous observation of Butano Geotechnical Engineering, Inc. will render the recommendations of this report invalid.

7.3.3 Settlements

Total and differential settlements beneath are expected to be within tolerable limits under static conditions. Vertical movements are not expected to exceed 1 inch. Differential movements are expected to be within the normal range (½ inch) for the anticipated loads.

7.4 Retaining Structures

7.4.1 Lateral Earth Pressures

The lateral earth pressures presented in Table 2 are recommended for the design of retaining structures with native backfill. Should the slope behind the retaining walls be other than level, supplemental design criteria will be provided for the active earth or at-rest pressures for the particular slope angle.

Table 2. Lateral Earth Pressures

Soil Profile	Soil Pressure (psf/ft)	
	Active	At-rest
Level	45	65
2:1	60	80

If desired, an earthquake load (ultimate) may be considered for critical walls. A seismic load of $20H^2$ and $35H^2$ may be applied at a height of 0.6H from the base of the wall for unrestrained and restrained walls respectively. A factor of safety of 1.1 is considered appropriate with respect to earthquake loading.

Pressure due to any surcharge loads from adjacent footings, traffic, etc., should be analyzed separately. Pressures due to these loading can be supplied upon receipt of the appropriate plans and loads. Refer to Appendix A, Figure A-1-Surcharge Pressure Diagram.

7.4.2 Backfill

Backfill should be placed under engineering control. Backfill should be compacted per Subsection 7.2.2; however, precautions should be taken to ensure that heavy compaction equipment is not used immediately adjacent to walls, so as to prevent undue pressures against, and movement of, the walls.

The backfill should be capped with at least 12 inches of relatively impermeable material.

7.4.3 Backfill Drainage

Retaining structures must be fully drained. Backdrains should consist of 4 inch diameter Schedule 40, PVC pipe or equivalent, embedded in 3/8 inch to 3/4 inch, clean crushed gravel, enveloped in **Mirafi 180N** or approved equivalent. The drain should be a minimum of 12 inches in thickness and should extend to within 12 inches from the surface. The pipe should be 4± inches above the trench bottom; a gradient of 2± percent being provided to the pipe and trench bottom; discharging into suitably protected outlets. See Appendix A, Figure A-2 for the standard detail for the backdrain.

Perforations in backdrains are recommended as follows: 3/8 inch diameter, in 2 rows at the ends of a 120 degree arc, at 3 inch centers in each row, staggered between rows, placed downward.

Backdrains should be approved by the Geotechnical Engineer after placement of bedding and pipe and prior to the placement of clean crushed gravel.

An unobstructed outlet should be provided at the lower end of each segment of backdrain. The outlet should consist of an unperforated pipe of the same diameter, connected to the perforated pipe and extended to a protected outlet at a lower elevation on a continuous gradient of at least 1 percent.

7.5 Pavement Sections

General

The on-site soil consists of lean clay with gravel and sandy lean clays. New pavement sections should be designed in accordance with anticipated loading. Recommendations are based on a minimum R-value of 5 and Traffic Index design values of 4.5. Recommendations are presented in Table 3.

Table 3. Pavement Sections

Traffic Index	Asphalt Concrete (inches)	Class II Aggregate Base (inches)
4.5	3.0	9.0

7.6 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans, Foundation Plans and design loads should be reviewed by Butano Geotechnical Engineering, Inc. prior to submitting the plans and contract bidding. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

7.7 Observation and Testing

Field observation and testing should be provided by a representative of Butano Geotechnical Engineering, Inc. to enable them to form an opinion regarding the adequacy of the site preparation, the adequacy of fill materials, and the extent to which the earthwork is performed in accordance with the geotechnical conditions

present, the requirements of the regulating agencies, the project specifications, and the recommendations presented in this report.

Butano Geotechnical Engineering, Inc. should be notified **at least 5 working days** prior to any site clearing or other earthwork operations on the subject project in order to observe the stripping and disposal of unsuitable materials and to ensure coordination with the grading contractor. During this period, a preconstruction meeting should be held on the site to discuss project specifications, observation and testing requirements and responsibilities, and scheduling.

8.0 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory testing, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the borings drilled during our field investigation. Variation in soil, geologic, and groundwater conditions can vary significantly between sample locations. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer, and revised recommendations be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field. The use of information contained in this report for bidding purposes should be done at the Contractor’s option and risk.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they are due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The scope of our services mutually agreed upon did not include any environmental assessment or study for the presence of hazardous to toxic materials in the soil, surface water, or air, on or below or around the site. Butano Geotechnical Engineering, Inc. is not a mold prevention consultant; none of our services performed in connection with the proposed project are for the purpose of mold prevention. Proper implementation of the recommendations conveyed in our reports will not itself be sufficient to prevent mold from growing in or on the structures involved.

REFERENCES

ASTM International (2016). *Annual Book of ASTM Standards, Section Four, Construction*. Volume 4.08, Soil and Rock (I): D 430 - D 5611.

ASTM International (2015). *Annual Book of ASTM Standards, Section Four, Construction*. Volume 4.09, Soil and Rock (II): D 5714 - Latest.

Dibblee, T.W., and Minch, J.A., 2005, Geologic map of the Los Gatos quadrangle, Santa Clara & Santa Cruz Counties, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-157, scale 1:24,000

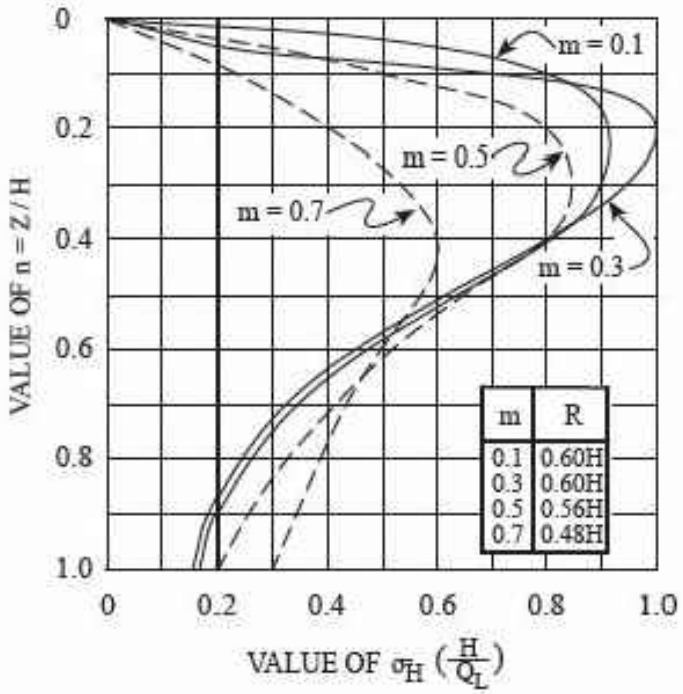
California Building Code (2016).

APPENDIX A

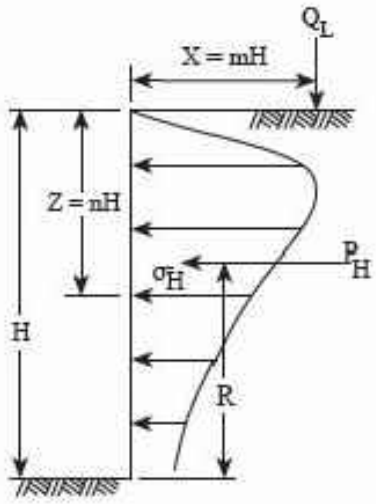
FIGURES AND STANDARD DETAILS

Surcharge Pressure Diagram	Figure A-1
Retaining Wall Backdrain Detail	Figure A-2
Key and Bench Detail	Figure A-3

LINE LOAD



m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H



FOR m ≦ 0.4:

$$\sigma_H \left(\frac{H}{Q_L}\right) = \frac{0.20\,n}{(0.16+n^2)^2}$$

$$P_H = 0.55\,Q_L$$

FOR m > 0.4:

$$\sigma_H \left(\frac{H}{Q_L}\right) = \frac{1.28\,m^2 n}{(m^2+n^2)^2}$$

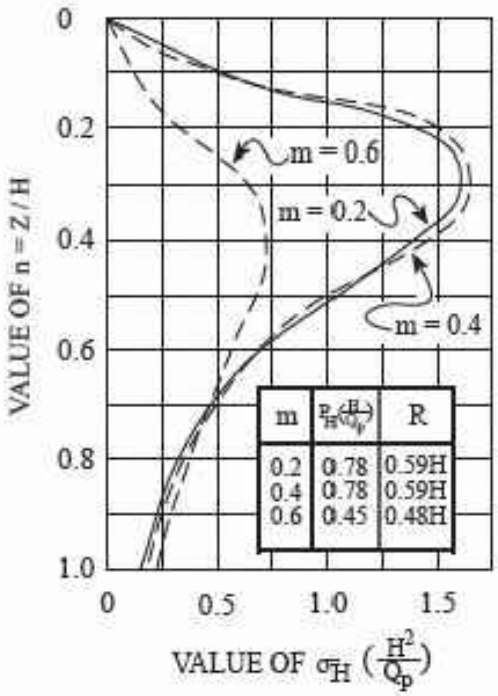
RESULTANT $P_H = \frac{0.64\,Q_L}{(m^2+1)}$

PRESSURES FROM LINE LOAD Q_L

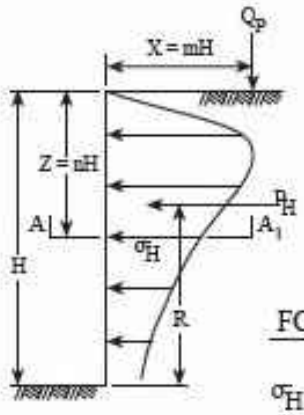
(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

REFERENCE: Design Manual
NAVFAC DM-7.02
Figure 11
Page 7.2-74

POINT LOAD



m	$\frac{P_H}{Q_p}\left(\frac{H}{Q_p}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



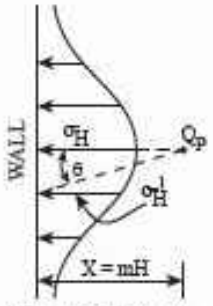
FOR m ≦ 0.4:

$$\sigma_H \left(\frac{H^2}{Q_p}\right) = \frac{0.28\,n^2}{(0.16+n^2)^3}$$

FOR m > 0.4:

$$\sigma_H \left(\frac{H^2}{Q_p}\right) = \frac{1.77\,m^2 n^2}{(m^2+n^2)^3}$$

$$\sigma_H^1 = \sigma_H \cos^2(1.1\,\theta)$$

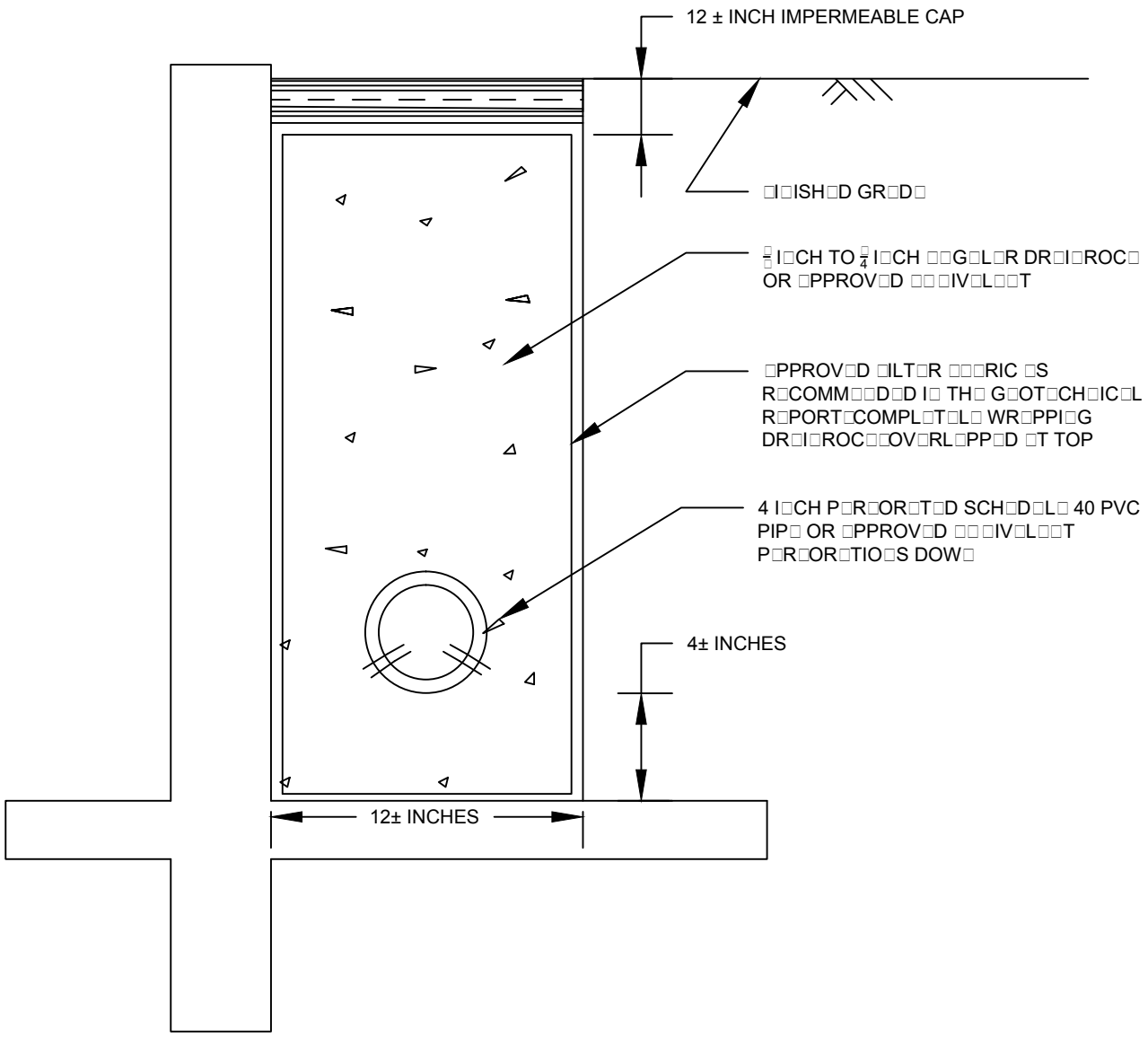


SECTION A-A_1

PRESSURES FROM POINT LOAD Q_P

(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

BUTANO GEOTECHNICAL ENGINEERING, INC.	**S□RCH□R□E □RESS□RE □I□□R□M**	FIGURE A□□

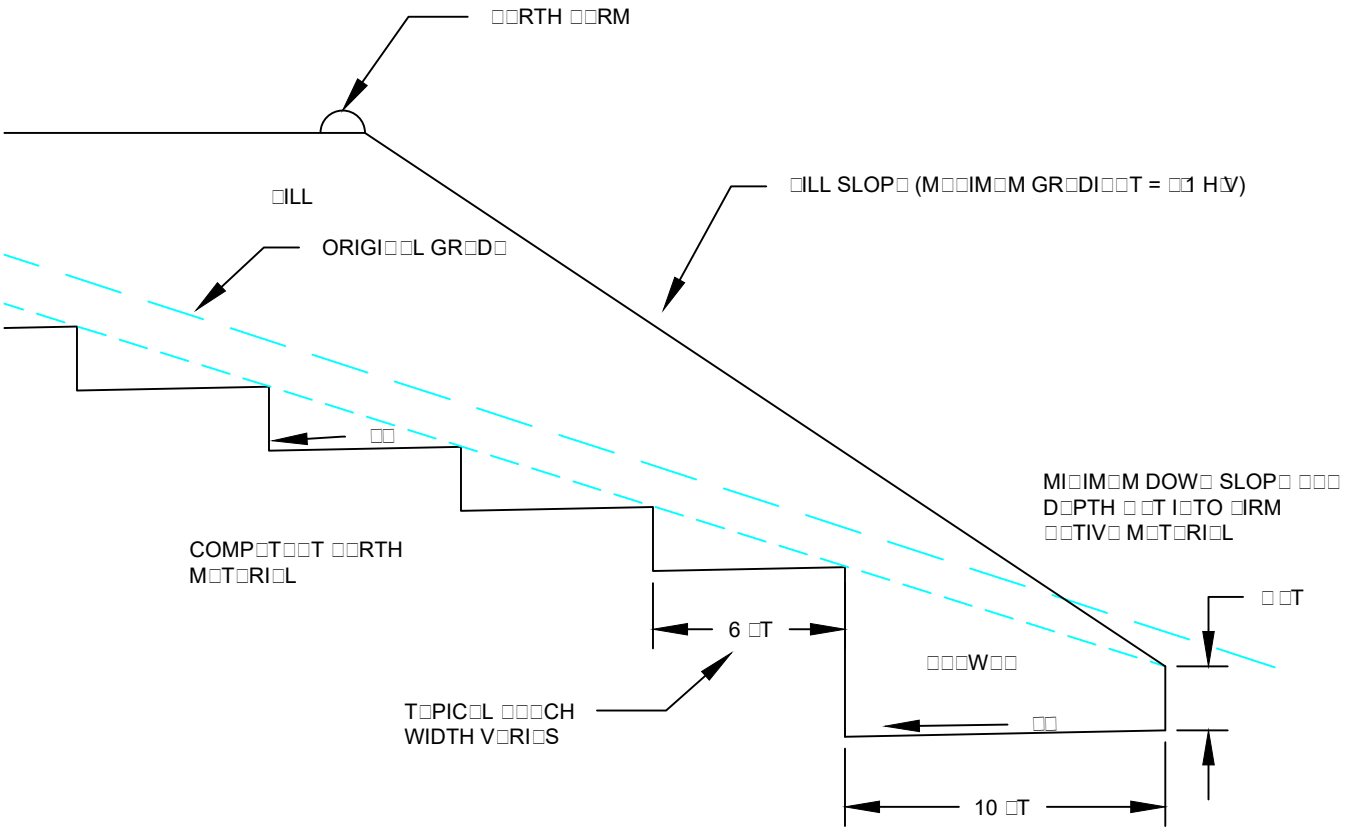


□OT□S:

1. DR□WI□G IS □OT TO SC□L□.
2. 2±% GRADIENT TO PIPE AND TRENCH BOTTOM CONNECTED TO A CLOSED CO□D□IT TH□T DISCH□RG□S TO AN □PPROV□D LOC□TIO□.

N.T.S.

BUTANO GEOTECHNICAL ENGINEERING, INC.	**TY□IC□□ RET□ININ□** WALL **□□C□□R□IN □ET□I□**	FIGURE A-2



□OT□S□

1□ DR□WI□G IS □OT TO SC□L□
□□ □ILLS SIT□□T□D O□ SLOP□S ST□□P□R TH□□ □□1 (H□V) SHO□LD □□ □□□□D □□D □□□CH□D□
□□ □ILL M□T□RI□L SHO□LD □□ PL□C□D P□R TH□ R□COMM□□D□TIO□S I□ TH□ G□OT□CH□IC□L R□PORT□
4□ LOC□TIO□S SH□LL □□ D□T□RMI□□D I□ TH□ □I□LD □□ TH□ G□OT□CH□IC□L □□GI□□□R□

N□T□S□

BUTANO GEOTECHNICAL ENGINEERING, INC.	**□EYIN□ □N□ □ENCHIN□ □I□□R□M**	FIGURE A□3

APPENDIX B

FIELD EXPLORATION PROGRAM

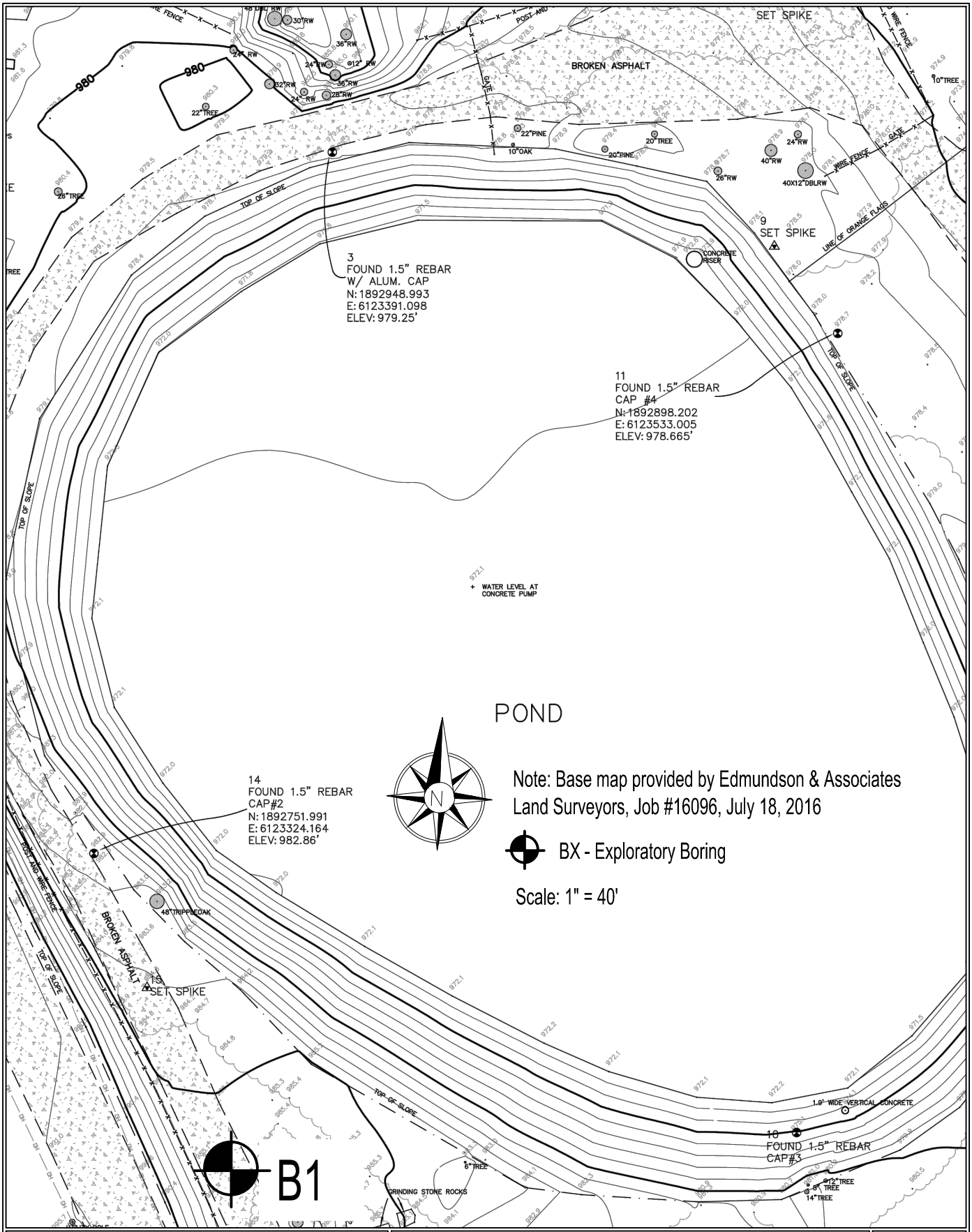
Field Exploration Procedures	Page B-1
Site Location Plan	Figure B-1
Boring Site Plan	Figure B-2 and B-3
Key to the Logs	Figure B-4
Logs of the Borings	Figures B-5 through B-9
Cross-Section X-X’	Figure B-10
Regional Geologic Map	Figure B-11

FIELD EXPLORATION PROCEDURES

Subsurface conditions were explored by advancing 5 borings below existing grade. The borings were advanced with solid and hollow stem augers by a track mounted auger. The Key to The Logs and the Logs of the Borings are included in Appendix B, Figures B-4 through B-9. The approximate locations of the borings are shown on the Boring Site Plans, Figures B-2 and B-3. The boring holes were located in the field by tape measurements from known landmarks. Their locations as shown are therefore within the accuracy of such measurement.

The soils encountered in the borings were continuously logged in the field by a representative of Butano Geotechnical Engineering, Inc. Bulk and relatively undisturbed soil samples for identification and laboratory testing were obtained in the field. These soils were classified based on field observations and laboratory tests. The classifications are accordance with the Unified Soil Classification System (USCS: Figure B-4).

BUTANO GEOTECHNICAL ENGINEERING, INC.	**SITE □OC□TION** PLA **N** Bear Creek Preserve	FIGURE B-1



BUTANO	**□ORIN□ SITE □□□N**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Bear Creek Preserve	B□□

GEOTECHNICAL ENGINEERING, INC.

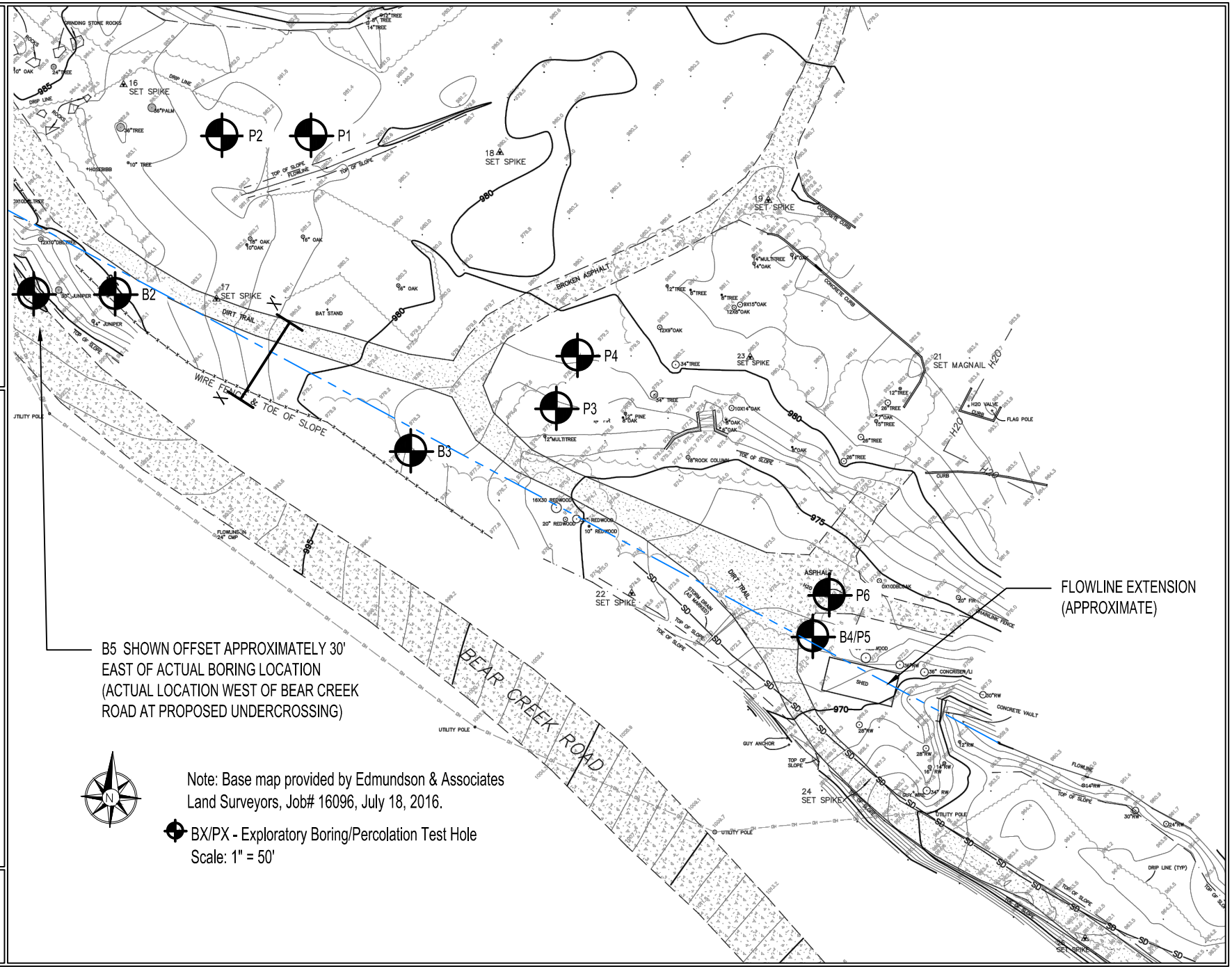
BUTANO

Bear Creek Preserve

□ORIN□ SITE □□□N

FIGURE

B□3



KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

No. 200 No. 40 No. 10 No. 4 3/4 in. 3 in. 12 in.

US STANDARD SIEVE SIZE

RELATIVE DENSITY	
SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY	
SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION	
CLAY	DRY
	MOIST
	SATURATED
SAND	DRY
	DAMP
	WET
	SATURATED

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

LOG OF EXPLORATORY BORING

Project No.:	16-136-SCL	Boring:	B1
Project:	Bear Creek Preserve	Location:	Proposed parking lot
		Elevation:	
Date:	May 30, 2017	Method of Drilling:	6 inch solid stem track mounted auger,
Logged By:	AP		automatic trip

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Expansion Index	Unconfined Comp. (psf)	Particle Size	Other Tests	
0	CL (FILL)	☒	☒	Dark brown LEAN CLAY with gravel, sand, loose (fill).	8	8		18.3	52				
5	SC	☒		Brown clayey SAND with siltstone clasts, gravel, loose.	6	6		20.6			✓		
10	CL (BR)	☒		Gray sandy LEAN CLAY, hard (San Lorenzo Formation siltstone - Tsl).	50/6"			25.1					
15				Boring terminated at a depth of 11 1/2 feet. No groundwater encountered during drilling.									
20													
25													
30													
35													

LOG OF EXPLORATORY BORING

Project No.:	16-136-SCL	Boring:	B2
Project:	Bear Creek Preserve	Location:	Proposed underpass crossing
		Elevation:	
Date:	May 30, 2017	Method of Drilling:	6 inch solid stem track mounted auger,
Logged By:	AP		automatic trip

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Expansion Index	Unconfined Comp. (psf)	Particle Size	Atterberg Limits: Liquid Limit	Atterberg Limits: Plasticity Index
	SM			Brown silty SAND (fill).									
	CL (FILL)			Dark brown LEAN CLAY with gravel, stiff (fill).	18	19		17.4					
5	SC			Brown clayey SAND with siltstone clasts, loose, slightly dam	11	11		26.4				42	19
10				Very loose.	4	4		16.4					
15				very loose, with organics	2	2		38.1			✓		
20	BR			Gray siltstone (San Lorenzo Formation siltstone - Tsl).	50/2"			18.9					
					50/0"			17.3					
25				Boring terminated at a depth of 25 feet. No groundwater encountered during drilling.									
30													
35													

BUTANO GEOTECHNICAL ENGINEERING, INC.

FIGURE B-6

LOG OF EXPLORATORY BORING

Project No.:	16-136-SCL	Boring:	B3
Project:	Bear Creek Preserve	Location:	Proposed parking lot
		Elevation:	
Date:	May 30, 2017	Method of Drilling:	6 inch solid stem track mounted auger,
Logged By:	AP		automatic trip

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Expansion Index	Unconfined Comp. (psf)	Particle Size	Other Tests: R-Value	Other Tests
0	CL			Brown LEAN CLAY with trace gravel, siltstone/sandstone clasts, loose, roots.	9	9		17.8				✓	
5					9	9		26.9					
10					13	15		20.3					
				Boring terminated at a depth of 11 1/2 feet. No groundwater encountered during drilling.									
15													
20													
25													
30													
35													

LOG OF EXPLORATORY BORING

Project No.:	16-136-SCL	Boring:	B4
Project:	Bear Creek Preserve	Location:	Proposed parking lot
		Elevation:	
Date:	May 30, 2017	Method of Drilling:	6 inch solid stem track mounted auger,
Logged By:	AP		automatic trip

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Expansion Index	Unconfined Comp. (psf)	Particle Size	Other Tests	
0	CL			Brown sandy LEAN CLAY with gravel, stiff.	12	12		12.5					
5					11	11		19.6					
10				Boring terminated at a depth of 6 1/2 feet. No groundwater encountered during drilling.									
15													
20													
25													
30													
35													

LOG OF EXPLORATORY BORING

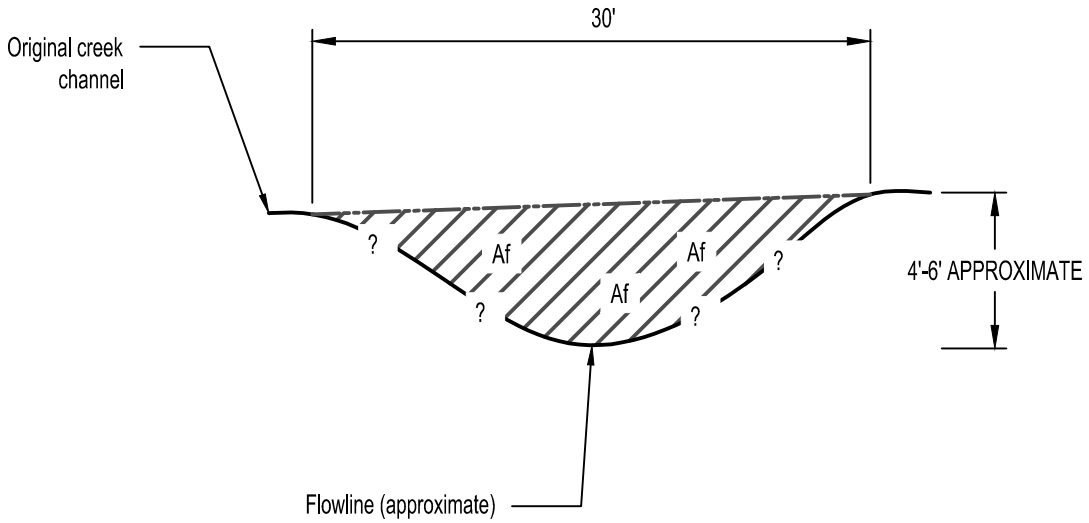
Project No.:	16-136-SCL	Boring:	B5
Project:	Bear Creek Preserve	Location:	Proposed underpass crossing
		Elevation:	
Date:	May 30, 2017	Method of Drilling:	6 inch solid stem track mounted auger,
Logged By:	AP		automatic trip

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Expansion Index	Unconfined Comp. (psf)	Particle Size	Other Tests	
	SC			Brown clayey SAND with gravel, very loose, slightly damp.	5	5		13.4					
	CL												
5				Brown sandy LEAN CLAY with trace gravel, stiff.	13	14		20.1			✓		
10													
	CL			Gray LEAN CLAY with trace siltstone/sandstone clasts, firm.	8	9		30.2					
15				Soft, increase in sand, moist, trace roots.	2	2		45.0					
20					20	25		25.7			✓		
25	BR			Gray siltstone (San Lorenzo Formation siltstone - Tsl).	50/6"			13.4					
30					60	96		14.2					
				Boring terminated at a depth of 31 1/2 feet. No groundwater encountered during drilling.									
35													

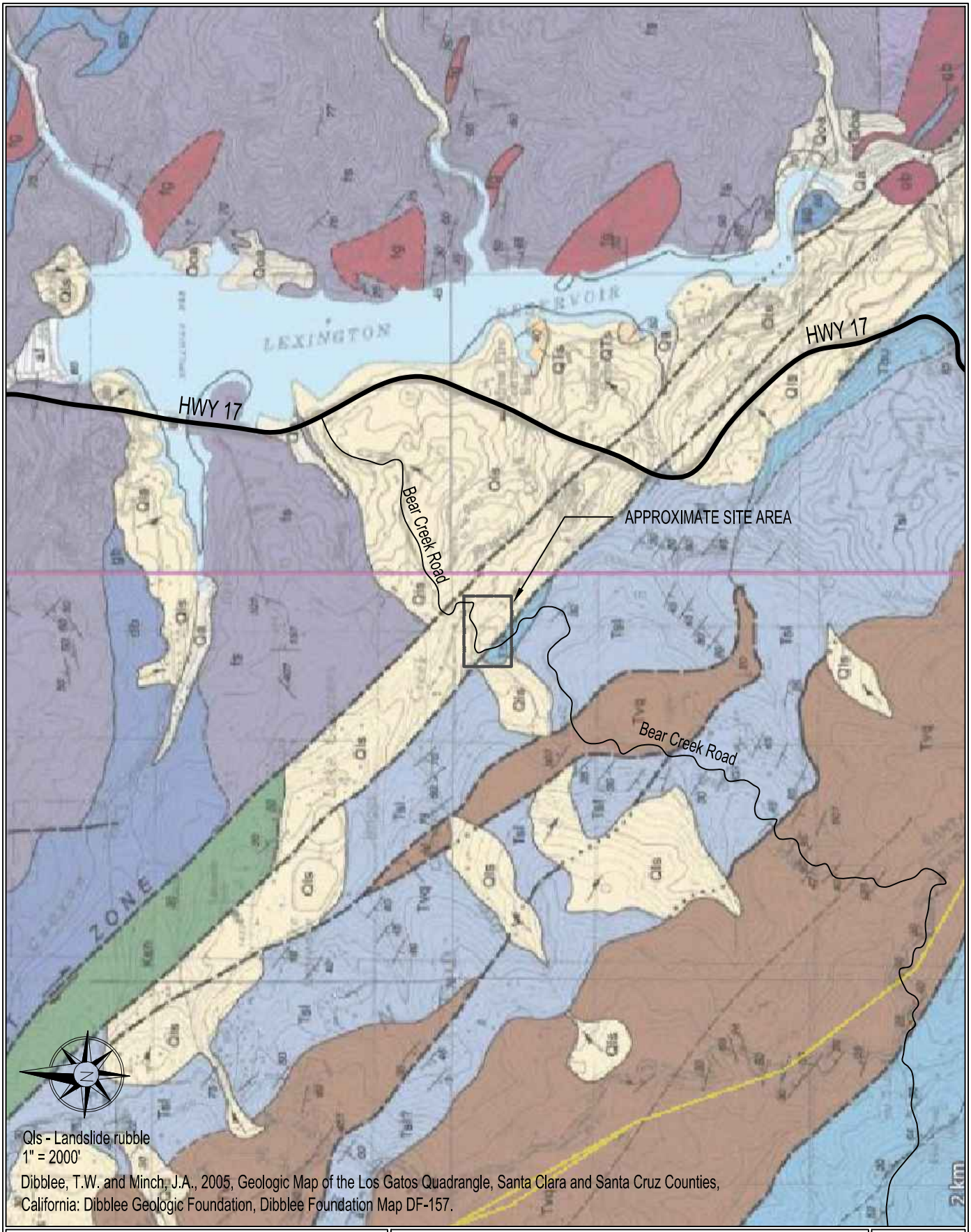
BUTANO GEOTECHNICAL ENGINEERING, INC.

FIGURE B-9



Artificial fill (Af) to be excavated and replaced as engineered fill. Boundaries queried (?) where approximate.

BUTANO	**CROSS SECTION '□'**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Bear Creek Preserve	B□□□



BUTANO	□EO□O□IC M□□	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Bear Creek Preserve	B□□□

APPENDIX C

LABORATORY TESTING PROGRAM

Laboratory Testing Procedures	Page C-1
Particle Size Analysis	Figure C-1 through C-4
Atterberg Limits	Figure C-5
R-value test results	Attached

LABORATORY TESTING PROCEDURES

Classification

Soils were classified according to the Unified Soil Classification System in accordance with ASTM D 2487 and D 2488. Moisture content and density determinations were made for representative samples in accordance with ASTM D 2216. Results of moisture density determinations, together with classifications, are shown on the Boring Logs, Figures B-5 through B-9.

R-Value

One R-Value was conducted on a representative sample of the pavement zone subgrade soil according to ASTM D2488 or CTM 301. The results are attached.

Particle Size Analysis

Three sieve analyses were performed on representative samples in accordance with ASTM D 422. The grain size distribution from the result of the particle size analysis is shown on Figures C-1 through C-3.

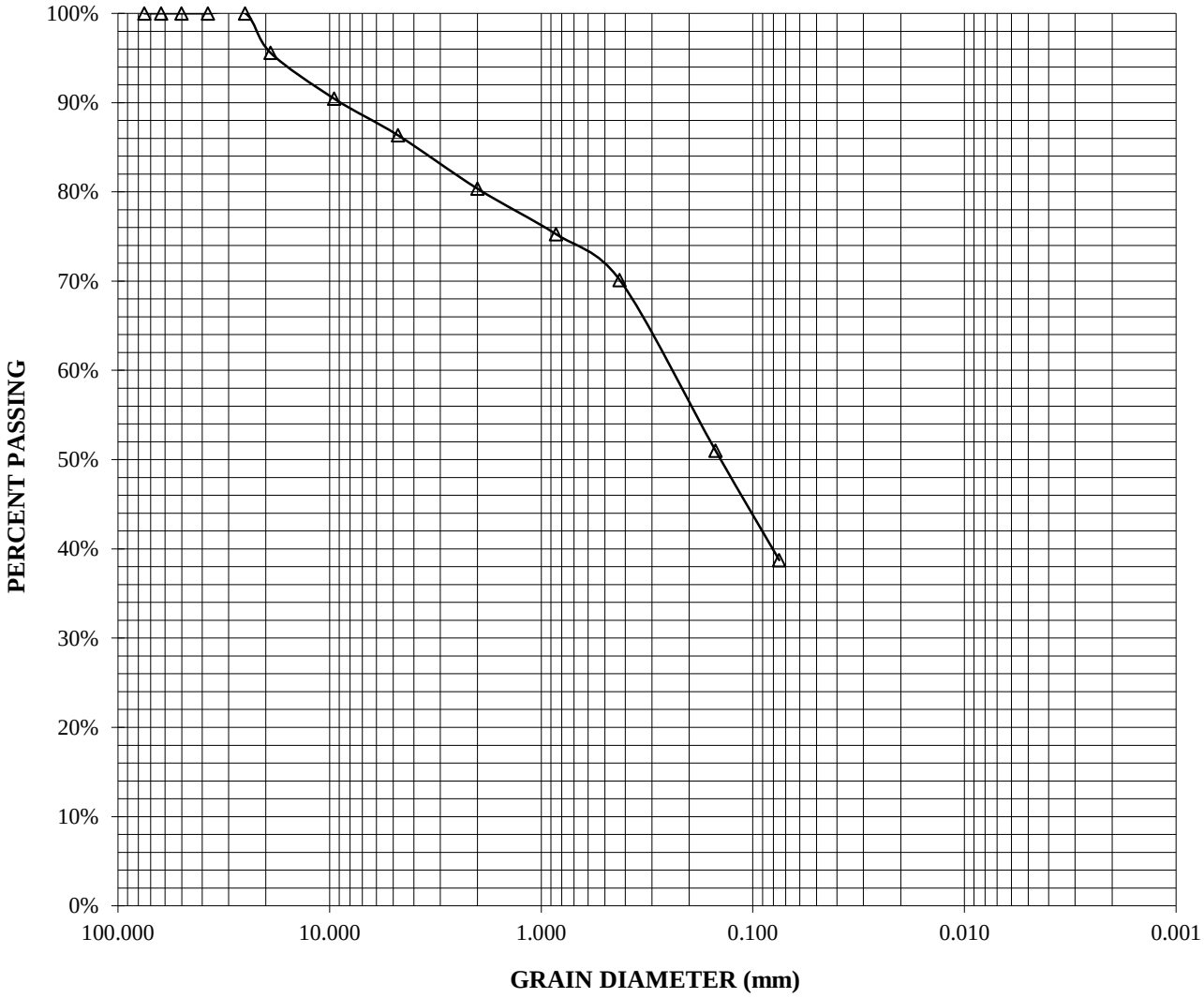
Expansion Index

One expansion index test was performed on a representative bulk sample of the foundation zone soil in accordance with ASTM D 4829-03. The result is shown on the Boring Logs, Figure B-5.

Atterberg Limits

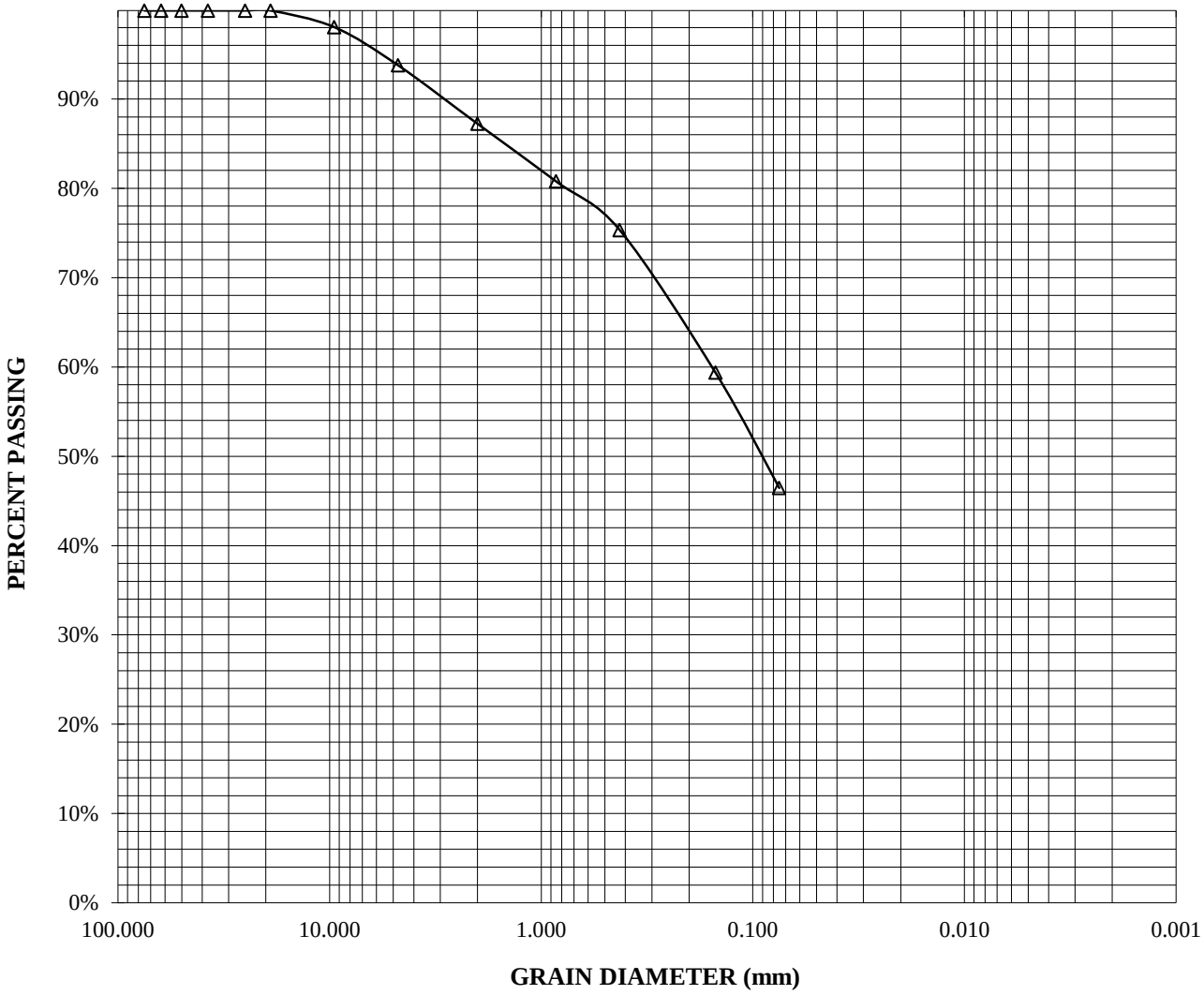
One Atterberg limits test was performed in accordance with ASTM D-4318. The results are presented on Figure C-4 and shown on the Boring Logs, Figure B-6.

BORING:	B1-2	PERCENT	PERCENT
DEPTH (ft):	5.0	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	SC	86.3%	38.7%



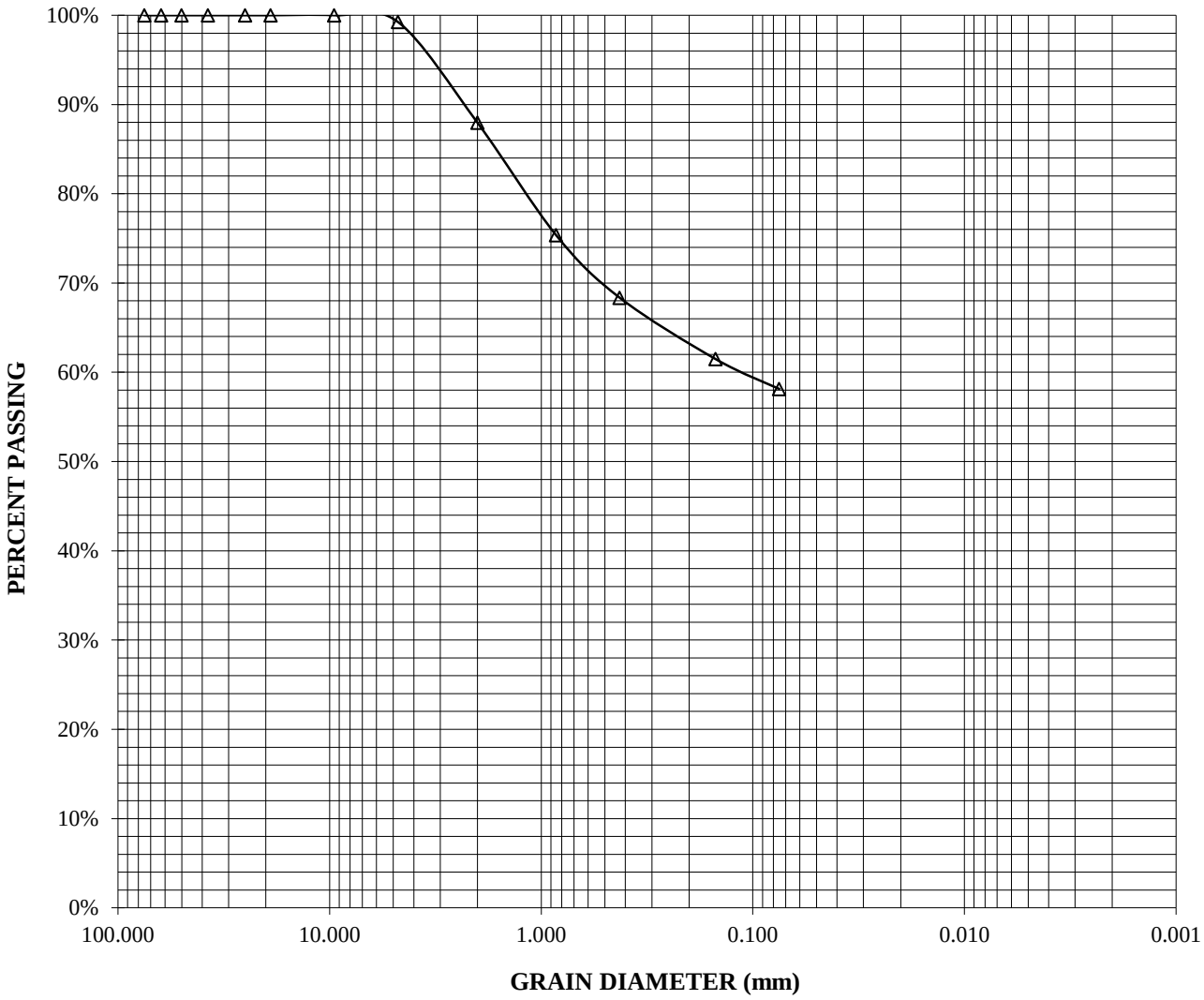
BUTANO	**GRAIN SIZE DISTRIBUTION**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Alma College Parking Area and Trailhead	C-1

BORING:	B2-4	PERCENT	PERCENT
DEPTH (ft):	15.0	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	SC	93.9%	46.6%



BUTANO	**GRAIN SIZE DISTRIBUTION**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Alma College Parking Area and Trailhead	C-2

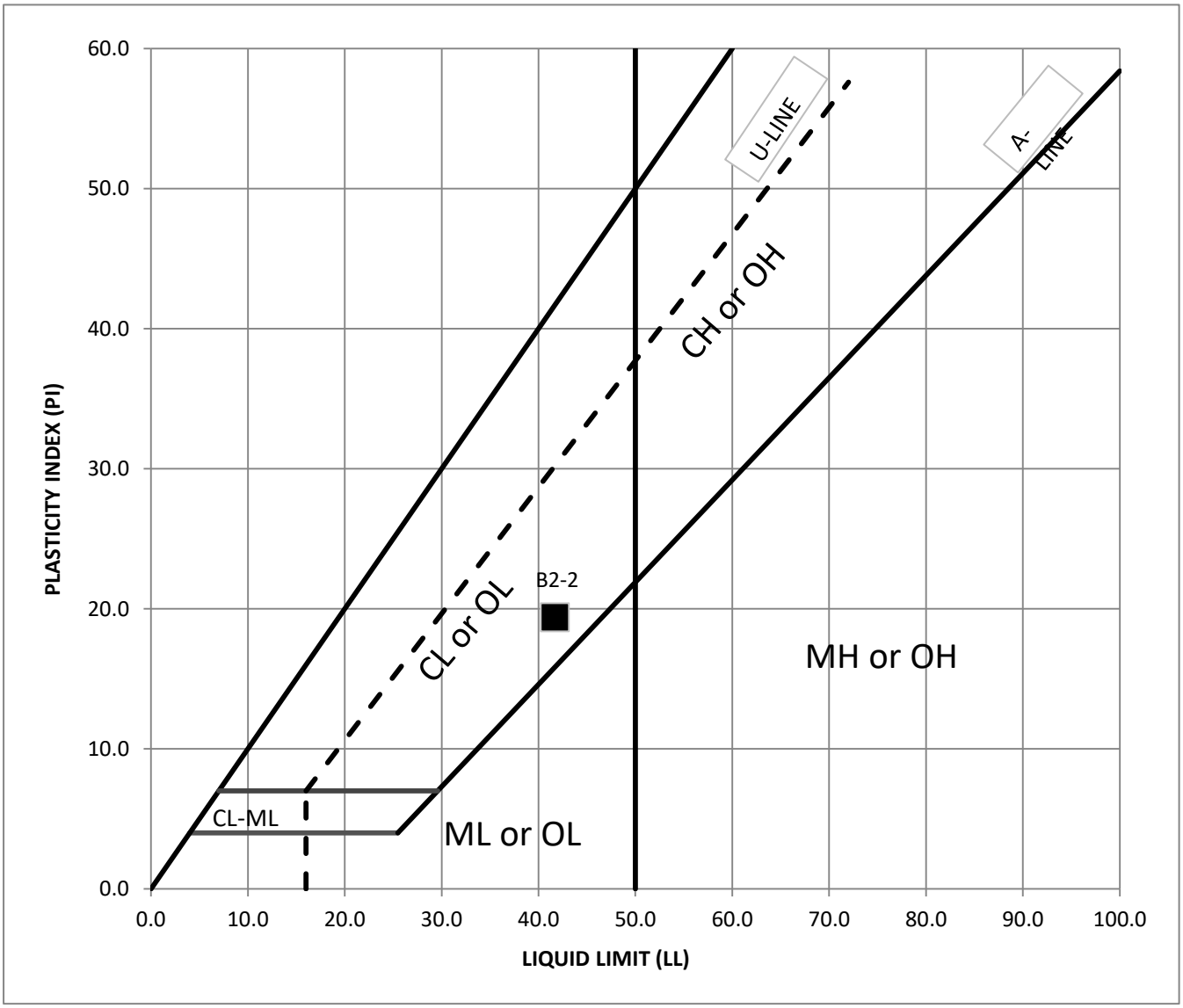
BORING:	B5-2	PERCENT	PERCENT
DEPTH (ft):	5.0	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	CL	99.2%	58.1%



BUTANO	**GRAIN SIZE DISTRIBUTION**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Alma College Parking Area and Trailhead	C-3

BORING:	B5-5	PERCENT	PERCENT
DEPTH (ft):	15.0	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	ML (Siltstone)	99.1%	67.9%

BUTANO	**GRAIN SIZE DISTRIBUTION**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Alma College Parking Area and Trailhead	C-4



BUTANO	**ATTERBERG LIMITS**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Alma College Parking Area and Trailhead	C-5

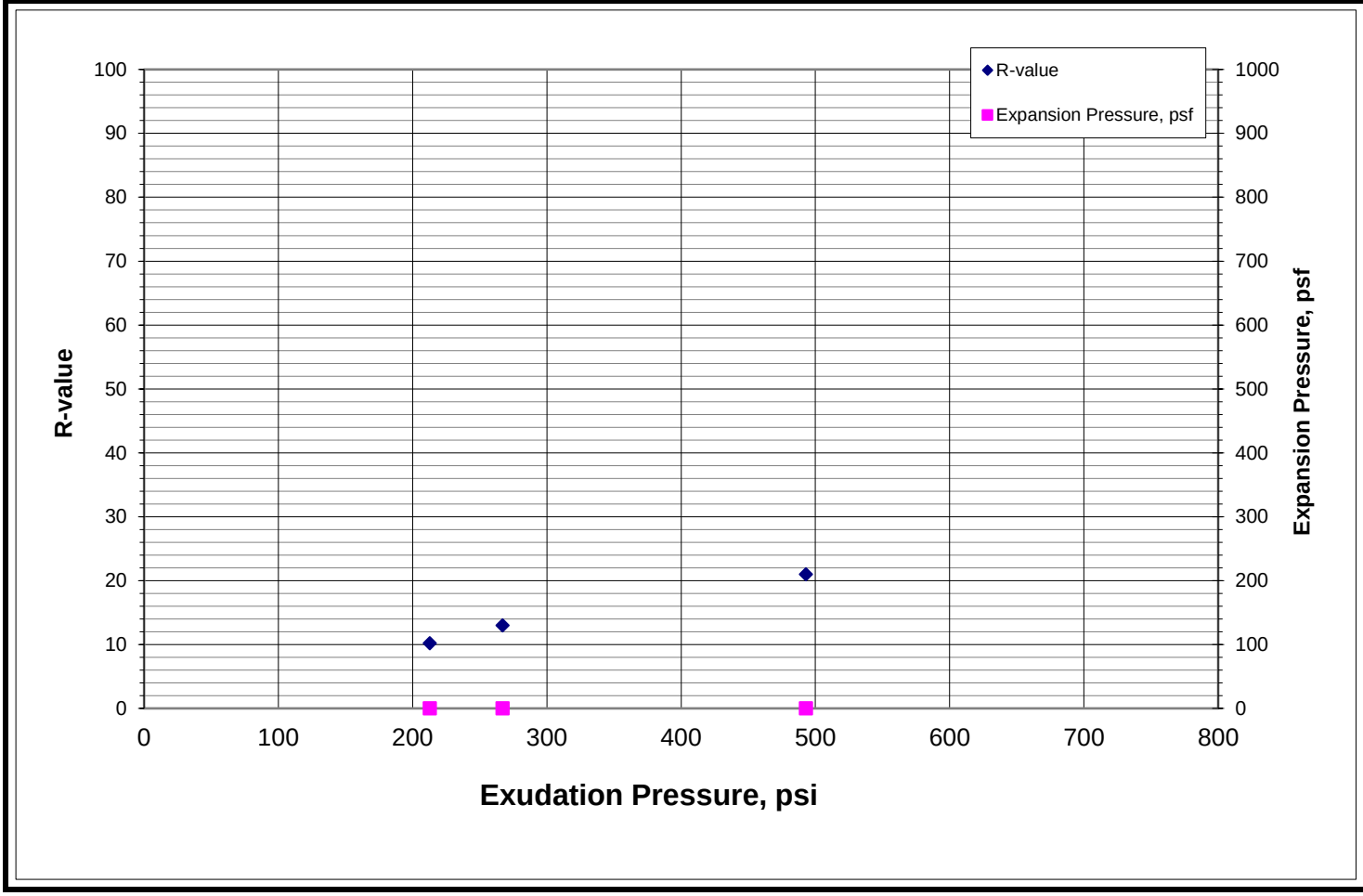
R-value Test Report (Caltrans 301)

Job No.:	673-018	**Date:**	06/16/17	**Initial Moisture,**	14.4
Client:	Butano Geotechnical	**Tested**	PJ	**R-value**	<5
Project:	Bear Creek Preserve - 16-136-SCL	**Reduced**	RU		
Sample	Bulk	**Checked**	DC	**Expansion Pressure**	psf
Soil Type:	Brown Sandy CLAY				

Specimen Number	A	B	C	D
Exudation Pressure, psi	493	267	213	
Prepaired Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	30	40	50	
Weight of Soil & Mold, grams	3140	3176	3172	
Weight of Mold, grams	2098	2099	2084	
Height After Compaction, in.	2.45	2.51	2.57	
Moisture Content, %	17.2	18.2	19.1	
Dry Density, pcf	110.0	110.1	107.7	
Expansion Pressure, psf	0	0	0	
Stabilometer @ 1000				
Stabilometer @ 2000	109	124	132	
Turns Displacement	4.25	4.90	4.85	
R-value	21	13	10	

Remarks:

Soil extruded from the mold giving a false exudation pressure (exudation pressures for Specimen C is greater than the reported value). Per Caltrans, the R-Value test was terminated and an R-Value of less than 5 was reported.



APPENDIX D

PERCOLATION TESTING PROCEDURES

Constant head percolation tests were performed at three locations on the parcel in borings P1/P2, P3/P4, and P5/P6. The approximate locations of the test holes are shown on the boring site plan in Appendix B, Figure B-3.

The borings for the percolation holes were logged in the field during the drilling process.

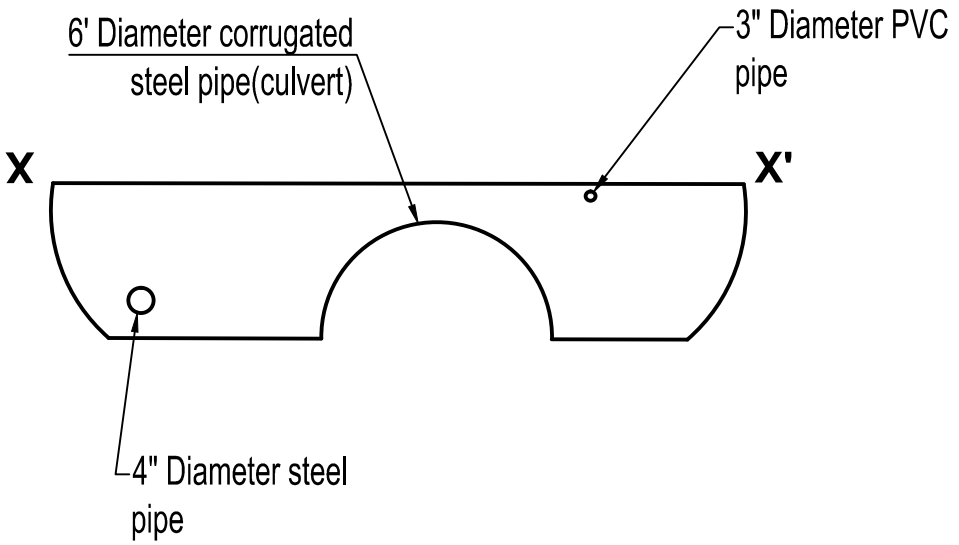
The percolation test holes were drilled with a 6-inch diameter solid stem track mounted auger. Perforated pipe was inserted to prevent potential collapse of the test holes and approximately 2 to 3 inches of clean, crushed ⅜" gravel was placed at the bottom of the holes as well as around the annulus of the pipe. The test holes were pre-soaked 24 hours prior to percolation testing.

The percolation rates were measured and recorded every 30 minutes.

The following rate reports the average of 3 consecutive measurements within 10% of each other.

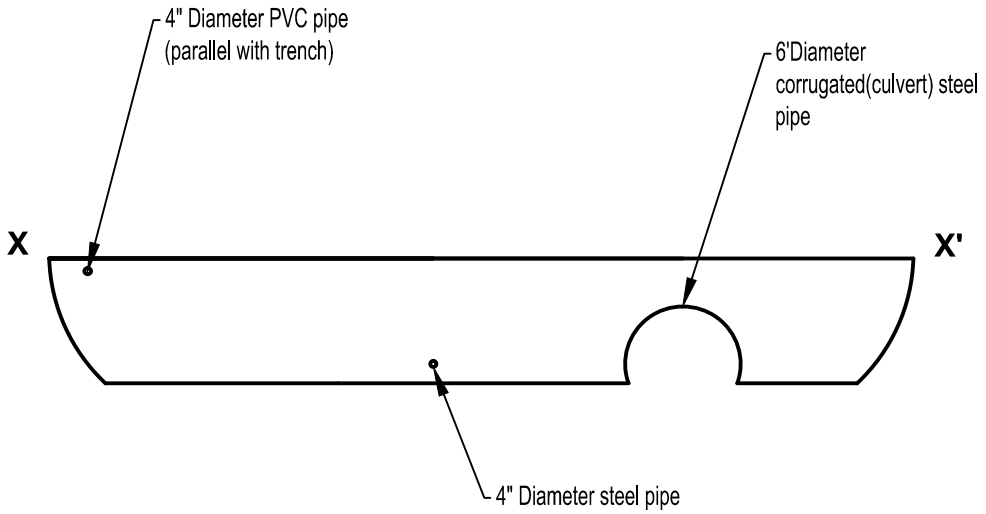
Percolation Test Hole (3 inch diameter)	Depth (ft)	Soil Description	Percolation Rate (inches/hour)
P1	2	SANDY LEAN CLAY	1
P2	4	SANDY LEAN CLAY	2.25
P3	2	SANDY LEAN CLAY WITH GRAVEL	1.75
P4	4	SANDY LEAN CLAY	1
P5	6	SANDY LEAN CLAY WITH GRAVEL	1
P6	2	SANDY LEAN CLAY	0.12

BUTANO	**TRENCH SITE □□□N**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Bear Creek Preserve	□



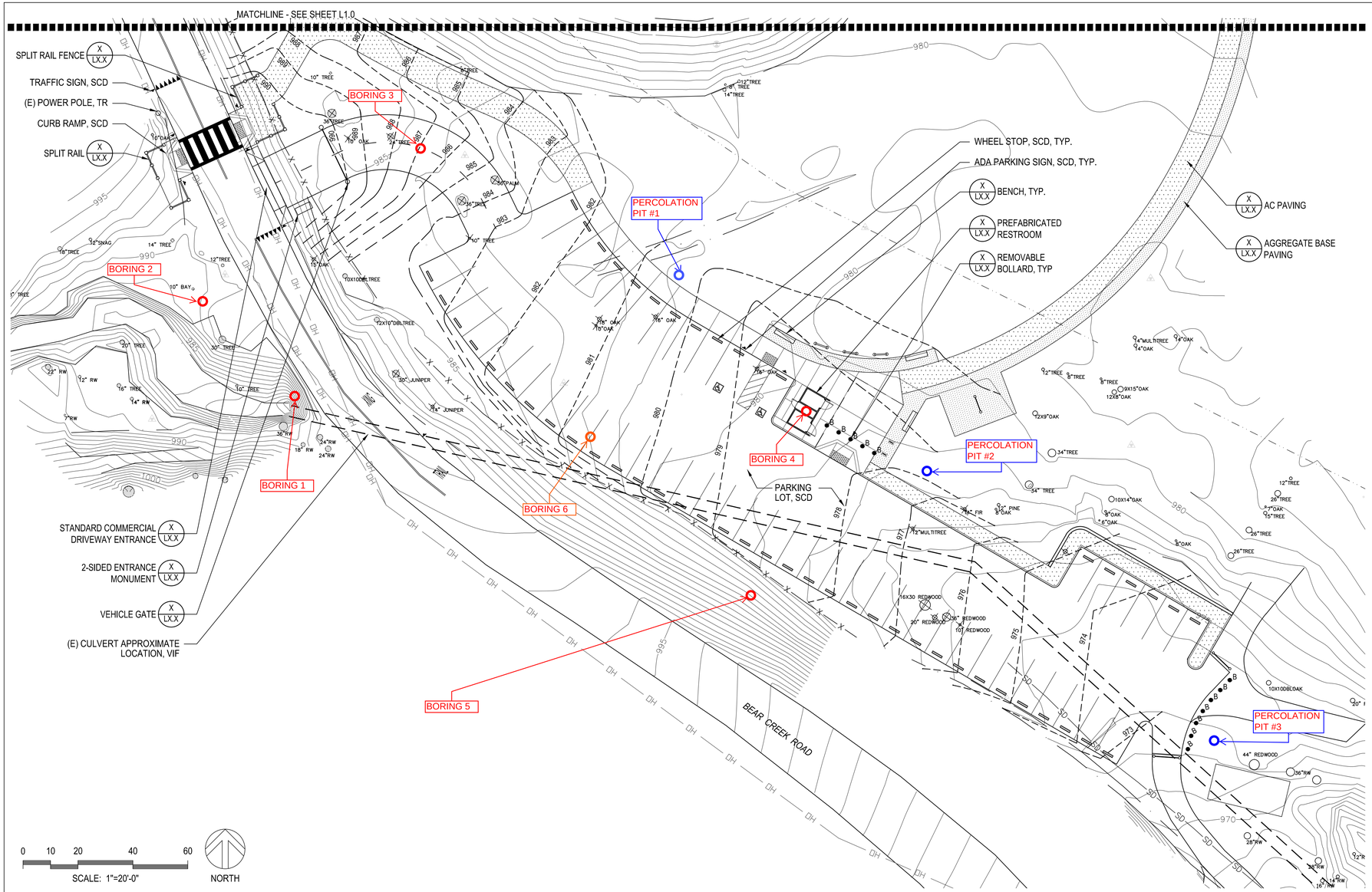
scale 1"=5'

BUTANO GEOTECHNICAL ENGINEERING, INC.	**CROSS SECTION '□' - TRENCH □** Bear Creek Preserve	FIGURE □



scale 1"= 10'

BUTANO	**CROSS SECTION 'Y' - TRENCH 2**	FIGURE
GEOTECHNICAL ENGINEERING, INC.	Bear Creek Preserve	3



SITE CONSTRUCTION LEGEND

- AC PAVING (X / LX.X)
- AGGREGATE BASE PAVING (X / LX.X)
- CONCRETE PAVING (X / LX.X)
- EXPANSION JOINT, TYP. (X / LX.X)
- SCORE JOINT, TYP. (X / LX.X)
- EXISTING WIRE FENCE
- BENCH, 8 FT, SURFACE MOUNT PER SPECS
- BR — BICYCLE RACK
- BS — BICYCLE STOP SIGN (X / LX.X)
- EXISTING TREE TO REMAIN
- EXISTING TREE TO BE REMOVED
- TR — TO REMAIN
- VIF — VERIFY IN FIELD

CONSTRUCTION NOTES

1. EXISTING CONDITIONS ARE SHOWN AS A HALF-TONE SCREEN.
2. EXPANSION JOINTS: INSTALL EXPANSION JOINTS IN CONCRETE PAVING AT 30'-0" O.C. MAX., OR AS SHOWN ON DRAWINGS. INSTALL EXPANSION JOINTS AT ALL LOCATIONS WHERE CONCRETE PAVING ABUTS WALLS OR OTHER VERTICAL SURFACES.
3. REFER TO SPECIFICATIONS FOR SITE FURNISHINGS.
4. SEE COVER SHEET FOR ADDITIONAL ABBREVIATIONS AND LEGEND.
5. LAY OUT BENCH LOCATIONS IN FIELD PER LAND ARCH'S DIRECTION.

Midpeninsula Regional Open Space District

Alma College Parking Area and Trailhead

Bear Creek Preserve
Santa Clara County, CA

HARRIS D□SIG□
Landscape Architecture
Park & Recreation Planning
Urban Design
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Issued for	Rev	Date	Appr

Seals and Signatures

LICENSED LANDSCAPE ARCHITECT
WILLIAM S. HARRIS #428
STATE OF CALIFORNIA
08-31-18

Drawn by : ZD
Checked by : BH

Drawing Title :

SITE CONSTRUCTION PLAN

Date :
Scale : 1" = 20'-0"
Project Number : 16.04
Sheet Number : L1.1

Exhibit 8-C: Webb Creek Bridge

CMAG ENGINEERING, INC.

P.O. BOX 640, APTOS, CALIFORNIA 95001
PHONE: 831.475.1411
WWW.CMAGENGINEERING.COM

June 12, 2017
Project No. 16-120-SCL

Midpeninsula Regional Open Space District
330 Distel Circle
Los Altos, California 94022

Attn: Matt Brunnings, PE

SUBJECT: **ADDENDUM TO GEOTECHNICAL REPORT**
Bear Creek Redwoods Roads and Trails
Proposed Bridge, Webb Creek Crossing - MP222
Los Gatos, Santa Clara County, California

REFERENCE: CMAG Engineering, Inc. (August 1, 2016). *Geotechnical Investigation, Bear Creek Redwoods Roads and Trails, Proposed Bridge, Webb Creek Crossing - MP222, Los Gatos, Santa Clara County, California*. Project No. 16-120-SCL.

Dear Mr. Brunnings:

In accordance with you authorization, we have completed an addendum to the existing geotechnical investigation report for the proposed bridge at the Webb Creek crossing (MP222). This addendum presents additional geotechnical recommendations based on the field exploration and laboratory testing presented in the referenced report. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

CMAG ENGINEERING, INC.

Adrian L. Garner, PE, GE
Principal Engineer
C 66087, GE 2814
Expires 6/30/18

Distribution: Addressee (Electronic Copy)
Dale Hendsbee, SE (Electronic Copy)

1.0 INTRODUCTION

It is our understanding that the design team is considering modifying the foundation design of the proposed bridge to a shallow foundation system in lieu of drilled, cast-in-place concrete shafts.

The site is underlain by potentially liquefiable soils that may undergo vertical reconsolidation settlements and lateral spreading during seismic shaking. The liquefaction analyses completed for the subject site, under the conditions anticipated during the design seismic event, determined that the upper 10± feet of deposits have a high potential for liquefaction. Due to the proposed configuration of the bridge and the geometry of the creek, the critical zone susceptible to lateral spreading consists of a 3 foot thick layer that extends from the base of the creek (centerline) at elevation 91± feet to 94± feet. We have provided bridge foundation recommendations in the referenced report (CMAG, 2016) for drilled, cast-in-place concrete shafts due to the potential for lateral spreading.

2.0 SHALLOW FOUNDATIONS

2.1 General

We evaluated the suitability of a shallow foundation system to support the proposed bridge when considering seismically induced deformations from the design earthquake. It is our understanding that the bridge can be designed to accommodate moderate differential vertical settlements. However, it is our opinion that significant lateral spreading, on a layer below the shallow foundation system, may cause significant structural damage or collapse.

Due to the potential for lateral spreading, we recommend removing the potentially liquefiable soils to a depth of 91± feet (approximately 8.5 feet below grade) beneath both abutments. The removed soil should be replaced with compacted engineered fill to a minimum of 90 percent relative compaction per the geotechnical report (CMAG, 2016). Reconsolidation settlements due to the remaining liquefiable soils will be minimized by the recommended earthwork. We recommend that the bridge be designed to tolerate 1.5 inches of differential settlement between the river right and river left abutments during the design seismic event.

Wet conditions should be anticipated for the excavations. Dewatering, caving conditions, and soft excavations should be anticipated during earthwork operations for the construction of shallow foundations. Temporary excavation recommendations are provided in Section 7.2.4 of the referenced report (CMAG, 2016).

2.2 Earthwork

Beneath the shallow foundations, the soil should be overexcavated to a minimum of 91+ feet (approximately 8.5 feet below grade) . Once the overexcavation has been achieved, geofabric consisting of Mirafi RS580i (or approved equivalent) should be placed at the base of the overexcavation. The geogrid should be installed per the manufacturer's recommendations. The soil which has been removed should then be replaced as engineered fill, compacted to a minimum of 90 percent relative compaction. The zone of compacted engineered fill should extend a minimum of 5 feet beyond the foundation footprint.

If shallow groundwater is present during grading, the excavation should proceed to prevent equipment from traversing across the excavation bottom. As indicated above, Mirafi RS580i geotextile, or approved equivalent, should be placed at the overexcavation bottom. Eight inches of loose engineered fill should be placed over the Mirafi RS580i without passage of heavy equipment. The engineered fill should be compacted with light compaction equipment (vibrating plate compactor) to a minimum of 88 percent relative compaction. A second lift of approximately eight inches of loose engineered fill should be placed. At this point, heavy compaction equipment, may be attempted to achieve the compaction requirements outlined above, however, if stress fractures or pumping are observed during compaction, the heavy equipment should be removed from the area to prevent damage of the engineered fill and/or the underlying subsurface soils. The recommendations in the prior paragraph should be adhered to for the remaining placement of engineered fill. The Geotechnical Engineer should be notified if stress fractures or pumping occurs. It is the contractor's responsibility to adhere to the recommendations provided above while performing the earthwork.

Fill should be compacted by mechanical means in uniform horizontal loose lifts not exceeding 8 inches in thickness. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557.

The on-site colluvial / alluvial soils may be used as backfill, however, all cobbles, boulders, and highly organic soils must be removed. A screening operation may be required to adequately achieve the removal of the boulders and cobbles. If used, the on-site soils must be blended to provide uniform engineered fill. Note: The on-site soils were over optimum at the time of our field exploration, significant drying may be required before use as engineered fill. The near surface on-site soils contain a significant percentage of fines and are not ideal for use as engineered fill. It should be anticipated that import fill may be required due to the difficulty in achieving compaction and the poor suitability of the on-site soils.

The soil should be verified by a representative of CMAG in the field during grading operations. All soils, both existing on-site and imported, to be used as fill, should contain less than 3 percent organics and be free of debris and cobbles over 3 inches in maximum dimension. Imported fill material should be approved by a representative of CMAG prior to importing. Soils having a significant expansion potential should not be used as imported fill. The Geotechnical Engineer should be notified not less than 5 working days in advance of placing any fill or base course material proposed for import. Each proposed source of import material should be sampled, tested, and approved by the Geotechnical Engineer prior to delivery of any soils imported for use on the site.

Any surface or subsurface obstruction, or questionable material encountered during grading, should be brought immediately to the attention of the Geotechnical Engineer for proper processing as required.

2.3 Foundation Resistance Design

2.3.1 Spread Footings

Table 1 may be used for the design of the service limits states for spread footings for the abutments and wingwalls founded on compacted fill per Section 2.2.

Table 1. Foundation Design Parameters - Service Limits States

Assumed Footing Dimensions (ft)	Service Limits State Bearing Resistance	Service Limits State Anticipated Total Settlement	Service Limits State Anticipated Differential Settlement
Width = 5 ft Length = 14 ft	1,200 psf	Total = 1 inch	Differential = 0.5 inch*

***Note:** The differential settlement is based on the length of the footing.

Table 2 may be used for the design of the strength limits states for spread footings for the abutments and wingwalls founded on compacted fill per Section 2.2.

Table 2. Foundation Design Parameters - Strength Limits States

Assumed Footing Dimensions (ft)	Strength Limits State Bearing Resistance	Strength Limits State Friction Factor	Strength Limits State Passive Resistance
Width = 5 ft Length = 14 ft	6,400 psf	0.26	215 psf/ft

Table 3 may be used for the design of the extreme limits states for spread footings for the abutments and wingwalls founded on compacted fill per Section 2.2.

Table 3. Foundation Design Parameters - Extreme Limits States*

Assumed Footing Dimensions (ft)	Extreme Limits State Bearing Resistance	Extreme Limits State Friction Factor	Extreme Limits State Passive Resistance
Width = 5 ft Length = 14 ft	2,700 psf	0.32	430 psf/ft

***Note:** A reconsolidation settlement (differential between abutments) of 1.5 inches should be anticipated for the extreme limits state.

3.0 LIMITATIONS

Our addendum was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report. Soil and geologic conditions can vary significantly between sample locations.

As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer, and revised recommendations be provided as required.

This addendum is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this addendum are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge.

Accordingly, this addendum may become invalidated wholly or partially by changes outside our control. Therefore, this addendum is subject to review and revision as changed conditions are identified.

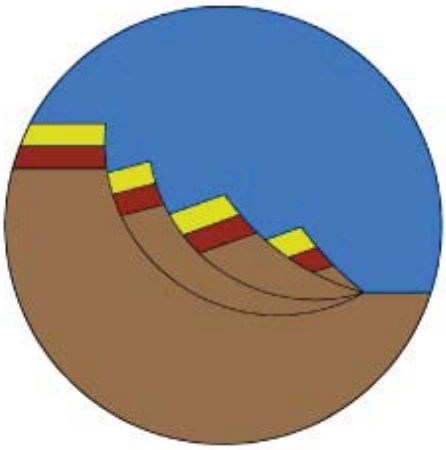
GEOTECHNICAL INVESTIGATION

Bear Creek Redwoods Roads and Trails - MP222
Los Gatos, Santa Clara County, California

Submitted to:

Waterways Consulting, Inc.
509A Swift Street
Santa Cruz, California 95060

ATTN: Matt Weld, PE



Prepared by:

CMAG ENGINEERING, INC.

Project No. 16-120-SCL
August 1, 2016

CMAG ENGINEERING, INC.

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August 1, 2016
Project No. 16-120-SCL

Waterways Consulting, Inc.
509A Swift Street
Santa Cruz, California 95060

Attn: Matt Weld, PE

SUBJECT: **GEOTECHNICAL INVESTIGATION**
Bear Creek Redwoods Roads and Trails
Proposed Bridge, Web Creek Crossing - MP222
Los Gatos, Santa Clara County, California

Dear Mr. Weld:

In accordance with your authorization, we have completed a geotechnical investigation for the subject project. This report summarizes the findings, conclusions, and recommendations from our field exploration, laboratory testing, and engineering analysis. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

CMAG ENGINEERING, INC.

Adrian L. Garner, PE, GE
Principal Engineer
C 66087, GE 2814
Expires 6/30/18

Distribution: Addressee (4 Hard Copies; Electronic Copy)

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APPENDICES

APPENDIX A
Field Exploration Program

APPENDIX B
Laboratory Testing Program

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed new bridge at MP222 in the Bear Creek Redwood Open Space Preserve in Los Gatos, Santa Clara County, California. The proposed bridge has a span of 30 feet and crosses Webb Creek to provide access for the trails north of the crossing.

The purpose of our investigation was to provide information regarding the surface and subsurface soil and bedrock conditions, and based on our findings, provide geotechnical recommendations for the design and construction of the proposed bridge. Conclusions and recommendations related to geotechnical hazards, general site grading, bridge foundations, and abutment retaining structures are presented herein.

1.1 Terms of Reference

CMAG Engineering, Inc.'s (CMAG) scope of work for this phase of the project included site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analyses, and preparation of this report.

CMAG Engineering, Inc. has been retained by Waterways Consulting, Inc. to provide geotechnical recommendations for the design and construction of the proposed bridge at MP222.

The recommendations contained in this report are subject to the limitations presented in Section 8.0 of this report.

1.2 Definitions

1.2.1 River Right

That bank of a stream or river on the right of the observer when facing in the direction of flow or downstream.

1.2.2 River Left

That bank of a stream or river on the left of the observer when facing in the direction of flow or downstream.

1.3 Site Location

The project site is located on the northwest side of Bear Creek Road, and north of Summit Road in the Bear Creek Redwood Open Space Preserve in Los Gatos, Santa Clara County, California. The site location is shown on the Site Location Map, Figure 1.

1.4 Site Conditions

The proposed bridge crosses Web Creek. The creek has an overall flow to the east, northeast in the vicinity of the site. The creek flows in a narrow valley that widens at the crossing. The north facing slopes steeply descend to the valley bottom. A gully ascends from the north side of the crossing to the north, northwest. The south facing slopes that descend to the valley floor are also steep. The slopes are densely vegetated with trees and brush. Boulders, cobbles, gravel, and sand were observed on the surface in the creek bed.

1.5 Project Description

It is our understanding that the project consists of the construction of a new, 30 foot single span, prefabricated steel bridge with a width of approximately 16 feet. The bridge is to be founded on cast-in-place concrete abutments. Rock slope protection is to be constructed to protect the abutments from hydraulic forces.

The abutments are to be founded on drilled, cast-in-place concrete shafts. The abutments are to retain approximately 4 feet of soil with an overall height of approximately 7 feet. Rock slope protection is to be constructed at the toe of both abutments, with an overall height of approximately 4 feet.

2.0 GEOLOGIC SETTING AND SEISMICITY

2.1 Geologic Setting

The site is located in the central Santa Cruz Mountains in the geomorphic province of the California Coast Ranges. The site is located on the northeast flank of the central Santa Cruz Mountains, which are mostly underlain by granitic and metamorphic basement rocks of the Salinian Block, and is separated by contrasting basement rock of the Franciscan Complex to the northeast by the San Andreas Fault. Overlying the granitic and metamorphic basement rocks is a sequence of Tertiary sedimentary rock ranging in age from Paleocene to Pliocene.

Tectonic forces associated with lateral or “transform” motion between the North American and Pacific Plates have produced the northwest trending faults such as the San Andreas Fault zone. The tectonic forces have also produced the northwest trending ridges and parallel valleys in the area.

The Quaternary history of the Santa Cruz Mountains includes significant landsliding, shaping the modern landscape. The steep topography, weak rock and soil, seasonal heavy rainfall, and active seismicity in the area are all contributing factors to the numerous landslides in the Santa Cruz Mountains.

The geologic map of Santa Clara County (Dibblee, 2007) depicts the subject property as underlain by a large landslide deposit. The site is mapped near the toe of the deposit on the southern end. The underlying rock is mapped as the San Lorenzo Formation (Tsl; Oligocene and Eocene) consisting of siltstone and micaceous shale. Numerous faults are located in the region, surrounding the site, discussed in Section 2.2 below. See Figure 2 for a local geologic map of the area.

2.2 Regional Seismicity and Faulting

The 2014 Working Group on California Earthquake Probabilities (2014 WGCEP) in association with the U.S. Geological Survey (USGS) developed estimates of earthquake probabilities for all of California. Within the greater San Francisco region, over the next 30 years, the 2014 WGCEP estimates a probability of 72 percent for a magnitude 6.7 or larger earthquake.

The major active faults in the area are the San Andreas Fault Zone, Zayante - Vergeles Fault Zone, and the San Gregorio Fault Zone.

The USGS has published national seismic hazard maps displaying earthquake ground motions for various probability levels across the United States. The approximate distances to the active faults from the site and the estimated Mean Characteristic Moment Magnitude are presented in Table 1. The distance to the faults and the Mean Characteristic Moment Magnitude were determined from the USGS *2008 National Seismic Hazard Maps* (NSHMP) model. A latitude and longitude of 37.174 degrees and -122.016 degrees, respectively was used for our spatial query.

Table 1. Regional Active Faults

Fault Segment	Approximate Distance to Site (miles)	Mean Characteristic Moment Magnitude
N. San Andreas; SA0+SAN+SAP+SAS	0.6	8.01
Monte Vista - Shannon	5.7	6.50
Zayante -Vergeles	6.4	7.00
San Gregorio Connected	15.9	7.50
Monterey Bay - Tularcitos	18.4	7.30
Calaveras: CN+CC+CS	20.1	7.03
Hayward - Rodgers Creek; RC+HN+HS	21.4	7.33

3.0 FIELD EXPLORATION AND LABORATORY TESTING PROGRAMS

Our field exploration program included drilling, logging, and interval sampling of 2 borings on May 25 and 26, 2016. The borings were advanced to depths of 31.5± feet and 41± feet below existing grades. Details of the field exploration program, including the Boring Logs, Figures A-1 and A-2, are presented in Appendix A.

Representative samples obtained during the field investigation were taken to the laboratory for testing to determine physical and engineering properties. Details of the laboratory testing program are presented in Appendix B. Test results are presented on the Boring Logs and in Appendix B.

4.0 SUBSURFACE CONDITIONS AND EARTH MATERIALS

4.1 General

One boring was advanced in the location of the proposed River Right abutment (Boring B-1) and 1 boring was advanced in the location of the proposed River Left abutment (Boring B-8). The subsurface profile encountered in the borings was relatively consistent, consisting of colluvium and alluvium within the depths explored. However, the colluvial / alluvial deposits, within the upper 10± feet were not consistent. River Right encountered relatively cohesionless soils and River Left encountered cohesive soils in the upper 10± feet. Fill soils were encountered in the upper 2.5 to 3.5 feet in both the borings.

Complete soil profiles are presented on the Boring Logs, Appendix A, Figures A-1 and A-2. The approximate boring locations are shown on the Boring Location Plan (Figure 3). A representative cross section has been constructed based on the results of our subsurface investigation (Figure 4).

4.2 Artificial Fill - af

Fill soils consisting of medium dense sandy silt with clasts of sandstone and siltstone were encountered in both the borings. The fill was approximately 3.5 feet thick and 2.5 feet thick in Borings B-1 and B-8, respectively.

4.3 Colluvial and Alluvial Deposits - Qc/Qal_1, Qc/Qal_2

Two distinct deposits of colluvium / alluvium were encountered, Qc/Qal_1, and Qc/Qal_2.

4.3.1 Qc/Qal_1

Beneath the fill, to a depth of 9.5+ feet in Boring B-1 (River Right), the deposits consisted of very loose to medium dense sandy silt and silty sand with clasts of sandstone and siltstone. Beneath the fill, to a depth of 12+ feet in Boring B-8 (River Left), the deposits consisted of soft to firm sandy lean clay with clasts of sandstone and siltstone. Highly organic layers were encountered within the deposits.

4.3.2 Qc/Qal_2

Beneath the upper deposits, to the extent of our field exploration at 41+ feet below the existing grades, the deposits generally consisted of sandstone boulders in a matrix of silty sand, sandy silt, and sandy lean clay. The blow counts indicated that the sandstone boulders were generally dense and the matrix was generally loose. Based on our observations within the samples, the material varied from matrix to clast supported. However, due to the size of the sandstone boulders (observed as >12 inches), relative to the size of the sampler, it is our opinion that the deposits are generally clast supported.

4.4 Groundwater

Groundwater was encountered at depths of 7.5+ and 8+ feet below existing grades in Borings B-1 and B-8, respectively.

It should be noted that groundwater conditions may vary with location and may fluctuate with variations in the river elevation, rainfall, runoff, irrigation, and other changes to the conditions existing at the time our field investigation was performed.

5.0 GEOTECHNICAL HAZARDS

5.1 General

In our opinion, the geotechnical hazards that could potentially affect the proposed project are:

- Seismic shaking
- Collateral Seismic Hazards
- Landsliding

5.2 Seismic Shaking

Intense seismic shaking is expected to occur at the site from a major earthquake along one of the local fault systems. Generally, the intensity of shaking will increase the closer the site is to the epicenter of an earthquake, however, seismic shaking is a complex phenomenon and may be modified by local topography and subsurface soil and bedrock conditions.

To characterize the ground shaking hazard at the site, we used the USGS 2002 and 2008 national seismic hazard maps. We determined a Maximum Considered Geometric Mean Peak Ground Acceleration (PGA_M), adjusted for Site Class effects in accordance with Section 11.8.3 of ASCE 7-10 *Minimum Design Loads for Buildings and Other Structures* (2010) published by the American Society of Civil Engineers. We also determined the spectral accelerations and PGA per the *2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design* (2011). For our determination of the ground motions, we used a site latitude and longitude of 37.174 degrees and -122.016 degrees, respectively.

5.2.1 ASCE 7-10

Spectral accelerations and a PGA_M were determined in accordance with the ASCE 7-10 using the USGS *U.S. National Maps Web Application* online tool. The ASCE 7-10 incorporates the *2008 National Seismic Hazard Maps.* The input parameters for the online tool consist of the site latitude and longitude and Site Class. A site class of D (Stiff Soil) has been determined for River Left and River Right. The site class has been determined based on our field investigation and laboratory testing.

Table 2. Spectral Accelerations and PGA_M - ASCE 7-10

S_S	S_1	Site Class	F_a	F_v	S_{MS}	S_{M1}	S_{DS}	S_{D1}	PGA_M
2.521g	1.211g	D	1.0	1.5	2.521g	1.817g	1.681g	1.211g	0.968g

5.2.2 2011 AASHTO

Spectral accelerations and a PGA were determined in accordance with the 2011 AASHTO guide specifications using the USGS *U.S. National Maps Web Application* online tool. The 2011 AASHTO guide incorporates the *2002 National Seismic Hazard Maps.* The input parameters for the online tool consist of the site latitude and longitude and Site Class. A site class of D (Stiff Soil) has been determined for River Left and for River Right. The site class has been determined based on our field investigation and laboratory testing.

Table 3. Spectral Accelerations and PGA - 2011 AASHTO

PGA	S_S	S_1	Site Class	F_{PGA}	F_a	F_v	A_S	S_{DS}	S_{D1}
0.930	2.154g	1.077g	D	1.0	1.0	1.5	0.930g	2.154g	1.615g

5.3 Collateral Seismic Hazards

In addition to seismic shaking, other seismic hazards that may have an adverse effect to the site and/or the structure are: fault ground surface rupture, seismically induced liquefaction, and seismically induced landsliding. Fault ground surface rupture, seismically induced liquefaction, and seismically induced landsliding are discussed in Subsections 5.3.1, 5.3.2, and 5.4, respectively.

5.3.1 Fault Ground Surface Rupture

The San Andreas Fault Zone and Butano Fault Zones are depicted on Figure 2 to the northeast and southwest of the site, respectively. Splay faults are mapped within close proximity of the site, concealed beneath the large mapped landslide underlying the site. Our scope of services for this project did not include a fault study. CMAG does not have an opinion, expressed or implied, of the risks associated with the hazard due to fault ground surface rupture. If an evaluation of the potential for faulting to affect the site is desired, we can provide investigation services in conjunction with a Certified Engineering Geologist for an additional fee.

5.3.2 Seismically Induced Liquefaction

Seismically induced liquefaction tends to occur in loose, unconsolidated, noncohesive soils beneath the groundwater table. The colluvial / alluvial deposits, Qc/Qal_1 beneath River Right (Boring B-1), underlying the site meet this criteria and we therefore performed a quantitative liquefaction analysis. It is our opinion that Qc/Qal_2 has a low potential for seismically induced liquefaction due to the clast supported nature of the deposits. Pockets of the matrix may be susceptible to liquefaction, however, it is our opinion that the matrix is not laterally continuous.

A quantitative liquefaction analysis was performed using empirical predictions of earthquake-induced liquefaction potential. The analysis is based on a comparison of the in situ cyclic stress ratio (CSR) with that historically present in areas experiencing liquefaction for a given earthquake magnitude and recorded soil grain size distribution and penetration resistance (as expressed by SPT blows\ft). The analysis is based on the method presented by Seed et al. (2003).

Our analysis was performed assuming an $A_S = F_{PGA}$ PGA of 0.930g and a magnitude 8.0 on the San Andreas Fault Zone. The ground shaking parameter used for our analysis was determined using the *2002 National Seismic Hazard Maps* published by the U.S. Geological Survey (USGS) and 2011 AASHTO Guide Specifications.

For our analysis, we assumed a groundwater table at 5 feet below the ground surface at the approach (below the top of Boring B-1). Particle size analyses were performed on samples considered representative of the potentially liquefiable soils encountered. Results of our particle size analyses are presented in Appendix B, Figures B-1 through B-3.

The liquefaction analyses completed for the subject site, under the conditions anticipated during the design seismic event, determined that the Qc/Qal_1 deposits on River Right have a high potential for liquefaction.

5.3.3 Liquefaction Induced Deformations

Deformations due to liquefaction may include vertical settlement or lateral spreading. Based on volumetric reconsolidation strains produced by Wu (2003) and recommended in the paper titled *Recent Advances In Soil Liquefaction Engineering: A Unified And Consistent Framework* (2003), a volumetric reconsolidation strain of approximately 2 to 3 inches should be anticipated for the subject site during the design seismic event in the proposed location of the River Right abutment.

Lateral spreading can occur on gently sloping ground or if the liquefied material is unrestrained with a free face facilitating cyclic mobility. It is our opinion that the potential for lateral spreading within the Qc/Qal_1 deposits on River Right is high. Due to the proposed configuration of the bridge and the geometry of the creek, the critical zone susceptible to lateral spreading consists of a 3 foot thick layer that extends from the base of the creek to the bottom of the abutment.

We performed a Newmark Analysis and determined that the anticipated deformation due to lateral spreading, for the design seismic event, is greater than the deformation required to mobilize full passive pressure.

5.4 Landsliding

The site is mapped as underlain by a large landslide deposit (Figure 2). The steep slopes in the area, composed of weak, intensely sheared rocks and overlying unconsolidated deposits, are highly prone to landsliding. Abundant landslides and debris flows are documented in the area.

Landsliding may impact the project directly or indirectly. Reactivation of the large mapped landslide causing significant deformation or deposition of debris is a direct impact. A debris flow impacting the bridge is also a direct impact. A landslide occurring upstream, depositing debris into the creek and causing an adverse affect to the bridge is an indirect impact.

Our scope of services for this project did not include investigating the potential for landsliding to affect the project. However, based on the work by others, the risk to landsliding is high in the general vicinity of the proposed crossing, consistent with the majority of the area. If a detailed landslide evaluation is desired, we can provide investigation services in conjunction with a Certified Engineering Geologist for an additional fee.

6.0 DISCUSSIONS AND CONCLUSIONS

The subsurface profile consists of alluvium / colluvium within the depths explored. The upper portion of the alluvium / colluvium (Qc/Qal_1) is heterogeneous. Very loose to medium dense cohesionless soils were encountered on River Right and soft to firm cohesive soils were encountered on River Left. Qc/Qal_1 extends to approximately 5 to 6 feet below the bottom of the both abutments. Qc/Qal_2 was encountered at 10 to 12 feet below grade to a maximum explored depth of 41± feet below grade. The deposits generally consisted of sandstone boulders in a matrix of silty sand, sandy silt, and sandy lean clay. Our field investigation indicated that, in general, the sandstone boulders were greater than 12 inches in maximum observed dimension. It is our opinion that the deposits are generally clast supported.

Due to the relative density and cohesionless nature of Qc/Qal_1 on River Right, the soils are susceptible to seismically induced liquefaction and lateral spreading. Based on the Qc/Qal_1 deposits encountered in our boring beneath River Left, the potential for seismically induced liquefaction, due to their cohesive nature, is low. However, due to the heterogeneity of the deposits when considering the close proximity of Boring B-1 and B-8, it is our opinion that it would be reasonable to assume that there is a moderate potential for seismically induced liquefaction and lateral spreading to occur within Qc/Qal_1 on River Left. It is our opinion that Qc/Qal_2 has a low potential for seismically induced liquefaction due to the clast supported nature of the deposits.

Based on the results of our field investigation, laboratory testing, and engineering analysis, it is our opinion that there is a high potential for lateral spreading to occur in a portion of the deposits beneath River Right. Due to the proposed configuration of the bridge and the geometry of the creek, the critical zone susceptible to lateral spreading consists of a 3 foot thick layer that extends from the base of the creek to the bottom of the abutment. As indicated above, it is also our opinion that is reasonable to consider that a moderate potential for liquefaction and lateral spreading exists beneath River Left. We have provided recommendations for designing the bridge abutments and foundations for seismically induced liquefaction and lateral spreading in Section 7 of this report.

7.0 RECOMMENDATIONS

7.1 General

Based on the results of our field investigation, laboratory testing, and engineering analysis, it is our opinion that from a geotechnical standpoint, the subject site will be suitable for the proposed development provided the recommendations presented herein are implemented during grading and construction.

We recommend the abutments for both River Right and River Left be founded on drilled, cast-in-place concrete shafts.

The drilled cast-in-place concrete shafts and abutments on both River Right and River Left should be designed to resist the lateral earth pressures due to seismically induced liquefaction and lateral spreading. See Section 7.3 for foundation recommendations.

Shallow groundwater was encountered in the borings advanced for both River Right and River Left, above the depth of the bottom of the proposed foundations. Coupled with the cohesionless alluvial deposits, caving during excavating should be anticipated. Dewatering and shoring should be anticipated for excavations. See Section 7.2.6 for anticipated excavating conditions.

7.2 Site Grading

7.2.1 Site Clearing

Prior to grading, the areas to be developed for structures and other improvements, should be stripped of any vegetation and cleared of any surface or subsurface obstructions, including existing bridge foundations, utility lines, unengineered fills, and miscellaneous debris.

Surface vegetation and organically contaminated topsoil should be removed from areas to be graded. The required depth of stripping will vary with the time of year the work is done and must be observed by the Geotechnical Engineer.

Voids resulting from the removal of buried obstructions, including cobbles and boulders, that extend below finished site grades, should be backfilled with engineered fill compacted to the requirements of Subsection 7.2.2. Prior to backfilling, the Geotechnical Engineer should observe the voids to determine if alternative recommendations are more suitable.

7.2.2 Preparation of On-Site Soils

Abutment backfill should be placed under engineering control. Backfill should be compacted to a minimum of 90 percent and a maximum of 92 percent relative compaction, however, precautions should be taken to ensure that heavy compaction equipment is not used immediately adjacent to walls, so as to prevent undue pressures against, and movement of, the walls. The upper 6 inches of subgrade and baserock should be compacted to a minimum of 95 percent relative compaction.

All fill should be compacted with heavy vibratory equipment. Fill should be compacted by mechanical means in uniform horizontal loose lifts not exceeding 8 inches in thickness. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557.

The on-site colluvial / alluvial soils may be used as backfill, however, all cobbles and boulders must be removed. A screening operation may be required to adequately achieve the removal of the boulders and cobbles. The soil should be verified by a representative of CMAG in the field during grading operations. All soils, both existing on-site and imported, to be used as fill, should contain less than 3 percent organics and be free of debris and cobbles over 3 inches in maximum dimension. Imported fill material should be approved by a representative of CMAG prior to importing. Soils having a significant expansion potential should not be used as imported fill. The Geotechnical Engineer should be notified not less than 5 working days in advance of placing any fill or base course material proposed for import. Each proposed source of import material should be sampled, tested, and approved by the Geotechnical Engineer prior to delivery of any soils imported for use on the site.

Any surface or subsurface obstruction, or questionable material encountered during grading, should be brought immediately to the attention of the Geotechnical Engineer for proper processing as required.

7.2.3 Fill Slopes

Fills situated on slopes greater than 5:1 (horizontal to vertical) should be constructed per the recommendations of this section.

All fill slopes should be constructed with engineered fill meeting the minimum density requirements of Subsection 7.2.2 and have a gradient no steeper than 2:1 (horizontal to vertical).

Fill slopes shall be benched and keyed into the native slopes by providing a base keyway whose minimum width is 10 feet and which is sloped negatively at least 2 percent back into the slope. The depth of keyways will vary, depending on the materials encountered, but at all locations shall be at least 2 feet into firm material. This keyway should be combined with intermediate benching as required. Refer to Figure 5 for general details.

The surfaces of all fill slopes should be worked to reduce erosion. This work, as a minimum, should include track rolling of the fill slopes and effective planting of all slopes. The protection of the slopes should be installed as soon as practicable so that a sufficient growth will be established prior to inclement weather conditions. It is vital that no slope be left standing through a winter season without the erosion control measures having been provided.

The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

7.2.4 Temporary Cut-Slopes

We recommend that temporary cut slopes within the colluvial / alluvial deposits be sloped at 1.5:1 H:V (horizontal to vertical). The slope angles presented above assume dewatered conditions. The excavations are considered temporary only. The excavations described above may be open without shoring for a **maximum of 30 days** under dewatered conditions. A representative of our firm must be present during the excavation to observe the stability of the excavation slopes and to verify the slope angle. A representative of our firm should visit the site a minimum of once a week after the excavation to observe the moisture condition of the soil and observe the stability of the excavation slopes. If any tension cracks occur at the top of the excavation during construction, our firm should be notified immediately. All work within the excavation should stop until a representative of our firm is present at the site.

NOTE: All existing fill soils should be removed in areas of by temporary cut slopes.

7.2.5 Excavating Conditions

Boulders were observed in the creek. Due to the relative size of the borings to the size of the sandstone clasts encountered during drilling, we cannot provide an accurate maximum boulder size, however, it is our opinion that boulders greater than 12 inches in diameter should be anticipated during excavation. The geotechnical drilling equipment was able to advance the borings within Qc/Qal_2, through the boulders, however, equipment capable of drilling through rock should be anticipated for the construction of this project. Caving should be anticipated within cohesionless colluvial / alluvial deposits above and below the groundwater surface.

7.3 Foundation Resistance Design

7.3.1 General

Geotechnical foundation resistance design values are presented below in sections 7.3.2 for the design of the drilled, cast-in-place concrete shafts supporting the abutments. The design values are based on limits states design incorporating the recommendations of *AASHTO LRFD Bridge Design Specifications* (2012). The values presented in Tables 4 through 7 incorporate the resistance factors outlined in the *AASHTO LRFD Bridge Design Specifications* (2012).

7.3.2 Cast-In-Place Concrete Shafts

We recommend that the drilled shafts supporting the abutments extend a minimum of 20 feet below the bottom of the abutments. The minimum recommended shaft diameter is 30 inches. Table 4 may be used for the design of the strength limits states resistance for 30 inch diameter drilled, cast-in-place concrete shafts. Group effects have been considered in the values presented in Table 4.

Table 4. 30 Inch Diameter Drilled Shafts - Strength Limits States

Depth Below Abutments (ft)	Axial Compression Resistance (kips)	Axial Uplift Resistance (kips)
20	67	49
22	77	58
24	90	65

Table 5 may be used for the design of the extreme limits states resistance for 30 inch diameter drilled, cast-in-place concrete shafts. Group effects have been considered in the values presented in Table 5.

Table 5. 30 Inch Diameter Drilled Shafts - Extreme Limits States

Depth Below Abutments (ft)	Axial Compression Resistance (kips)	Axial Uplift Resistance (kips)
20	122	87
22	140	103
24	164	116

Geotechnical input parameters are provided in Tables 6 and 7 for performing a lateral analysis of the drilled shafts using p-y methods. Parameters for Qc/Qal_1 and Qc/Qal_2 are presented in Table 6 and 7 for input into LPile. For design purposes, the contact between Qc/Qal_1 and Qc/Qal_2 should be assumed to be 6 feet below the bottom of the abutments.

Table 6. Drilled Shafts - Lateral Limits States Resistance
LPile Geotechnical Input Parameters

Material Type	p-y Curve Model	Effective Unit Weight (lbs/ft^3	Cohesion (lbs/ft^2)	Friction Angle (°)	Strain Factor ε_{50}	k_1 (lbs/in^3)	P_m (P-multiplier for Group Effects)
Qc/Qal_1	Soft Clay (Matlock)	62.6*	400	0	0.02	-	0.7
Qc/Qal_2	Cemented c-phi Soil	66.6*	300	33	-	350	0.7

***Note:** Soil effective unit weights provided in the table are assumed to be below the water table.

Table 7. Drilled Shafts - Extreme Limits States Resistance
LPile Geotechnical Input Parameters

Material Type	p-y Curve Model	Effective Unit Weight (lbs/ft^3)	Cohesion (lbs/ft^2)	Friction Angle (°)	k_1 (lbs/in^3)	P_m (P-multiplier for Group Effects)
Qc/Qal_2	Cemented c-phi Soil	66.6*	300	33	150	0.7

***Note:** Soil effective unit weights provided in the table are assumed to be below the water table.

The drilled excavations for the cast-in-place concrete shafts should be clean, dry, and free of debris or loose soil. The drilled excavations should not deviate more than 1 percent from vertical.

Based on the results of our field exploration, caving should be anticipated during the excavation of the drilled, cast-in-place concrete shafts. If the contractor chooses to use casing, it must be pulled during the concrete pour. It must be pulled slowly with a minimum of 4 feet of casing remaining embedded within the concrete at all times. If the bottom of the holes are unable to be cleaned with conventional drilling and hand equipment, a bucket auger should be utilized to clean the bottom of the shafts and remove all loose slough.

It should be anticipated that groundwater will present a problem during construction. If groundwater is encountered within the shafts and is unable to be pumped from the drilled excavation, a tremie will be required. The tremie must be placed to the bottom of the drilled excavation to remove all groundwater. The end of the tube must remain embedded a minimum of 4 feet into the concrete at all times. The concrete and steel design of the drilled, cast-in-place concrete shaft should be such that a tremie can be easily placed down the center of the excavation.

For drilled, cast-in-place concrete shafts depths in excess of 8 feet, concrete should be placed via a tremie. The end of the tube must remain embedded a minimum of 4 feet into the concrete at all times.

All shaft construction must be observed by the Geotechnical Engineer before steel reinforcement is placed and concrete is poured.

7.4 Earth Pressure Loads

7.4.1 Lateral Earth Pressures

The following parameters for the backfill material may be used to calculate the lateral earth pressures on the abutment retaining walls. The values presented in Table 8 are unfactored values based on using the on-site soils as engineered backfill. The calculated force should act 1/3H, where H is the height of the wall. We recommend that saturated unit weights be used for the design, however, we also recommend that a backdrain be constructed behind the walls per Section 7.4.2.

Table 8. Geotechnical Parameters for Calculation of Lateral Earth Pressures

At-Rest Earth Pressure K_o	Active Earth Pressure K_a	Saturated Unit Weight γ_s (pcf)	Effective Friction Angle Φ' (degrees)
0.470	0.307	132	32

7.4.2 Backfill Drainage

Backdrains should consist of 4 inch diameter SDR 35 PVC perforated pipe or equivalent, embedded in Caltrans Class 1, Type A permeable drain rock. The drain should be a minimum of 18 inches in width and should extend to within 12 inches from the surface. The upper 12 inches should be capped with native soils. Mirafi 180N or approved equivalent should be placed between the surface cap and the permeable material. The pipe should be 4± inches above the trench bottom; a gradient of 2± percent being provided to the pipe and trench bottom; discharging into suitably protected outlets. See Figure 6 for the standard detail for the backdrain.

Perforations in backdrains are recommended as follows: 1/2 inch diameter, in 2 rows at the ends of a 120 degree arc, at 5 inch centers in each row, staggered between rows, placed downward. An unobstructed outlet should be provided at the lower end of each segment of backdrain. The outlet should consist of an unperforated pipe of the same diameter, connected to the perforated pipe and extended to a protected outlet at a lower elevation on a continuous gradient of at least 1 percent.

Backdrains should be approved by the Geotechnical Engineer after placement of bedding and pipe and prior to the placement of drain rock.

7.4.3 Surcharge Loads

Pressure due to any surcharge loads from traffic and compaction equipment should be analyzed separately. Pressures due to these loading can be supplied upon receipt of the appropriate plans and loads.

7.4.4 Lateral Pressures Due to Seismically Induced Lateral Spreading

For design purposes, a lateral earth pressure of 355 psf/ft (equivalent fluid pressure) should be applied to the abutment, extending the width of the abutment and from the surface to 2 feet below the bottom of the abutment. A lateral earth pressure of 210 psf/ft, acting over one pier diameter should be applied to the piers from the base of the abutment to 6 feet below the abutment.

7.4.5 Lateral Pressures Due to Earthquake Motions

A seismic acceleration coefficient, $k_h = 0.930$, may be assumed for design purposes due to earthquake motions. An unfactored lateral force due to earthquake motions, $\Delta P_{AE} = 44H^2$ lbs/horizontal foot, acting at a point 1/3H above the wall base, where H is the height of the wall in feet, may be assume for design purposes.

NOTE: the lateral force due to earthquake motions should be applied separately from the lateral pressures due to seismically induced lateral spreading.

7.5 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans, Foundation Plans and design loads should be reviewed by CMAG prior to submitting the plans and contract bidding. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

7.6 Observation and Testing

Field observation and testing must be provided by a representative of CMAG to enable them to form an opinion regarding the adequacy of the site preparation, the adequacy of fill materials, and the extent to which the earthwork is performed in accordance with the geotechnical conditions present, the requirements of the regulating agencies, the project specifications, and the recommendations presented in this report. Any earthwork performed in connection with the subject project without the full knowledge of, and not under the direct observation of CMAG will render the recommendations of this report invalid.

CMAG should be notified at least 5 working days prior to any site clearing or other earthwork operations on the subject project in order to observe the stripping and disposal of unsuitable materials and to ensure coordination with the grading contractor. During this period, a preconstruction meeting should be held on the site to discuss project specifications, observation and testing requirements and responsibilities, and scheduling.

8.0 LIMITATIONS

The recommendations contained in this report are based on our field explorations, laboratory testing, and our understanding of the proposed construction. The subsurface data used in the preparation of this report was obtained from the borings drilled during our field investigation. Variation in soil, geologic, and groundwater conditions can vary significantly between sample locations. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer and the Geologist, and revised recommendations be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this report are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, this report may become invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The scope of our services mutually agreed upon did not include any environmental assessment or study for the presence of hazardous to toxic materials in the soil, surface water, or air, on or below or around the site.

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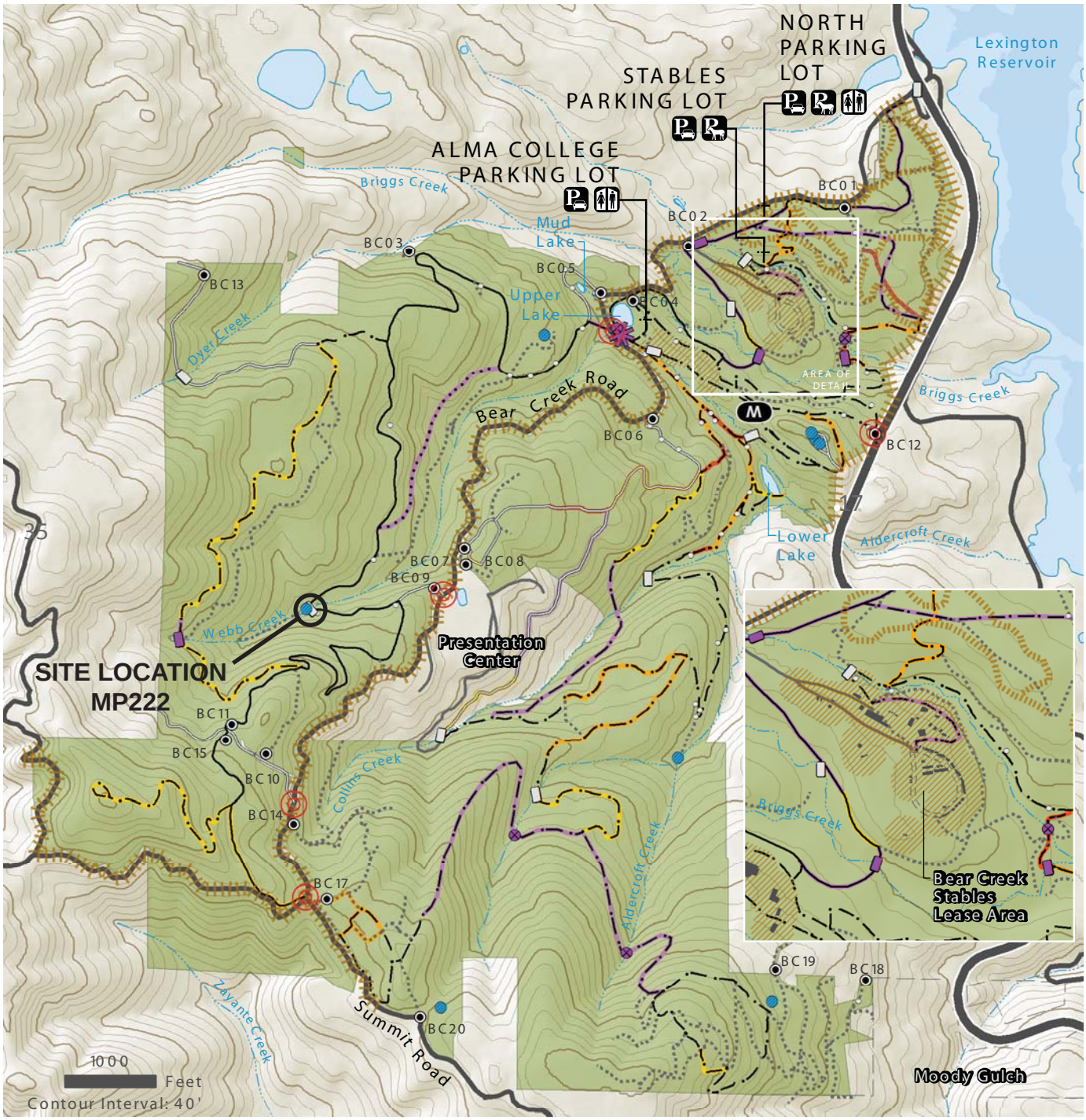
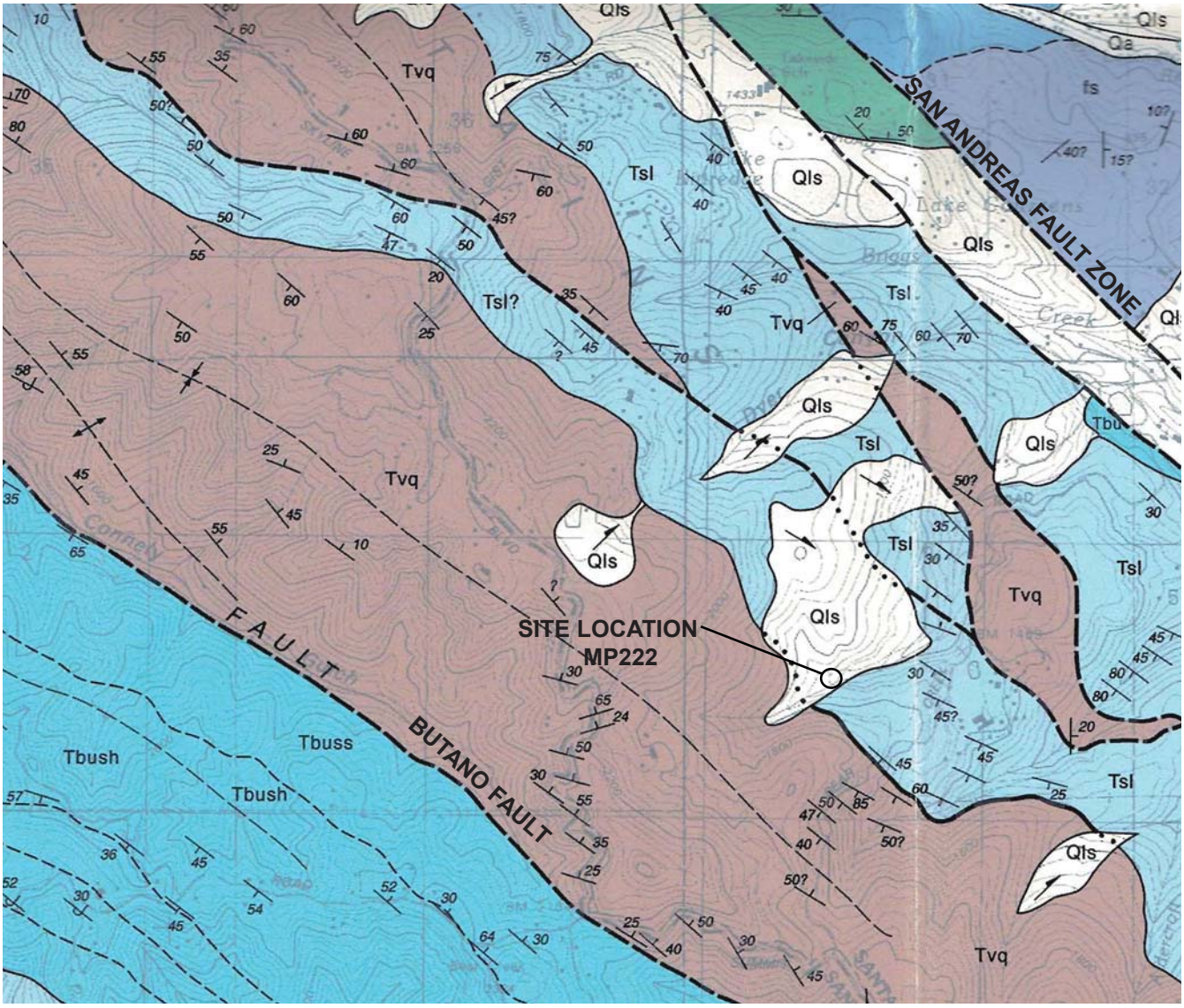


BASEMAP: *Maintenance & Operations Plan*. Figure 3-7.

CMAG ENGINEERING	SITE LOCATION MAP	FIGURE
	Bear Creek Redwoods Roads and Trails - MP222	1



EXPLANATION

UNITS

Qls	Landslide Debris (Holocene and Pleistocene)
Tl	Lambert Shale (Miocene)
Tvq	Vaqueros Formation (Miocene and Oligocene)
Tsl	San Lorenzo Formation (Oligocene and Eocene)
Tbu	Butano Formation (Eocene)
Ksh	Unnamed Sedimentary Rocks (Cretaceous)
db	Coast Range Ophiolite Complex (Jurassic andCretaceous)
fs	Franciscan Assemblage (Jurassic and Cretaceous)

SYMBOLS

- GEOLOGIC CONTACT - Dashed where approximate, dotted where concealed, queried where uncertain
- FAULT - Dashed where approximate, dotted where concealed, queried where uncertain. U and D denote upthrown and downthrown blocks (U / D)
- BEDDING - Strike and dip (30)
- ANTICLINE - Dashed where approximate, dotted where concealed, queried where uncertain
- SYNCLINE - Dashed where approximate, dotted where concealed, queried where uncertain

N

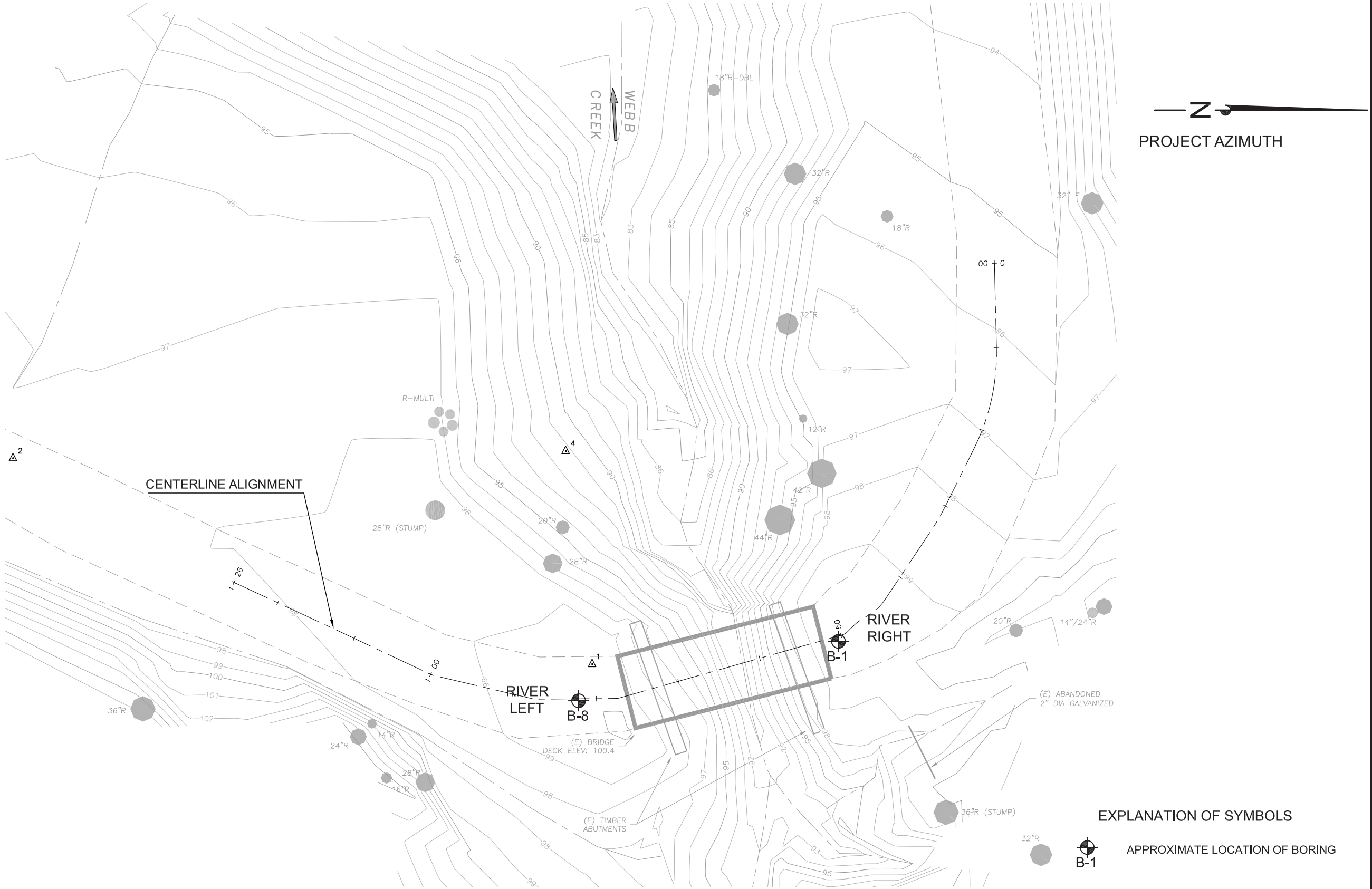
SCALE: 1:24,000

1,000 0 1,000 2,000 FEET

1 INCH = 2,000 FEET

BASEMAP: Dibblee, T.W. Jr. (2007). *Geologic Map of the Castle Rock Quadrangle, Santa Clara and Santa Cruz Counties, California* . Santa Barbara Museum of Natural History, Dibblee Geology Center Map #DF-352, Scale 1:24000.

CMAG ENGINEERING	LOCAL GEOLOGIC MAP	FIGURE
	Bear Creek Redwoods Roads and Trails - MP222	2

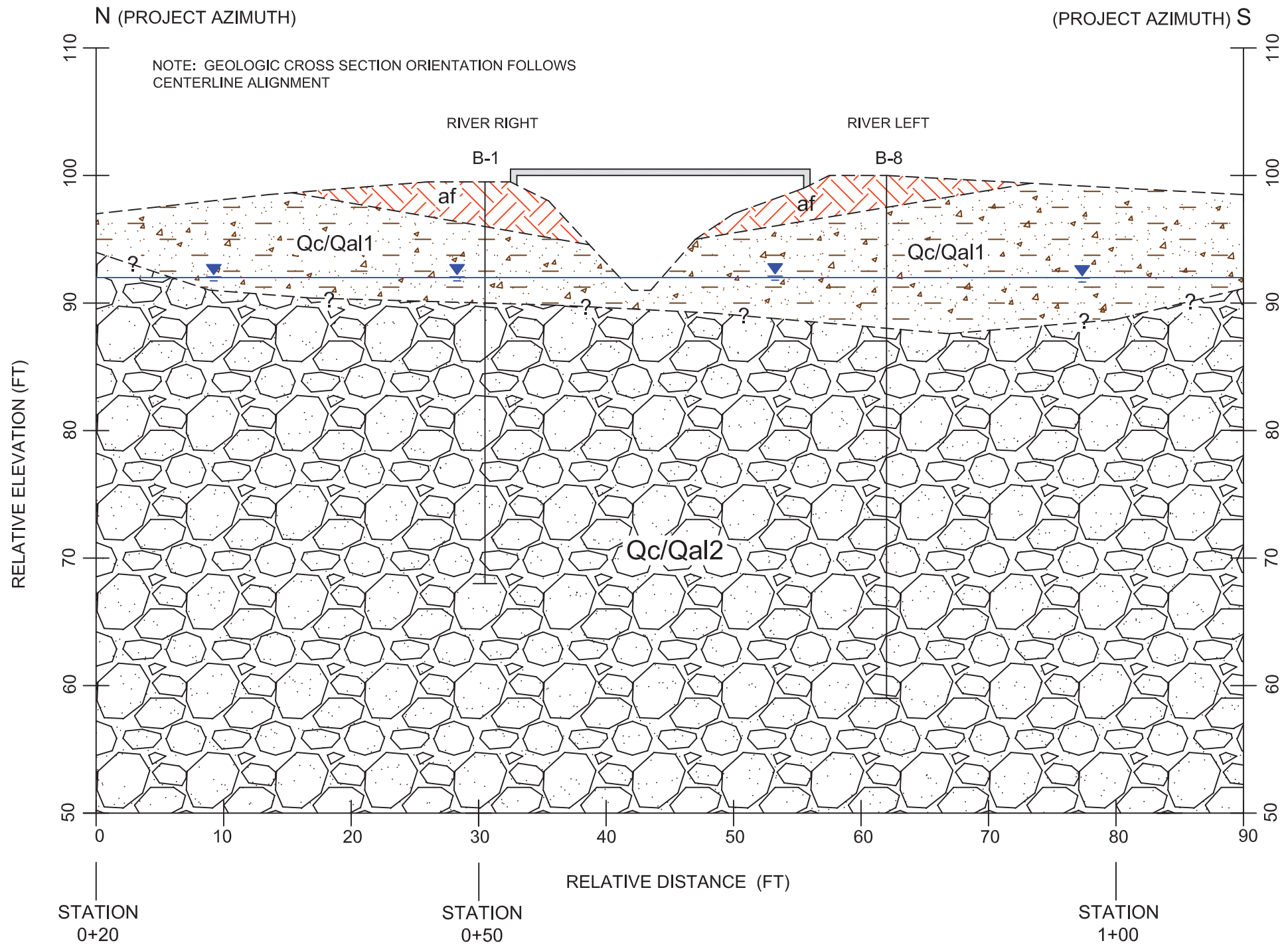


BASEMAP: Waterways Consulting, Inc. (June 2, 2016). *WEBB CREEK BRIDGE EXISTING CONDITIONS, BEAR CREEK REDWOODS ROADS AND TRAILS INVENTORY UPDATE.* SHEET C1, Original Scale 1" = 6'.

CMAG ENGINEERING	**BORING LOCATION PLAN**	FIGURE
	Bear Creek Redwoods Roads and Trails - MP222	3

GEOLOGIC CROSS SECTION

SCALE: 1" = 10' H = V



EXPLANATION

UNITS

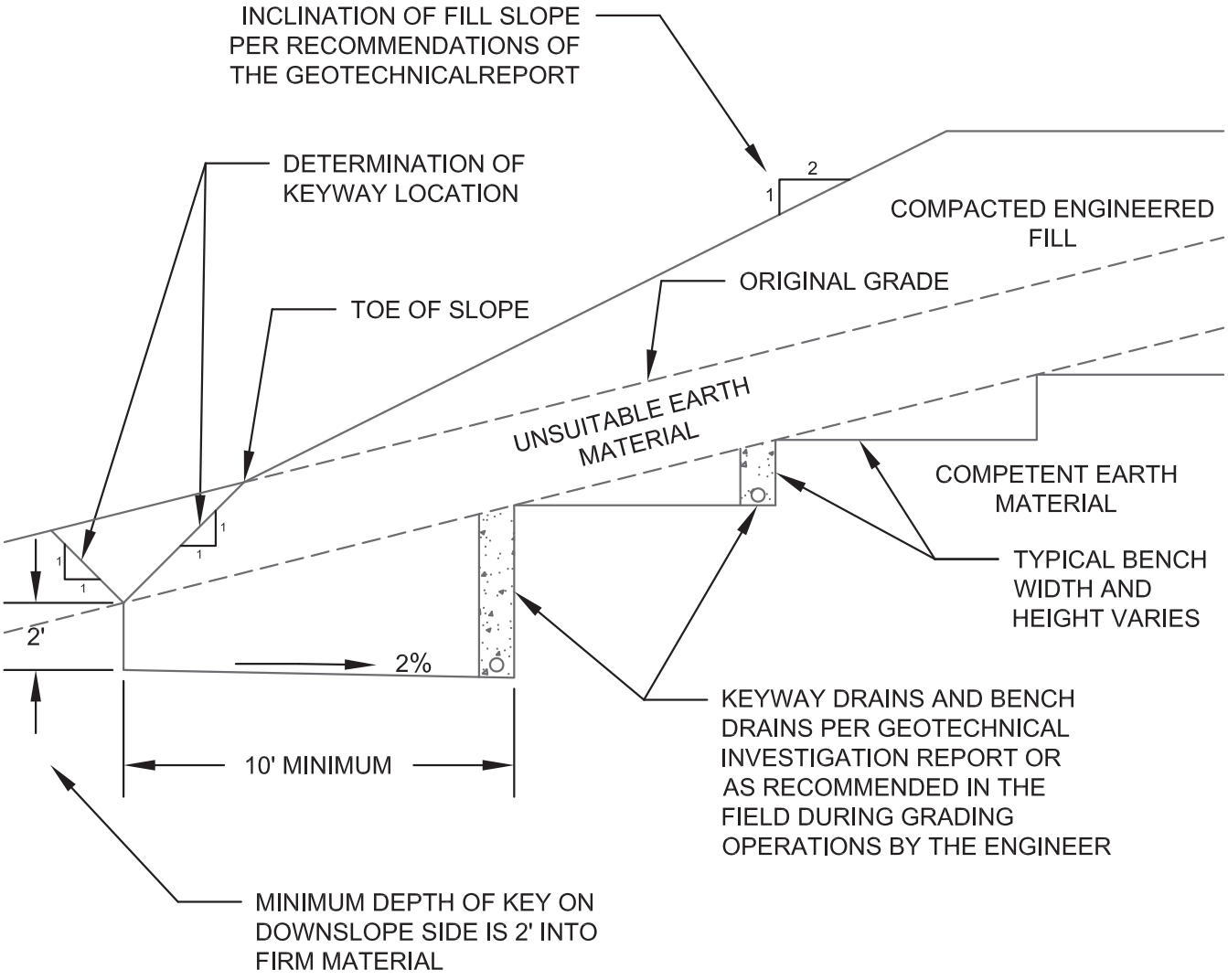
- af: Artificial Fill
- Qc/Qal1: Colluvial / Alluvial Deposits: Very Loose to Medium Dense Silty Sands, Sandy Silts, and Sandy Lean Clays (Soft to Firm).
- Qc/Qal2: Colluvial / Alluvial Deposits: Sandstone Boulders in Matrix of Silty Sand, Sandy Silt, and Sandy Lean Clay. Sandstone - Dense, Matrix - Loose. Clast and Matrix Supported.

SYMBOLS

- Geologic Contact, Dashed Where Approximate, Queried Where Uncertain
- Approximate Groundwater Table Elevation Observed at end of Drilling on May 25, 2016 (Boring B-1) and May 28, 2016 (Boring B-8)
- Existing Bridge

228/280

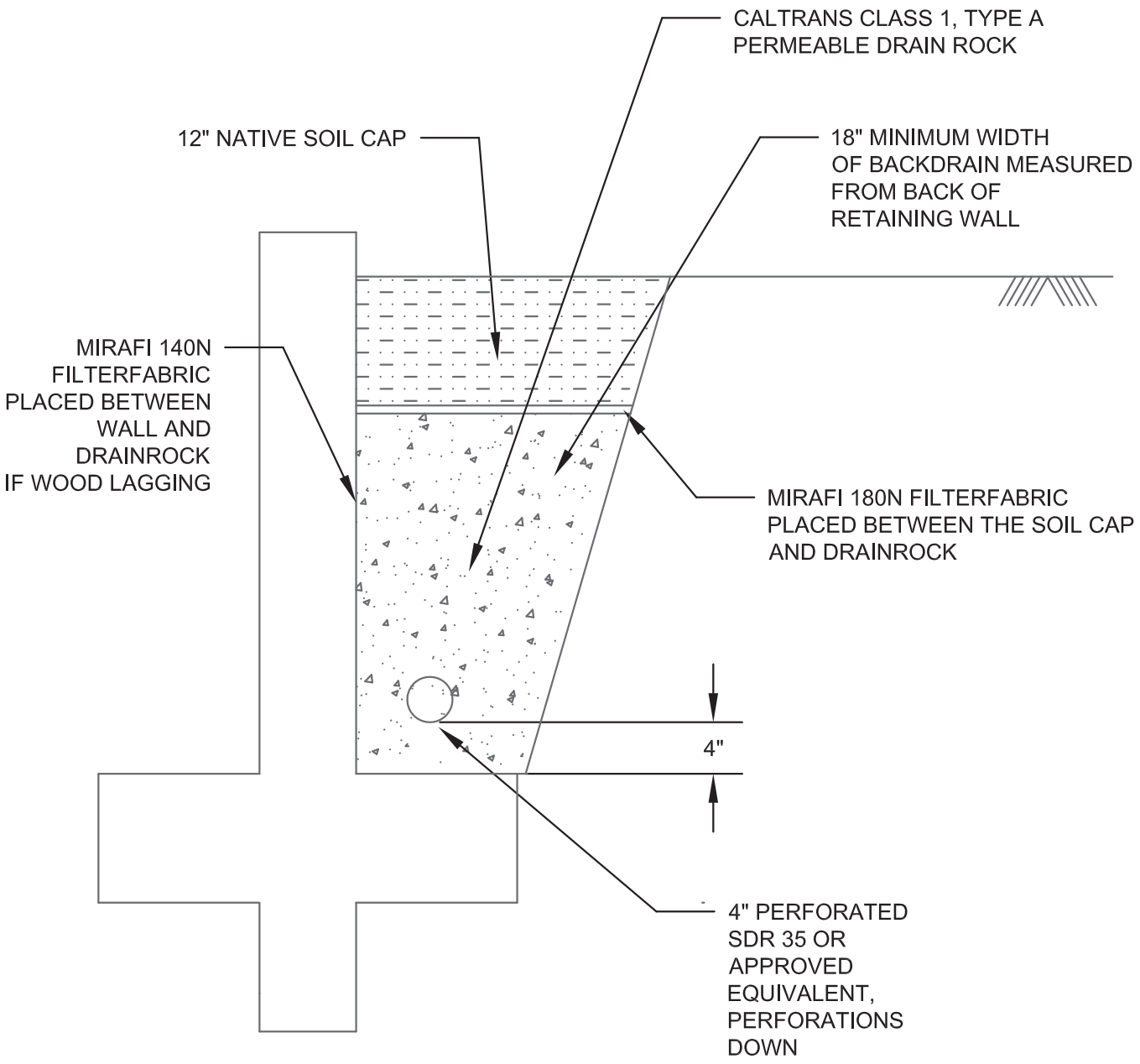
CMAG ENGINEERING	GEOLOGIC CROSS SECTION - CENTERLINE ALIGNMENT Bear Creek Redwood Roads and Trails - MP222	FIGURE 4



NOTES:

1. DRAWING IS NOT TO SCALE
2. FILLS SITUATED ON SLOPES STEEPER THAN 5:1 (H:V) SHOULD BE KEYED AND BENCHED
3. ENGINEERED FILL SHOULD BE PLACED PER THE GEOTECHNICAL INVESTIGATION REPORT
4. KEYWAY AND BENCH DRAINS SHOULD BE CONSTRUCTED PER THE GEOTECHNICAL INVESTIGATION REPORT

CMAG ENGINEERING	TYPICAL FILL SLOPE DETAIL	FIGURE 5



NOTES:

1. DRAWING IS NOT TO SCALE
2. 2± PERCENT TO PIPE AND TRENCH BOTTOM
3. PERFORATED SDR 35 PVC PIPE, OR APPROVED EQUIVALENT, CONNECTED TO CLOSED CONDUITS THAT DISCHARGE TO AN APPROVED LOCATION
4. INSTALL CLEAN OUTS AT APPROVED LOCATIONS

CMAG ENGINEERING	TYPICAL BACKDRAIN DETAIL	FIGURE 6

APPENDIX A

FIELD EXPLORATION PROGRAM

Field Exploration Procedures	Page A-1
Logs of the Borings	Figures A-1 and A-2
Key to the Logs	Figures A-3.0 through A-3.2

FIELD EXPLORATION PROCEDURES

Subsurface conditions were explored by drilling 2 borings to depths of 31.5± feet and 41± feet below the existing grades. Boring B-1 was drilled with a track mounted drill rig equipped with 6 inch diameter solid stem augers. Boring B-8 was drilled with a track mounted drill rig equipped with 8 inch diameter hollow stem augers. The Key to The Logs and the Logs of the Borings are included in Appendix A, Figures A-1 through A-3. The approximate location of the borings are shown on the Boring Location Plan, Figure 3.

The earth materials encountered in the borings were continuously logged in the field by a representative of CMAG. Bulk and relatively undisturbed samples for identification and laboratory testing were obtained in the field. These samples were classified based on field observations and laboratory tests. The soil classification is in accordance with the Unified Soil Classification System (Figure A-3.0). Rock descriptions are based on the classification systems outlined on Figures A-3.1 and A-3.2.

Representative samples were obtained by means of a drive sampler, the hammer weight and drop being 140 lb and 30 inches, respectively. These samples were recovered using a 3 inch outside diameter Modified California Sampler or a 2 inch outside diameter Terzaghi Sampler. The number of blows required to drive the samplers 12 inches are indicated on the Boring Logs. The penetration test data for the Terzaghi driven samples has been presented as N_{60} values. The N_{60} values are also indicated on the Boring Logs.

A representative cross section was obtained for the site. See Figure 4. For an explanation of the symbols and units on the cross section, see Section 4 of the report.

LOG OF EXPLORATORY BORING

Project No.:	16-120-SCL	Boring:	B-1
Project:	Bear Creek Redwood Roads and Trails	Location:	MP222 - See Figure 3, Boring Location Plan
	Santa Clara County, California	Elevation:	
Date:	May 25, 2016	Method of Drilling:	Track Mounted Drill Rig, 6in. Solid Stem
Logged By:	ALG		Auger, 140lb. Safety Hammer

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Groundwater | 3" Shelby Tube (S)

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	ML			**af:** Dark Brown Sandy SILT with Clasts of Dark Yellowish Brown Sandstone and Siltstone. Medium Dense, Moist, Non Plastic to Slightly Plastic.	16	11		15.3	
	ML-SM			**Qc / Qal1:** Dark Grayish Brown Sandy SILT to Silty SAND. Loose, Moist,	36		107.6	16.8	Particle Size
5	SM			Non to Slightly Plastic. Sand - Fine to Coarse Grained. High Organics.	12	8		17.2	F.C. = 43.6%
	SM/ ML			Dark Yellowish Brown and Dark Grayish Brown Silty SAND and Sandy SILT with Clasts of Siltstone and Sandstone. Very Loose to Medium Dense,	2	2		17.0	Particle Size
				Moist, Wet at 7', Non Plastic. Sand - Fine to Medium Grained,	15	12		23.3	F.C. = 37.3%
10				Clasts - up to 4", Subangular to Subrounded.				9.1	F.C. = 31.3%
	(SM)/ SM/ ML/ CL			**Qc / Qal2:** Greenish Gray SANDSTONE in Matrix of Silty SAND / Sandy SILT/ Sandy Lean CLAY. Sandstone - Moist, Dense. Matrix - Loose, Wet, Plastic to Non Plastic. Generally Clast Supported - Varies from Matrix to	5	4		9.4	
15				to Clast Supported. Clasts > 12". Organics. Matrix and Clast Supported.	10	9		24.9	
20				Material Consistent - Clast Supported.	100+	100+		22.0	
	(SP-SM)/ SM/								
25	ML/ CL			Material Consistent - Clast Supported.	60	57		19.2	
30				Material Consistent - Matrix and Clast Supported.	26	25		20.7	
				Boring Terminated at 31.5± ft.					
				Groundwater Encountered at 7.5± ft.					
35				Boring Backfilled With Cuttings.					

CMAG ENGINEERING

FIGURE A-1

LOG OF EXPLORATORY BORING

Project No.:	16-120-SCL	Boring:	B-8
Project:	Bear Creek Redwood Roads and Trails	Location:	MP222 - See Figure 3, Boring Location Plan
	Santa Clara County, California	Elevation:	
Date:	May 26, 2016	Method of Drilling:	Track Mounted Drill Rig, 8in. Hollow Stem
Logged By:	ALG		Auger, 140lb. Safety Hammer

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Groundwater | 3" Shelby Tube (S)

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
	ML			**af:** Dark Brown Sandy SILT with Clasts of Dark Yellowish Brown Sandstone and Siltstone. Moist, Non Plastic to Slightly Plastic.					
					30				
	CL			**Qc / Qal1:** Dark Gray and Dark Yellowish Brown Sandy Lean CLAY with			107.4	17.6	
5				with Clasts of Siltstone and Sandstone. Soft to Firm,	13	10		21.0	
				Moist, Wet at 8', Plastic. Sand - Fine to Coarse Grained,					
				Clasts - up to 2", Angular to Subrounded. High Organics.					
					8	7		27.7	
10									
	CL			Material Consistent.	9	8		41.7	
	(SM)/			**Qc / Qal2:** Greenish Gray SANDSTONE in Matrix of Silty SAND / Sandy					
15	SM/			SILT/ Sandy Lean CLAY. Sandstone - Moist, Dense. Matrix - Loose, Wet,			110.4	17.0	
	ML/			Plastic to Non Plastic. Generally Clast Supported - Varies from Matrix to	25				
	CL			to Clast Supported. Clasts >12". Organics.	20	20		20.9	
20									
				Material Consistent - Clast and Matrix Supported.	18	18		19.0	
25	(SM)/			Material Consistent with Clasts of Very Dark Gray Siltstone.				18.0	
	(ML)/			Clast and Matrix Supported.	37	38			
	SM/								
	ML/								
	CL								
30									
				Material Consistent - Clast Supported.	35	37		19.6	
35									

CMAG ENGINEERING

FIGURE A-2.0

LOG OF EXPLORATORY BORING

Project No.:	16-120-SCL	Boring:	B-8, Continued
Project:	Bear Creek Redwood Roads and Trails	Location:	MP222 - See Figure 3, Boring Location Plan
	Santa Clara County, California	Elevation:	
Date:	May 26, 2016	Method of Drilling:	Track Mounted Drill Rig, 8in. Hollow Stem
Logged By:	ALG		Auger, 140lb. Safety Hammer

2" Ring Sample | 2.5" Ring Sample | Bulk Sample | Terzaghi Split Spoon Sample | Groundwater | S 3" Shelby Tube

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows / Foot	N_{60}	Dry Density (pcf)	Moisture Content (%)	Other Tests
40	(SM)/ (ML)/ SM/ ML/ CL			**Qc / Qal2:** Greenish Gray SANDSTONE and Black SILTSTONE in Matrix of Silty SAND/ Sandy SILT/ Sandy Lean CLAY. Sandstone/Siltstone - Dense, Moist. Matrix - Loose, Wet, Plastic to Non Plastic. Generally Clast Supported - Varies from Matrix to Clast Supported. Clasts > 12". Organics.	32 100+	34 100+		17.1 17.0	

Boring Terminated at 41± ft.
Groundwater Encountered at 8± ft.
Boring Backfilled With Cuttings.

45 50 55 60 65 70

CMAG ENGINEERING

FIGURE A-2.1

KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
No. 200	No. 40	No. 10	No. 4	3/4 in.	3 in.	12 in.	

US STANDARD SIEVE SIZE

RELATIVE DENSITY	
SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY	
SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION
DRY
MOIST
WET

BEDROCK
(GROUP SYMBOL)
Brackets Denote Bedrock

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

CMAG ENGINEERING

FIGURE A-3.0

KEY TO THE LOGS

WEATHERING

FRESH: Body of rock is not oxidized or discolored; fracture surfaces are not oxidized or discolored; no seperation of grain boundaries; no change of texture and no solutioning. Hammer rings when crystalline rocks are struck.

SLIGHTLY WEATHERED: Discoloration or oxidation is limited to surface of, or short distance from fractures; some feldspar crystals are dull; fracture surfaces have minor to complete discoloration or oxidation; no visual separation of grain boundaries; texture preserved and minor leaching of soluble minerals may be present. Hammer rings when crystalline rocks are struck, body of rock is not weakend by weathering.

MODERATELY WEATHERED: Discoloration or oxidation extends from fractures, usually throughout body of rock; ferromagnesian minerals are "rusty", feldspar crystalsare "cloudy"; all fracture surfaces are discolored or oxidized; partial opening of grain boundaries visible; texture generally preserved but soluble minerals may be mostly leached. Hammer does not ring when rock is struck, body of rock is slightly weakened.

INTENSELY WEATHERED: Body of rock is discolored or oxidized throughout; all feldspars and ferromagnesian minerals are altered to clay to some extent. All fracture surfaces are discolored or oxidized, surfaces friable; partial separation of grain boundaries, rock is friable; in situ disaggregation of granitics common in semi-arid regions; texture altered and leaching of soluble minerals may be complete. Rock has dull sound when struck with hammer; rock is weakened., usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness.

DECOMPOSED: Body of rock is discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and ferromagnesian minerals are completely altered to clay; complete seperation of grain boundaries (disaggregated), partial or complete remnant rock structure may be preserved, but resembles a soil.

CLASSIFICATION OF ROCK AND SOIL STRENGTHS (ISRM, 1981)

GRADE	DESCRIPTION	FIELD IDENTIFICATION
R6	Extremely strong rock	Specimen can only be chipped with geological hammer.
R5	Very strong rock	Specimen requires many blows of geological hammer to fracture it.
R4	Strong rock	Specimen requires more than one blow of geological hammer to fracture it.
R3	Medium strong rock	Cannot be scraped or peeled with a pocket knife, specimen can be fractured with a single firm blow of geological hammer.
R2	Weak rock	Can be peeled with a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.
R1	Very weak rock	Crumbles under firm blows with point of geological hammer and can be peeled by pocket knife.
R0	Extremely weak rock	Indented by thumbnail.
S6	Hard Clay	Indented with difficulty by thumbnail.
S5	Very stiff clay	Readily indented by thumbnail.
S4	Stiff clay	Readily indented by thumb but penetrated only with great difficulty.
S3	Firm clay	Can be penetrated several inches by thumb with moderate effort.
S2	Soft clay	Easily penetrated several inches by thumb.
S1	Very soft clay	Easily penetrated several inches by fist.

KEY TO THE LOGS

CEMENTATION

Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

BEDDING SIZE

Thinly laminated	<0.1 inch
Thickly laminated	0.1 to 0.4 inches
Very thinly bedded	0.4 to 1 inches
Thinly bedded	1 to 4 inches
Medium bedded	4 inches to 1 foot
Thickly bedded	1 to 3 feet
Very thickly bedded	>3 feet
Massive	No observable bedding

FRACTURE DENSITY

Unfractured	No Observed Fractures
Very Slightly Fractured	>3 feet
Slightly Fractured	1 to 3 feet
Moderately Fractured	0.33 to 1 foot
Intensely Fractured	0.1 to 0.33 feet
Very Intensely Fractured	<0.1 feet

FRACTURE SPACING

Extremely widely spaced	>10 feet
Very widely spaced	3 to 10 feet
Widely spaced	1 to 3 feet
Moderately spaced	0.3 to 1 foot
Closely spaced	0.1 to 0.3 feet
Very closely spaced	<0.1 feet

FRACTURE CONTINUITY

Discontinuous	<3 feet
Slightly continuous	3 to 10 feet
Moderately continuous	10 to 30 feet
Highly continuous	30 to 100 feet
Very continuous	>100 feet

FRACTURE IN-FILLING THICKNESS

Clean	No film coating
Very thin	<0.003 feet
Moderately thin	0.003 to 0.01 feet
Thin	0.01 to 0.03 feet
Moderately thick	0.03 to 0.1 feet
Thick	> 0.1 feet

APPENDIX B

LABORATORY TESTING PROGRAM

Laboratory Testing Procedures	Page B-1
Particle Size Distribution Test Results	Figures B-1 through B-3

LABORATORY TESTING PROCEDURES

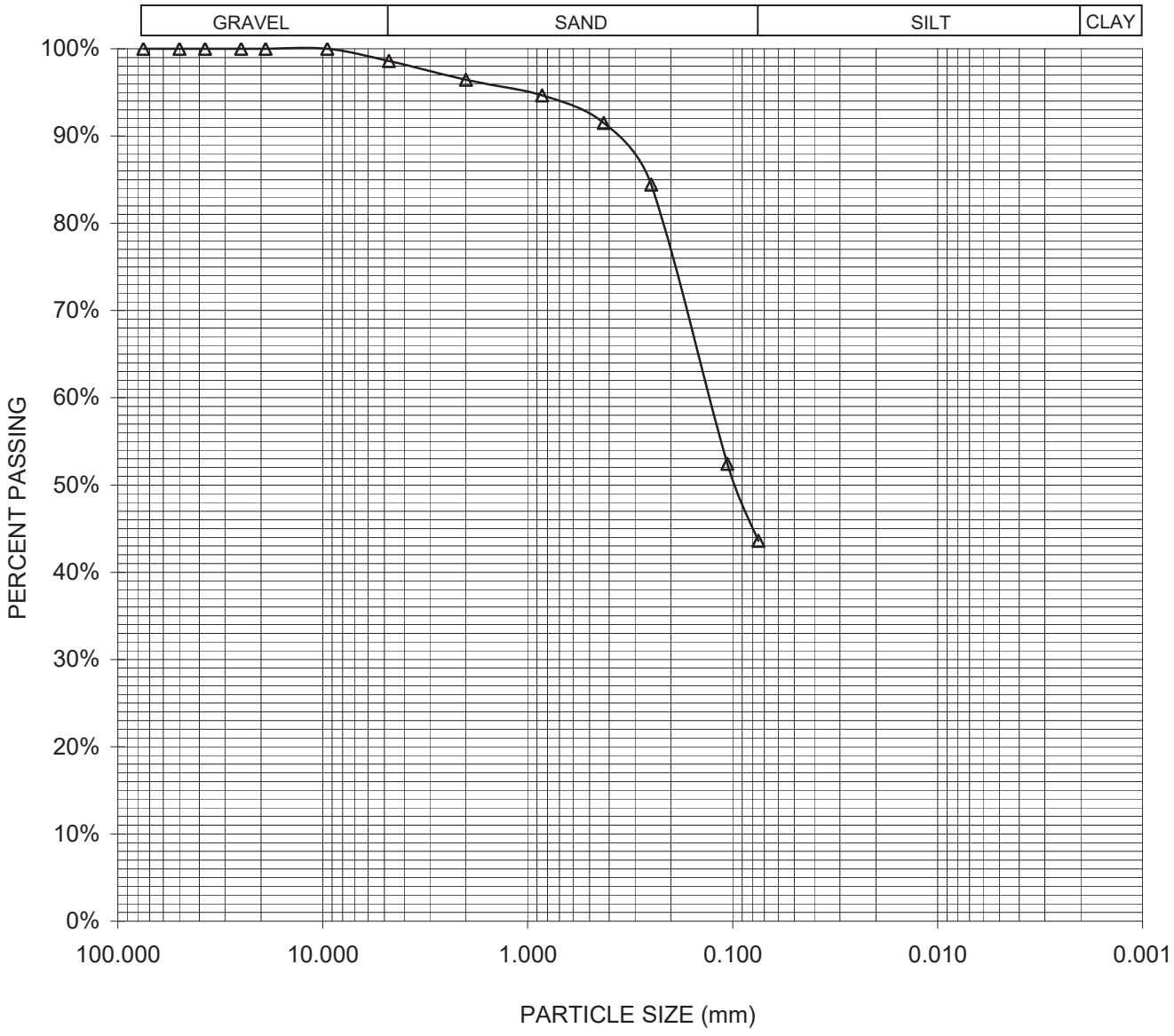
Classification

Soils were classified according to the Unified Soil Classification System in accordance with ASTM D 2487 and D 2488. See Figure A-3.0. Rock descriptions were based on the classification systems outlined in Figures A-3.0 through A-3.2. Moisture content and dry density determinations were made for representative, relatively undisturbed samples of the underlying soil and rock. Results of moisture-density determinations, together with classifications, are shown on the Boring Logs, Figures A-1 and A-2.

Particle Size Distribution

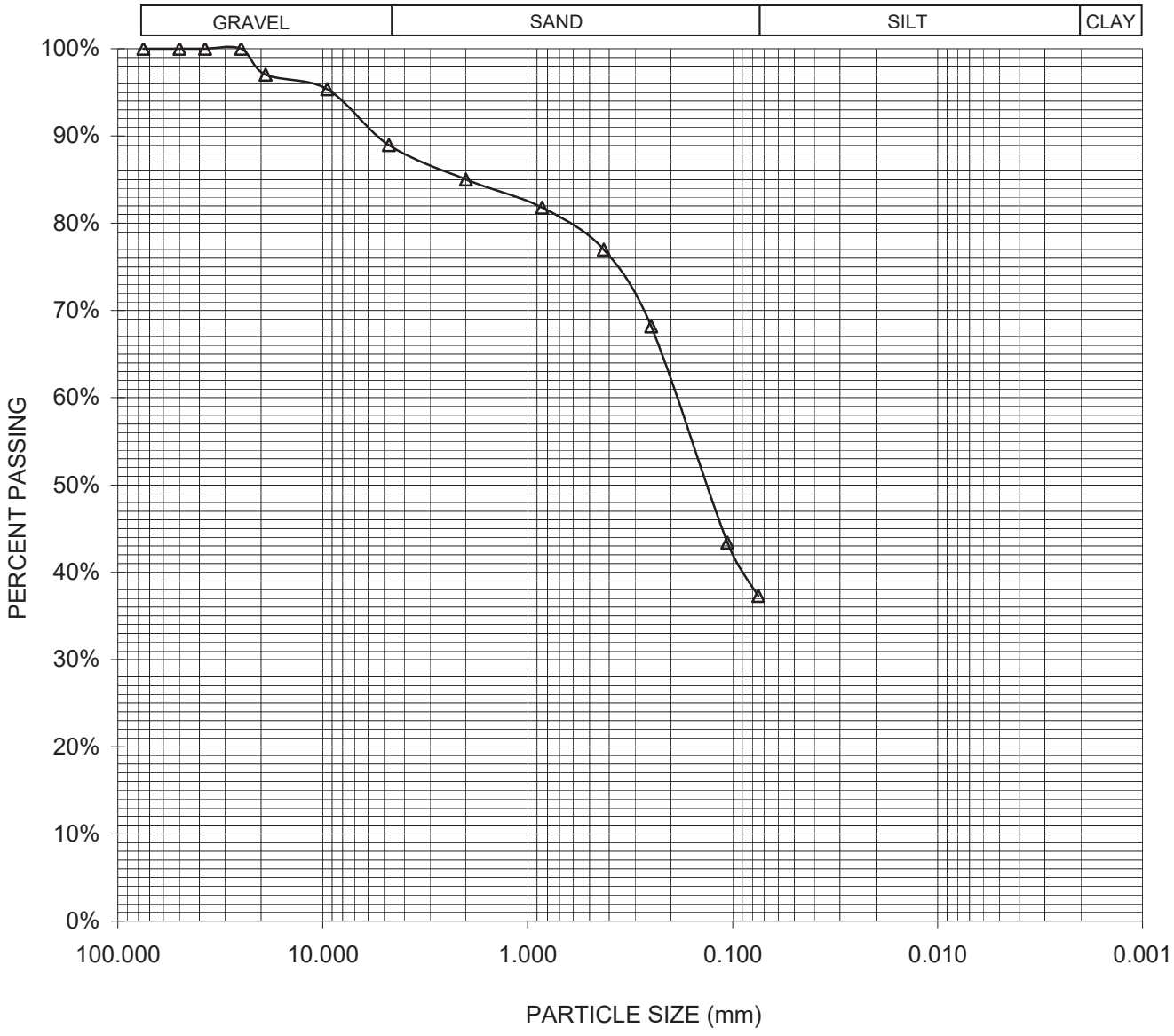
Particle size distribution tests were performed on representative samples of the underlying soils in accordance with ASTM D 422. The test results are presented on Figures B-1 through B-3.

BORING:	B-1	PERCENT	PERCENT
DEPTH (ft):	4	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	SM	98.6%	43.6%



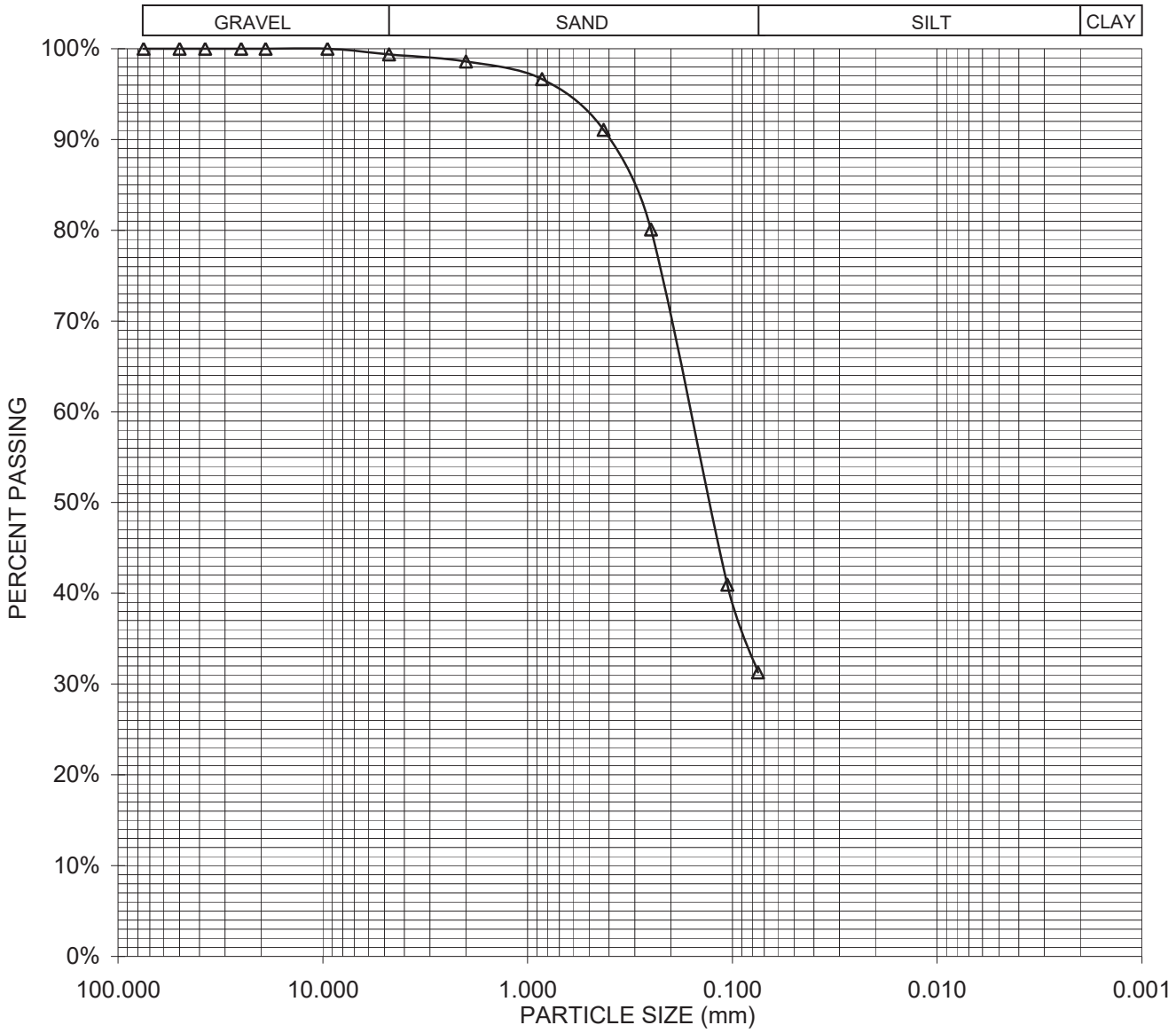
CMAG ENGINEERING	PARTICLE SIZE DISTRIBUTION	FIGURE
	Bear Creek Redwoods Roads and Trails - MP222	B-1

BORING:	B-1	PERCENT	PERCENT
DEPTH (ft):	7	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	SM	89.0%	37.3%



CMAG ENGINEERING	PARTICLE SIZE DISTRIBUTION	FIGURE
	Bear Creek Redwoods Roads and Trails - MP222	B-2

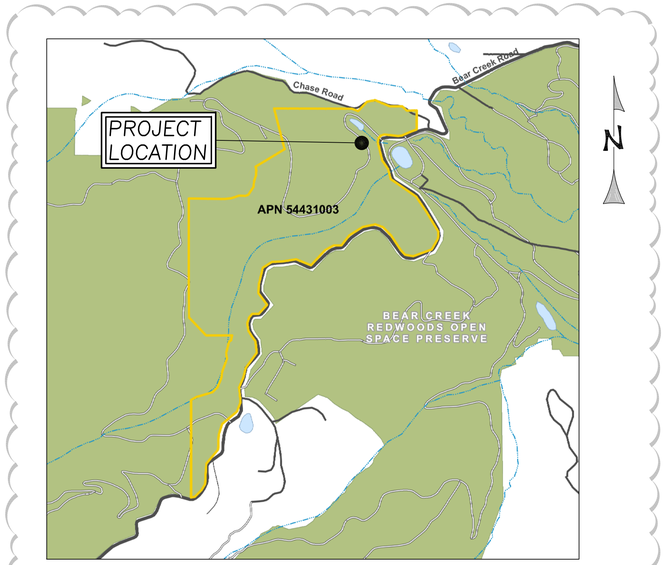
BORING:	B-1	PERCENT	PERCENT
DEPTH (ft):	8.5	PASSING No. 4	PASSING No. 200
SOIL TYPE (USCS):	SM	99.4%	31.3%



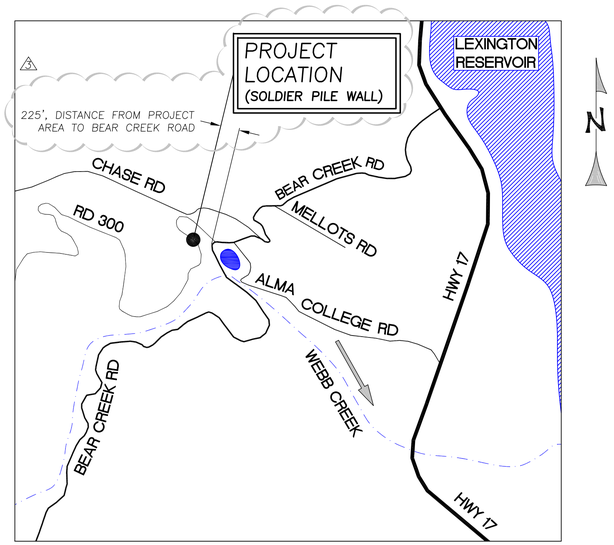
CMAG ENGINEERING	PARTICLE SIZE DISTRIBUTION	FIGURE
	Bear Creek Redwoods Roads and Trails - MP222	B-3

Project Plans A: Solider Pile Retaining Wall

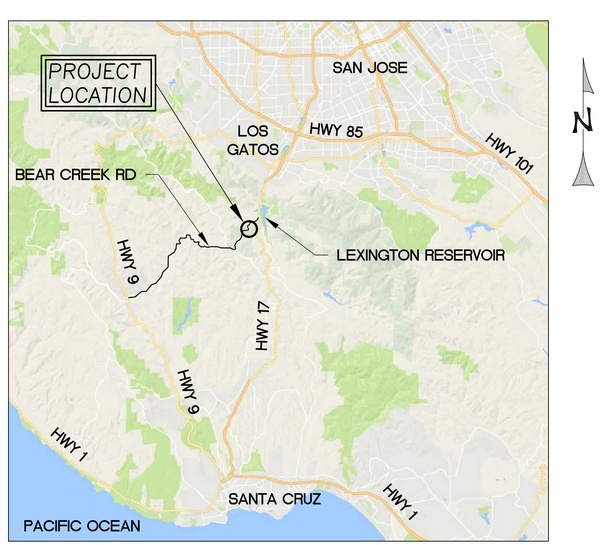
BEAR CREEK REDWOODS - PHASE ONE ROAD WORK
RETAINING WALL AT MP204
100% DESIGN SUBMITTAL



PROPERTY MAP
N.T.S. (SOURCE: MIDPEN)



VICINITY MAP
N.T.S. (GOOGLE)



REGIONAL MAP
N.T.S. (GOOGLE)

SHEET INDEX

C1 COVER SHEET
C2 SITE PLAN AND CROSS SECTIONS
C3 WALL ELEVATION AND TYPICAL DETAILS
C4 GENERAL NOTES
C5 EXISTING CONDITIONS AND ROAD PROFILE
S1 STRUCTURAL NOTES & SPECIFICATIONS
S2 STRUCTURAL DETAILS

GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY WATERWAYS CONSULTING IN MAY OF 2016. REFER TO NOTES ON SHEET C3 FOR SURVEY CONTROL AND DATUM.

2. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

ABBREVIATIONS

AVG.	AVERAGE
CC	CONCRETE
CY	CUBIC YARDS
DIA.	DIAMETER
E	EXISTING
EG	EXISTING GROUND
ELEV.	ELEVATION
DI	DRAINAGE INLET
FG	FINISHED GRADE
FT	FEET
INV	INVERT
N	NEW
NIC	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
RC	RELATIVE COMPACTION
RSP	ROCK SLOPE PROTECTION
SPK	SPIKE
SQ.FT.	SQUARE FOOT
T	TREE
T.B.D.	TO BE DETERMINED
TYP	TYPICAL
UNK	UNKNOWN
WSE	WATER SURFACE ELEVATION
YR	YEAR

TREE SPECIES

BM	BIGLEAF MAPLE
DF	DOUGLAS FIR
RC	RED CEDAR
WF	WHITE FIR

PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 100% DESIGN LEVEL DETAILS FOR THE INSTALLATION OF A SOLDIER PILE RETAINING WALL AND CULVERT TO REPAIR A SLOPE FAILURE ALONG AN EXISTING UNPAVED PRIVATE ROAD.

WORK SHALL CONSIST OF DEMOLITION AND REMOVAL OF AN EXISTING CULVERT AND INSTALLATION OF A NEW CULVERT, SLOPE DRAIN, AND RETAINING WALL AS SHOWN.

SECTION AND DETAIL CONVENTION

SECTION OR DETAIL IDENTIFICATION (NUMBER OR LETTER)

5
C2 C3

REFERENCE SHEET FROM WHICH DETAIL OR SECTION IS TAKEN.

REFERENCE SHEET ON WHICH SECTION OR DETAIL IS SHOWN.

REV.	DATE	DESCRIPTION	BY
1	9/13/17	NO REVISIONS THIS SHEET	B.M.Z.
2	9/22/17	PROPERTY MAP ADDED	B.M.Z.
3	1/16/18	DISTANCE TO BEAR CREEK ROAD REVISIONS ON THIS SHEET ONLY	B.M.Z.

WATERWAYS CONSULTING INC.
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SANTA CRUZ, CA 95060
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1/16/18 DATE

REGISTERED PROFESSIONAL ENGINEER MATT W. WELD No. 62235 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINUSULA REGIONAL OPEN SPACE DISTRICT

MAP POINT 204
RETAINING WALL

BEAR CREEK REDWOODS
PHASE 1 ROAD WORK
100% DESIGN SUBMITTAL

DESIGNED BY: M.W.W.
DRAWN BY: M.B.
CHECKED BY: M.W.W.
DATE: 6/21/17
JOB NO.: 16-017A

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1

1 OF 7

⚠ 1

CONCRETE WASHOUT NOTES:

CONSTRUCT TEMPORARY CONCRETE WASHOUT AT A DISTURBED PORTION OF THE EXISTING ROAD 150' FROM THE CHANNEL, PER CASQA DETAIL WM-8 (CONCRETE WASTE MANAGEMENT).

PROJECT AZIMUTH

⚠ 1

WHERE DIRECTED BY THE ENGINEER PROTECT EXISTING TREES WITH ESA FENCING PLACED 2 FT. MINIMUM FROM FACE OF TREE, PER DETAIL 1, SHT. C5.

FIBER ROLL 1 C2 C2'

INSTALL APPROX. 50 LF OF 24 INCH DIA. "ADS N-12 WT" DUAL-WALLED CORRUGATED HDPE PIPE

8'

6'

A C2 C2'

INSTALL 3.5 CY CALTRANS 1/4 TON ROCK OVER CLASS 8 GEOTEXTILE FABRIC

INSTALL SILT FENCE AT LOCATIONS TO BE APPROVED BY THE ENGINEER, INCLUDING DOWNSTREAM PERIMETER OF WORK AREA

TOP OF WALL: 1002.2

TOP OF WALL: 1001.2

TOP OF WALL: 1000.3

TOP OF WALL: 999.4

PLACE APPROX. 1 CY OF CALTRANS LIGHT CLASS RSP TO CONFORM BETWEEN PIPE AND SURROUNDING FINISHED GRADES, AS DIRECTED BY THE ENGINEER.

REMOVE (E) 12" DIA STEEL PIPE

⚠ 1

INSTALL APPROX. 25 LF. "ADS N12 WATER TIGHT" CULVERT. SLOPE MAY BE ADJUSTED TO CONFORM TO WALL PENETRATION. FINAL GRADES SUBJECT TO APPROVAL OF THE ENGINEER. REFER TO TYPICAL TRENCH SECTION, SHEET, C3.

CLEAN THE DITCH LINE FOR 50 FT. EITHER SIDE OF PIPE INLET

SITE PLAN

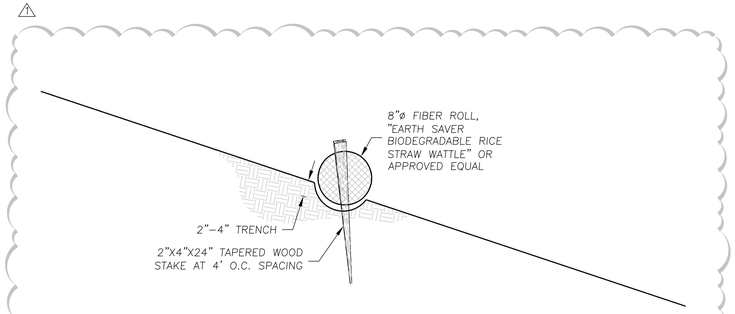
SCALE: 1" = 5'

⚠ 1

NOTES:

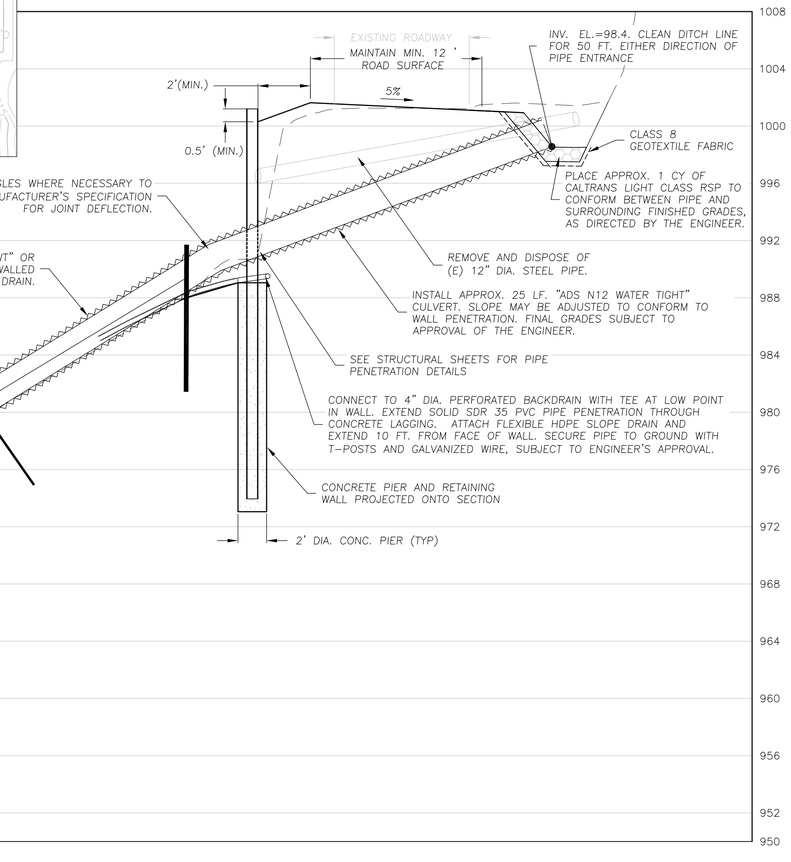
1. PIPE PROFILE IS SHOWN AS APPROXIMATE.
2. SLOPE DRAIN BELOW WALL SHALL CONFORM TO EXISTING GRADES.
3. ELEVATION OF PIPE PENETRATION THROUGH RETAINING WALL IS SHOWN AS APPROXIMATE AND MAY BE ADJUSTED TO CONFORM TO THE RETAINING WALL STRUCTURES SUBJECT TO THE APPROVAL OF THE ENGINEER.
4. REMOVE ALL SPOILS FROM THE SLOPE AND PROJECT AREA THAT ARE A RESULT OF CONSTRUCTION ACTIVITIES.

⚠ 1



FIBER ROLL

SCALE: 1"=1' 1 C2 C2



SECTION

SCALE: 1" = 5' A C2 C2

REV.	DATE	DESCRIPTION	BY
⚠ 1	9/13/17	EROSION/WATER QUALITY INFO	B.M.Z.
⚠ 2	9/22/17	NO REVISIONS THIS SHEET	B.M.Z.

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9/22/17 DATE

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MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP 204
SITE PLAN AND SECTION

BEAR CREEK REDWOODS
PHASE 1 ROAD WORK
100% DESIGN SUBMITTAL

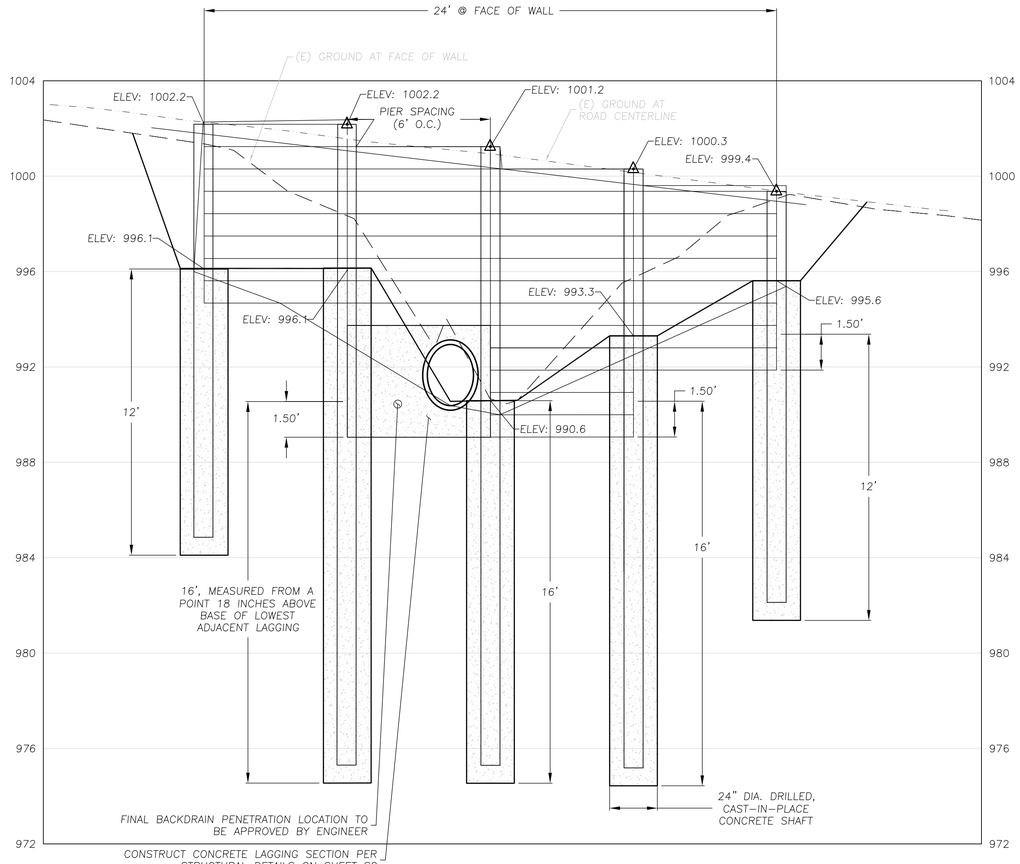
DESIGNED BY:	M.W.W.
DRAWN BY:	M.L.B.
CHECKED BY:	M.W.W.
DATE:	6/21/17
JOB NO.:	16-017A

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

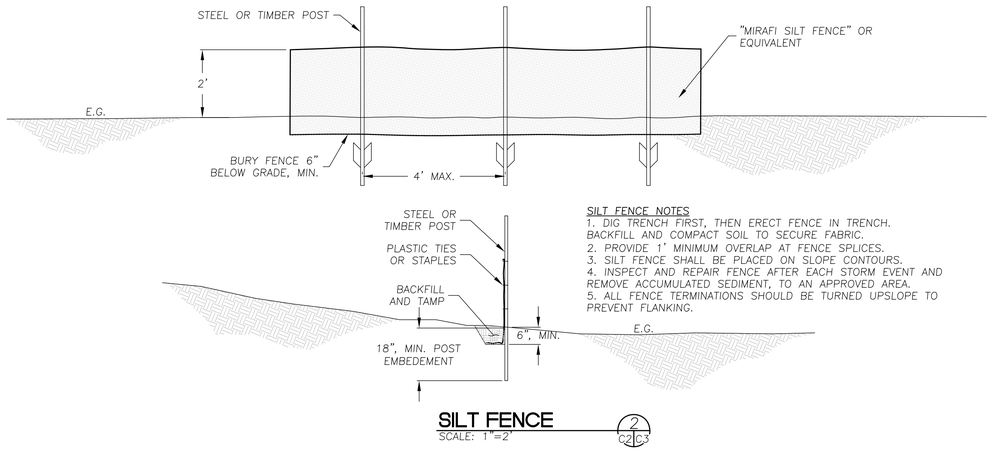
0 1"

C2

2 OF 7

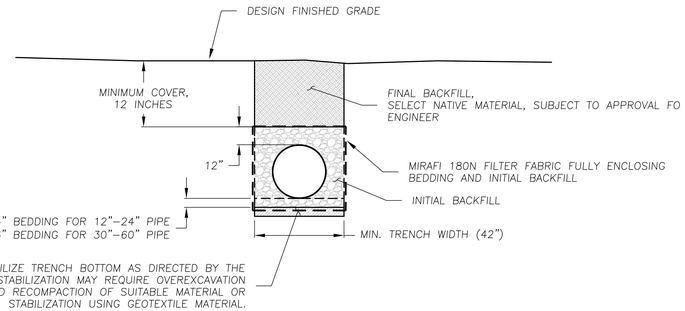


WALL ELEVATION
SCALE: 1"=3' (A, C2, C3)

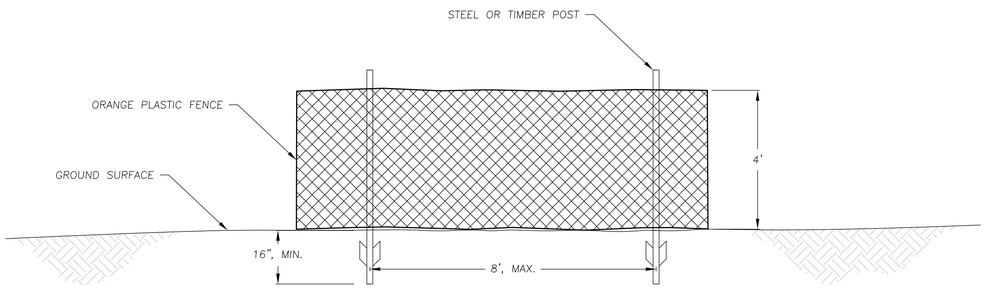


SILT FENCE NOTES
1. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
2. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
4. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
5. ALL FENCE TERMINATIONS SHOULD BE TURNED UPSLOPE TO PREVENT FLANKING.

SILT FENCE
SCALE: 1"=2' (2, C2, C3)



TRENCH DETAIL
N.T.S. (A, C2, C3)



BOUNDARY FENCE
SCALE: 1"=2' (1, C2, C3)

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL CULVERT AND SLOPE DRAINS SHALL BE "ADS N-12 WT" DUAL-WALLED HDPE PIPE WITH WATER-TIGHT BELL AND SOCKET FITTINGS WITH RUBBER GASKETS.
2. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION
3. FOUNDATION: TRENCH EXCAVATION SHALL BE INSPECTED AND APPROVED BY THE ENGINEER PRIOR TO PLACEMENT OF BEDDING MATERAILS. WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH SPECIFIED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
4. BEDDING: BEDDING MATERIAL SHALL BE ¾" DRAIN ROCK.MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
5. INITIAL BACKFILL: INITIAL BACKFILL SHALL BE ¾" DRAIN ROCK. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
6. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION OF COMPLIANCE WITH MATERIAL SPECIFICATION TO ENGINEER FOR APPROVAL, PRIOR TO MOBILIZING MATERAILS ON SITE.
7. MINIMUM COVER: MINIMUM COVER. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 18" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR PIPES OVER 36" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

REV.	DATE	DESCRIPTION	BY
1	9/13/17	NO REVISIONS THIS SHEET	B.M.Z.
2	9/22/17	NO REVISIONS THIS SHEET	B.M.Z.

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9/22/17 DATE

REGISTERED PROFESSIONAL ENGINEER MATT W. WELD No. 62235 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINUSULA REGIONAL OPEN SPACE DISTRICT

WALL ELEVATION AND NOTES

BEAR CREEK REDWOODS
PHASE 1 ROAD WORK
100% DESIGN SUBMITTAL

DESIGNED BY:	N/A
DRAWN BY:	M.L.B.
CHECKED BY:	M.W.W.
DATE:	6/21/17
JOB NO.:	16-017A

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C3

EROSION CONTROL NOTES

1. THE EROSION CONTROL PLAN SHOWN IS INTENDED FOR THE SUMMER CONSTRUCTION SEASON (APRIL 15TH TO OCTOBER 15TH). IF THE DRAINAGE FEATURES SHOWN ON THESE DRAWINGS ARE NOT COMPLETED AND DISTURBED AREAS STABILIZED BY OCTOBER 1ST, CONSULT THE ENGINEER FOR ADDITIONAL RAINY SEASON EROSION CONTROL MEASURES.
2. THE EROSION CONTROL DEVICES ON THIS PLAN ARE A SCHEMATIC REPRESENTATION OF WHAT MAY BE REQUIRED. EROSION CONTROL DEVICES MAY BE RELOCATED, DELETED, OR ADDITIONAL ITEMS MAY BE REQUIRED DEPENDING ON THE ACTUAL SOIL CONDITIONS ENCOUNTERED, AT THE DISCRETION OF THE ENGINEER.
3. CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.
4. PRIOR TO COMMENCING WORK, PROTECT AREAS TO REMAIN UNDISTURBED WITH ESA FENCING, AS SHOWN ON THE DRAWINGS. ADDITIONAL FENCING MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER.
5. BETWEEN OCTOBER 15 AND APRIL 15, PROTECT EXPOSED SOIL FROM EROSION AT ALL TIMES. DURING CONSTRUCTION, SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, STABILIZE ALL EXPOSED SOIL ON DISTURBED SLOPES AGAINST EROSION.
6. MAINTAIN A STANDBY CREW FOR EMERGENCY WORK AT ALL TIMES DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). STOCKPILE NECESSARY MATERIALS AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.
7. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THIS PLAN AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.
8. INCORPORATE ADEQUATE DRAINAGE PROCEDURES DURING THE CONSTRUCTION PROCESS TO ELIMINATE EXCESSIVE PONDING AND EROSION.
9. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.
10. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.
11. MAINTAIN ALL EROSION CONTROL DEVICES AND MODIFY THEM AS SITE PROGRESS DICTATES.
12. MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.
13. REMOVE ALL SPOILS FROM THE SLOPE AND PROJECT AREA THAT ARE A RESULT OF CONSTRUCTION ACTIVITIES.
14. BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING SITE DISTURBING ACTIVITIES.

ACCESS AND STAGING AREA NOTES

1. USE ONLY THE APPROVED ACCESS POINTS, AS SHOWN ON THE DRAWINGS.
2. STOCKPILE AND STAGING AREA: STOCKPILE MATERIALS WITHIN AN EXISTING FLAT AND PREVIOUSLY DISTURBED AREA, TO BE IDENTIFIED BY THE DISTRICT AT THE PREBID MEETING.
3. CONTAIN THE DOWNSLOPE PERIMETER OF STAGING OR STOCKPILE AREAS WITH SILT FENCE.
4. STORE, MAINTAIN AND REFUEL ALL EQUIPMENT AND MATERIALS IN A DESIGNATED PORTION OF THE STAGING AREA.

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SEEDING

1. SEED AND MULCH ALL DISTURBED AREAS OUTSIDE OF THE PROPOSED ROAD BED AS FOLLOWS:
   - 1.1. HAND BROADCAST SEED AT A RATE OF 30 LBS/ACRE.
   - 1.2. HAND BROADCAST MULCH TO A DEPTH OF TWO (2) INCHES.
   - 1.3. SURFACES TO RECEIVE SEED AND MULCH SHALL BE SCARIFIED TO A DEPTH OF 4 INCHES PRIOR TO APPLICATION.
   - 1.4. SEED AND MULCH SHALL BE IN PLACE PRIOR TO OCTOBER 15TH.

SEED MIX

37% BY WEIGHT CALIFORNIA BROME
64% BY WEIGHT "REGREEN" OR EQUIVALENT STERILE WHEAT.

MULCH

MULCH SHALL CONSIST OF CERTIFIED WEED FREE RICE STRAW OR NATIVE DUFF.

EARTHWORK NOTES

1. GRADING SUMMARY:

TEMPORARY CUT VOLUME =	76 CY
TOTAL FILL VOLUME =	44 CY
OFFHAUL =	32 CY

THE ABOVE QUANTITIES ARE APPROXIMATE I VOLUMES CALCULATED FROM THE DRAWINGS, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF WORK TO BE CONSTRUCTED. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. PRIOR TO COMMENCING WORK, PROTECT ALL SENSITIVE AREAS TO REMAIN UNDISTURBED WITH TEMPORARY FENCING, AS SHOWN ON THE DRAWINGS, AS SPECIFIED, OR AS DIRECTED BY THE ENGINEER.
3. DO NOT DISTRURB AREAS OUTSIDE OF THE DESIGNATED LIMITS OF DISTURBANCE, UNLESS AUTHORIZED IN WRITING BY THE ENGINEER. THE COST OF ALL ADDITIONAL WORK ASSOCIATED WITH RESTORATION AND REVEGETATION OF DISTURBED AREAS OUTSIDE THE DESIGNATED LIMITS OF DISTURBANCE, AS SHOWN ON THE DRAWINGS, SHALL BE BORN SOLELY BY THE CONTRACTOR.
4. REMOVE ALL EXCESS SOILS TO AN APPROVED DUMP SITE OR DISPOSE OF ON SITE AT A LOCATION TO BE APPROVED BY THE ENGINEER, IN A MANNER THAT WILL NOT CAUSE EROSION.
5. FINE GRADING ELEVATIONS, CONFORMS, AND SLOPES NOT CLEARLY SHOWN ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO DIRECT DRAINAGE TO PROTECTED DRAINAGE CONTROL STRUCTURES OR NATURAL WATERWAYS IN A MANNER THAT SUPPORTS THE INTENT OF THE DESIGN. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THESE DRAWINGS AND SPECIFICATIONS, THE CURRENT EDITION OF THE CALTRANS STANDARD PLANS AND SPECIFICATIONS, (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS"), AND THE COUNTY OF SANTA CLARA DESIGN CRITERIA.
2. NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL OBSERVE THE CONSTRUCTION PROCESS, AS NECESSARY TO ENSURE PROPER INSTALLATION PROCEDURES. REFER TO THE GEOTECHNICAL REPORT FOR SPECIFIC OBSERVATION REQUIREMENTS.
3. EXISTING UNDERGROUND UTILITY LOCATIONS:
   - A. PRIOR TO BEGINNING WORK, CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.
   - B. EXISTING UTILITY LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.
   - C. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.
   - D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.
   - E. TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
   - F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.
   - G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.
4. IF DISCREPANCIES ARE DISCOVERED BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, PERMITS, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION, AND THE MATERIALS USED IN THE CONSTRUCTION.
6. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL A DETAILED CONSTRUCTION SCHEDULE. DO NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.
8. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.
9. MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.
10. MAINTAIN THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. STORE ALL MATERIALS WITHIN APPROVED STAGING AREAS.
11. PROVIDE, AT CONTRACTOR'S SOLE EXPENSE, ALL MATERIALS, LABOR AND EQUIPMENT REQUIRED TO COMPLY WITH ALL APPLICABLE PERMIT CONDITIONS AND REQUIREMENTS.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING AND LAYOUT, UNLESS OTHERWISE SPECIFIED.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE SOLE EXPENSE OF THE CONTRACTOR.
14. CONTRACTOR IS REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
15. THE CONTRACTOR SHALL CONFORM TO THE RULES AND REGULATIONS OF THE CONSTRUCTION SAFETY ORDERS OF THE CALIFORNIA DIVISION OF OCCUPATIONAL SAFETY AND HEALTH PERTAINING TO EXCAVATION AND TRENCHES THE CALIFORNIA CODE OF REGULATIONS TITLE 8, SUBCHAPTER 4 CONSTRUCTION SAFETY ORDERS, ARTICLE 6 EXCAVATION.

REV.	DATE	DESCRIPTION	BY
⚠1	9/13/17	EROSION CONTROL INFORMATION	B.M.Z.
⚠2	9/22/17	NO REVISIONS THIS SHEET	B.M.Z.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

9/22/17 DATE

REGISTERED PROFESSIONAL ENGINEER MATT W. WELD No. 62235 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

GENERAL NOTES

BEAR CREEK REDWOODS
PHASE 1 ROAD WORK
100% DESIGN SUBMITTAL

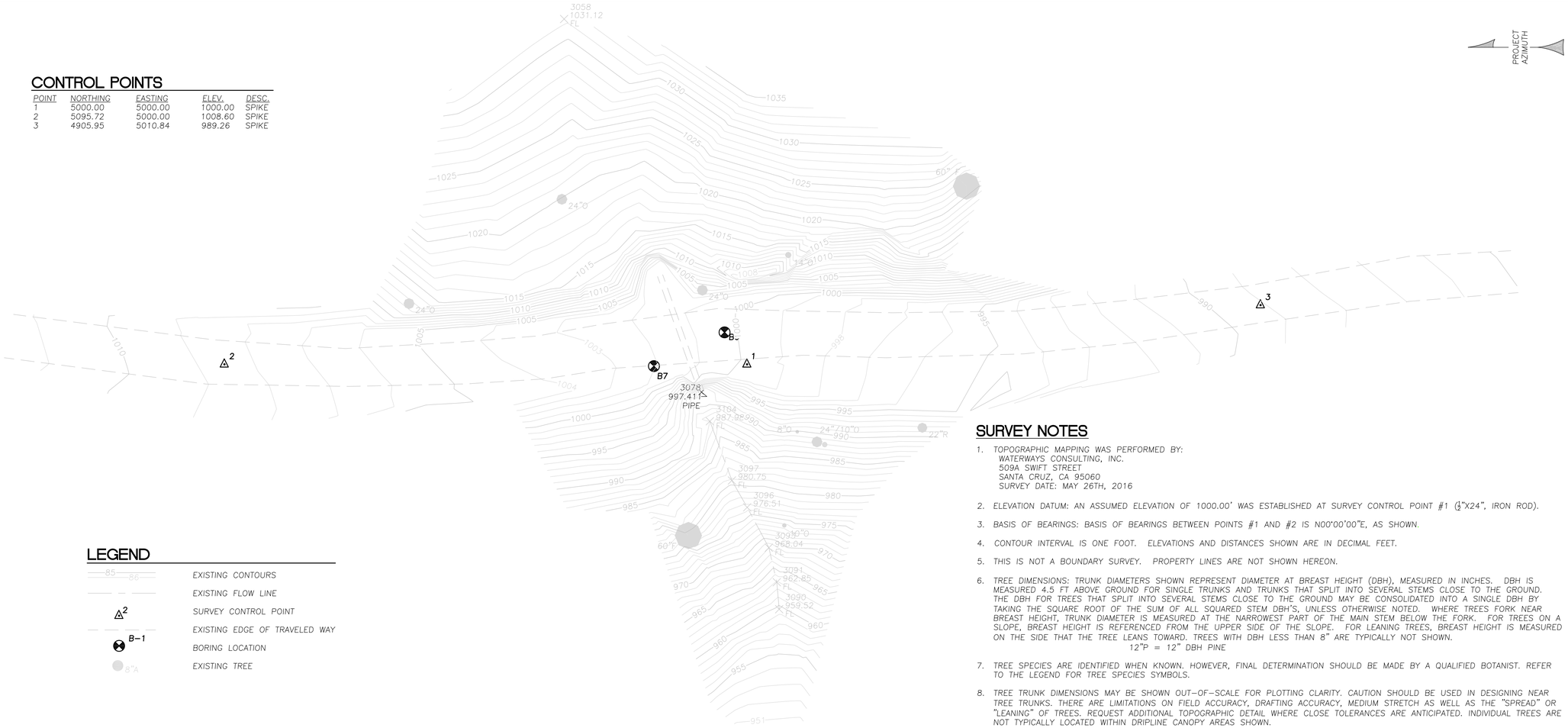
DESIGNED BY:	N/A
DRAWN BY:	M.L.B.
CHECKED BY:	M.W.W.
DATE:	6/21/17
JOB NO.:	16-017A

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C4

CONTROL POINTS

POINT	NORTHING	EASTING	ELEV.	DESC.
1	5000.00	5000.00	1000.00	SPIKE
2	5095.72	5000.00	1008.60	SPIKE
3	4905.95	5010.84	989.26	SPIKE



LEGEND

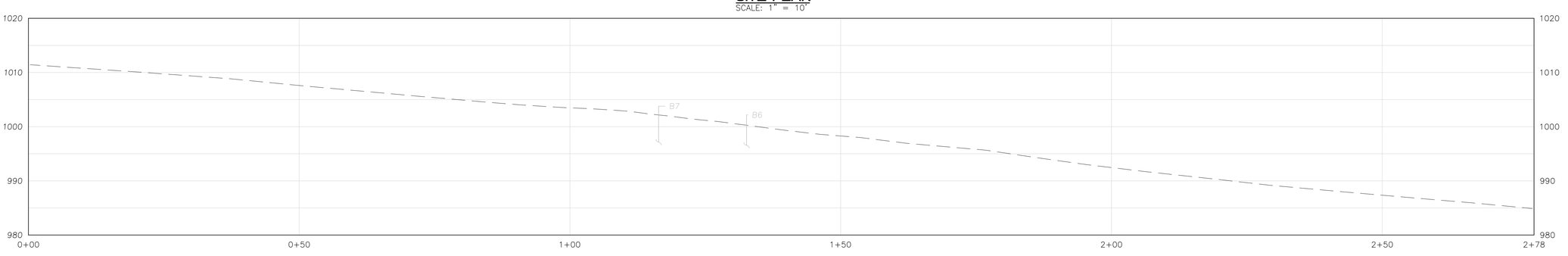
85 86	EXISTING CONTOURS
	EXISTING FLOW LINE
2	SURVEY CONTROL POINT
B-1	EXISTING EDGE OF TRAVELED WAY
	BORING LOCATION
8"A	EXISTING TREE

SURVEY NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509A SWIFT STREET
   SANTA CRUZ, CA 95060
   SURVEY DATE: MAY 26TH, 2016
2. ELEVATION DATUM: AN ASSUMED ELEVATION OF 1000.00' WAS ESTABLISHED AT SURVEY CONTROL POINT #1 (½"X24", IRON ROD).
3. BASIS OF BEARINGS: BASIS OF BEARINGS BETWEEN POINTS #1 AND #2 IS N00°00'00"E, AS SHOWN.
4. CONTOUR INTERVAL IS ONE FOOT. ELEVATIONS AND DISTANCES SHOWN ARE IN DECIMAL FEET.
5. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES ARE NOT SHOWN HEREON.
6. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. THE DBH FOR TREES THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND MAY BE CONSOLIDATED INTO A SINGLE DBH BY TAKING THE SQUARE ROOT OF THE SUM OF ALL SQUARED STEM DBH'S, UNLESS OTHERWISE NOTED. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.
   12"P = 12" DBH PINE
7. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
8. TREE TRUNK DIMENSIONS MAY BE SHOWN OUT-OF-SCALE FOR PLOTTING CLARITY. CAUTION SHOULD BE USED IN DESIGNING NEAR TREE TRUNKS. THERE ARE LIMITATIONS ON FIELD ACCURACY, DRAFTING ACCURACY, MEDIUM STRETCH AS WELL AS THE "SPREAD" OR "LEANING" OF TREES. REQUEST ADDITIONAL TOPOGRAPHIC DETAIL WHERE CLOSE TOLERANCES ARE ANTICIPATED. INDIVIDUAL TREES ARE NOT TYPICALLY LOCATED WITHIN DRIPLINE CANOPY AREAS SHOWN.

TREE SPECIES	
O	OAK
F	FIR

SITE PLAN
SCALE: 1" = 10'



CENTERLINE ALIGNMENT PROFILE
SCALE: 1" = 10'

REV.	DATE	DESCRIPTION	BY
1	9/13/17	NO REVISIONS THIS SHEET	B.M.Z.
2	9/22/17	NO REVISIONS THIS SHEET	B.M.Z.

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9/22/17 DATE

REGISTERED PROFESSIONAL ENGINEER MATT W. WELD No. 62235 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

MAP POINT 204
EXISTING SITE
CONDITIONS

BEAR CREEK REDWOODS
PHASE 1 ROAD WORK
100% DESIGN SUBMITTAL

DESIGNED BY:	M.W.W.
DRAWN BY:	M.L.B.
CHECKED BY:	M.W.W.
DATE:	6/21/17
JOB NO.:	16-017A

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C5

5 OF 7

GENERAL NOTES:

1. TYPICAL NOTES AND DETAILS ON THESE SHEETS SHALL APPLY UNLESS SPECIFICALLY SHOWN OR NOTED OTHERWISE. CONSTRUCTION DETAILS NOT FULLY SHOWN OR NOTED SHALL BE SIMILAR TO DETAILS SHOWN FOR SIMILAR CONDITIONS. ALL WORK OR CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES, REGULATIONS, AND SAFETY REQUIREMENTS.
2. ALL CONSTRUCTION SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS IN THE CURRENT ADDITION OF THE COUNTY OF SANTA CLARA DESIGN CRITERIA AND THE 2016 CALIFORNIA BUILDING CODE.
3. NO CHANGES IN THE APPROVED IMPROVEMENT PLANS SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE PROJECT ENGINEER.
4. THE CONTRACTOR SHALL SUPPLY ALL LABOR, MATERIALS, EQUIPMENT, AND SERVICES OF EVERY KIND, INCLUDING WATER AND POWER, NECESSARY FOR THE PROPER EXECUTION OF THE WORK SHOWN OR INDICATED ON THESE DRAWINGS. ALL MATERIAL SHALL BE NEW AND MATERIALS AND WORKMANSHIP SHALL BE IN GOOD QUALITY. ALL WORKMEN AND SUBCONTRACTORS SHALL BE SKILLED IN THEIR TRADE.
5. THE CONTRACTOR SHALL ADEQUATELY PROTECT HIS WORK, ADJACENT PROPERTY AND THE PUBLIC, AND BE RESPONSIBLE FOR DAMAGE OR INJURY DUE TO HIS/HER ACT OR NEGLECT.
6. THE PREMISES SHALL BE KEPT FREE FROM ACCUMULATION OF WASTE MATERIALS, AND DEBRIS, AND AT THE END OF THE JOB, THE CONTRACTOR SHALL REMOVE MATERIALS, DEBRIS, ALL RUBBISH, SURPLUS MATERIALS, AND TOOLS, AND LEAVE THE BUILDING SITE CLEAN.
7. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION, HOWEVER, OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER AS OUTLINED IN THIS PLAN SET AND IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO SEE THAT THE REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.
8. THE RETAINING WALL HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2016 CALIFORNIA BUILDING CODE AND THE RECOMMENDATIONS IN THE GEOTECHNICAL INVESTIGATION REPORT BY CMAG ENGINEERING, INC., " *GEOTECHNICAL INVESTIGATION, BEAR CREEK REDWOODS ROADS AND TRAILS - MP204, LOS GATOS, SANTA CLARA COUNTY, CALIFORNIA*", DATED JULY 6, 2016, PROJECT NO. 16-120-SCL.

TYPICAL CONSTRUCTION SEQUENCE:

1. CUT BACK TEMPORARY CONSTRUCTION SLOPE TO 0.75:1 (H:V) PER THE REQUIREMENTS OF SUBSECTION 6.6 OF THE REFERENCED GEOTECHNICAL INVESTIGATION REPORT.
2. LOCATE AND DRILL SHAFTS TO REQUIRED DEPTHS AND DIAMETER PER THE PLAN SET AND THE REFERENCED GEOTECHNICAL INVESTIGATION REPORT.
3. INSTALL THE I-BEAMS AND POUR THE CONCRETE.
4. CONSTRUCT CULVERT THROUGH WALL AND POUR CONCRETE LAGGING AND OPTIONAL CONCRETE FOOTING.
5. INSTALL THE WOOD WALL LAGGING AND BACKDRAIN (A MINIMUM OF 7 DAYS AFTER POURING CONCRETE).
6. COMPACT BACKFILL TO 90 PERCENT RELATIVE COMPACTION PER THE GEOTECHNICAL INVESTIGATION REPORT.
7. CONSTRUCT REMAINING DRAINAGE IMPROVEMENTS.
8. INSTALL EROSION CONTROL.

STEEL NOTES:

1. ALL STRUCTURAL STEEL SECTIONS SHALL CONFORM TO ASTM A992 (Fy = 50 ksi) AND BE FABRICATED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE AISC.
2. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. IT IS THE CONTRACTORS RESPONSIBILITY TO SEE THAT THE REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.
3. ALL STEEL SECTIONS SHALL BE PROTECTED WITH A THREE PAINT SYSTEM CONSISTING OF DEVOE PRE-PRIME 167 / DEVOE BAR-RUST 235 / AND DEVTHANE 379, OR APPROVED EQ.
4. STEEL THAT HAS BEEN WELDED, CUT, OR SCRATCHED IN THE FIELD SHALL BE TOUCHED UP WITH A THREE PAINT SYSTEM.

CONCRETE NOTES:

1. CONCRETE PLACEMENT AND QUALITY SHALL BE PER RECOMMENDATIONS IN ACI 301 AND SUPPLEMENT S1. A COPY SHALL BE AVAILABLE AT THE CONSTRUCTION SITE DURING CONSTRUCTION.
2. PROTECT FRESHLY PLACED CONCRETE FROM PREMATURE DRYING AND EXCESSIVE COLD OR HOT TEMPERATURES. START CURING AS SOON AS FREE WATER HAS DISAPPEARED FROM THE CONCRETE SURFACE AFTER PLACING AND FINISHING. KEEP CONTINUOUSLY MOIST FOR AT LEAST 14 DAYS ACCORDING TO ACI 301 PROCEDURES. CURING MAY BE BY MOIST CURING, MOISTURE RETAINING COVER, CURING COMPOUND OR COMBINATIONS THEREOF.
3. ALL ITEMS TO BE CAST IN CONCRETE SUCH AS REINFORCING, DOWELS, BOLTS, ANCHORS, PIPES, SLEEVES, ETC., SHALL BE SECURELY POSITIONED IN THE FORMS BEFORE PLACING THE CONCRETE.
4. PROVIDE A MINIMUM OF 3 INCHES OF COVER BETWEEN CONCRETE REINFORCING AND EARTH.
5. THE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2500 PSI, A MAXIMUM AGGREGATE SIZE OF ¾ INCH, A MAXIMUM 6 INCH SLUMP, AND A WATER/CEMENT RATIO NOT TO EXCEED 0.55. THE MIX DESIGN OF THE CONCRETE SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER FOR APPROVAL A MINIMUM OF 5 DAYS PRIOR TO PLACEMENT.
6. CEMENT SHALL BE TYPE II.
7. NO MORE THAN 90 MINUTES SHALL ELAPSE BETWEEN CONCRETE BATCHING AND CONCRETE PLACEMENT UNLESS APPROVED BY THE TESTING AGENCY. CONCRETE SHALL BE PLACED WITHIN 15 MINUTES AFTER DISCHARGE.
8. THE FIELD FORMAN RESPONSIBLE FOR THE PLACEMENT OF ALL STRUCTURAL CONCRETE SHALL HAVE A MINIMUM OF 3 YEARS EXPERIENCE IN THE CAPACITY FOR THIS TYPE OF CONSTRUCTION.
9. ALL REINFORCING STEEL SHALL BE NEW STOCK DEFORMED BARS CONFORMING TO ASTM A615 AS FOLLOWS:
   NO. 4 AND SMALLER BARS: GRADE 40
   NO. 5 AND LARGER BARS: GRADE 60

TIMBER NOTES:

1. ALL TIMBER LAGGING SHALL BE TREATED #1 DOUGLAS FIR, ROUGH LUMBER FOR FULL DIMENSIONS. THE TREATED TIMBER SHALL CONFORM TO AWPA U1-09, USE CATEGORY UC4B, COMMODITY SPECIFICATION A. THE SELECTION OF TIMBER LAGGING SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER FOR APPROVAL A MINIMUM OF 5 DAYS PRIOR TO PLACEMENT.
2. ALL CUTS, HOLES, AND INJURIES SHALL BE FIELD TREATED WITH COPPER NAPHTHENATE PRESERVATIVES CONTAINING A MINIMUM 2 PERCENT COPPER METAL PER AWPA STANDARD M4-08, TENINO™, OR APPROVED EQUIVALENT, MAY BE USED FOR FIELD TREATMENT. THE FIELD TREATMENT SHALL BE APPLIED PER THE MANUFACTURERS RECOMMENDATIONS.
3. ALL BOLTS SHALL HAVE STANDARD CUT WASHERS UNDER HEADS AND/OR NUTS WHERE IN CONTACT WITH WOOD. ALL INSERTS TO BE HOT DIPPED GALVANIZED.
4. TIMBER LAGGING MAY BE SLIPPED INTO PLACE AND HELD FORWARD TO THE FRONT FLANGE WITH A SINGLE PIECE OF SHIM STOCK. ALL SHIM STOCK SHALL BE TREATED PER AWPA U1-09, USE CATEGORY UC4B, COMMODITY SPECIFICATION A.
5. ALL NAILS SHALL BE COMMON, HOT-DIPPED, GALVANIZED.

GENERAL GRADING NOTES:

1. ALL CONSTRUCTION SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS IN THE CURRENT ADDITION OF THE SANTA CLARA COUNTY GRADING ORDINANCE AND THE 2016 CALIFORNIA BUILDING CODE.
2. NO LAND DISTURBANCE SHALL TAKE PLACE PRIOR TO THE ISSUANCE OF BUILDING PERMITS.
3. NO LAND CLEARING, GRADING, OR EXCAVATING SHALL TAKE PLACE BETWEEN OCTOBER 15 AND APRIL 15.
4. THE CONTRACTOR SHALL APPLY WATER TO ALL EXPOSED EARTH SURFACES AT INTERVALS SUFFICIENT TO PREVENT AIRBORNE DUST FROM LEAVING THE PROJECT SITE. ALL EXPOSED EARTH SHALL BE WATERED DOWN AT THE END OF THE WORK DAY. NO VEGETATION REMOVAL OR GRADING WILL BE ALLOWED WHICH WILL RESULT IN SILTATION OF WATER COURSES OR UNCONTROLLABLE EROSION.
5. WHILE IN TRANSIT TO AND FROM THE PROJECT SITE, ALL TRUCKS TRANSPORTING FILL SHALL BE EQUIPPED WITH TARPS.
6. THE DIRECTOR OF PLANNING, OR HIS AUTHORIZED REPRESENTATIVE, SHALL HAVE THE AUTHORITY TO "STOP WORK" IF THE WORK IS NOT BEING DONE IN ACCORDANCE WITH THE APPROVED IMPROVEMENT PLANS.
7. THE CONTRACTOR SHALL VERIFY ACTUAL LOCATIONS OF AFFECTED UTILITY LINES PRIOR TO EXCAVATING AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.
8. CONTRACTOR SHALL REQUEST LOCATION OF UNDERGROUND UTILITIES BY CONTACTING USA ALERT (1-800-642-2444) AND APPROPRIATE UTILITY AGENCIES PRIOR TO THE COMMENCEMENT OF THE CONSTRUCTION AND SHALL TAKE APPROPRIATE MEASURES TO PROTECT UTILITIES DURING DURING THE CONSTRUCTION OPERATIONS.
9. ANY EXISTING UTILITY THAT IS REQUIRED TO BE RELOCATED AS A PART OF THIS CONSTRUCTION WILL BE NEGOTIATED BETWEEN THE DEVELOPER AND THE UTILITY AGENCY.

EXCAVATION, BACKFILL, AND GRADING NOTES:

1. ALL EARTHWORK SHALL BE PERFORMED PER THE RECOMMENDATIONS IN THE GEOTECHNICAL INVESTIGATION REPORT BY CMAG ENGINEERING, INC. DATED JULY 6, 2016.
2. FIELD OBSERVATION AND TESTING MUST BE PROVIDED BY A REPRESENTATIVE OF CMAG ENGINEERING, INC. TO ENABLE THEM TO FORM AN OPINION REGARDING THE ADEQUACY OF THE SITE PREPARATION. THE ADEQUACY OF FILL MATERIALS, AND THE EXTENT TO WHICH THE EARTHWORK IS PERFORMED IN ACCORDANCE WITH THE GEOTECHNICAL CONDITIONS PRESENT, THE REQUIREMENTS OF THE REGULATING AGENCIES, THE PROJECT SPECIFICATIONS, AND THE RECOMMENDATIONS PRESENTED IN THE REPORT. A COPY OF ALL COMPACTION TESTS AND FINAL GRADING LETTER SHALL BE SUBMITTED TO THE COUNTY AT SCHEDULED INSPECTIONS.
3. CMAG ENGINEERING, INC. SHOULD BE NOTIFIED AT LEAST 5 WORKING DAYS PRIOR TO ANY SITE CLEARING OR OTHER EARTHWORK OPERATIONS ON THE SUBJECT PROJECT IN ORDER TO OBSERVE THE STRIPPING AND DISPOSAL OF UNSUITABLE MATERIALS AND TO ENSURE COORDINATION WITH THE GRADING CONTRACTOR. DURING THIS PERIOD, A PRECONSTRUCTION MEETING SHOULD BE HELD ON THE SITE TO DISCUSS PROJECT SPECIFICATIONS, OBSERVATION AND TESTING REQUIREMENTS AND RESPONSIBILITIES, AND SCHEDULING.
4. A TEMPORARY CUT SLOPE FOR THE CONSTRUCTION OF THE RETAINING WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH SUBSECTION 6.6 OF THE GEOTECHNICAL INVESTIGATION REPORT BY CMAG ENGINEERING, INC. DATED JULY 6, 2016. A REPRESENTATIVE OF CMAG ENGINEERING, INC. SHOULD BE NOTIFIED TO OBSERVE THE STABILITY OF THE EXCAVATION SLOPE AND VERIFY THE SLOPE ANGLE. IN ADDITION, A REPRESENTATIVE OF CMAG ENGINEERING, INC. SHOULD OBSERVE THE SITE A MINIMUM OF ONCE A WEEK AFTER THE EXCAVATION TO OBSERVE THE MOISUTRE CONIDITION OF THE SOIL AND THE STABILITY OF THE EXCAVATION SLOPES.
5. IMPORTED SOIL SHOULD BE REVIEWED AND APPROVED BY CMAG ENGINEERING, INC. A MINIMUM OF (5) DAYS PRIOR TO IMPORTING.
6. ENGINEERED FILL SHOULD BE PLACED AT A MINIMUM OF 90 PERCENT RELATIVE COMPACTION. BACKDRAINS SHALL BE VIBRATED IN LIFTS PER THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING CUTSLOPES AND EXPOSED SOIL DURING CONSTRUCTION.
7. BACKFILL OF ALL TRENCHES SHOULD BE PLACED IN THIN LIFTS AND COMPACTED TO ACHIEVE A RELATIVE COMPACTION OF NOT LESS THAN 90 PERCENT PER ASTM D1557.
8. DIFFICULT DRILLING CONDITIONS SHOULD BE ANTICIPATED DUE TO THE VERY DENSE, SANDSTONE BEDROCK. DRILLING EQUIPMENT CAPABLE OF EXCAVATING THROUGH ROCK SHOULD BE ANTICIPATED FOR THIS PROJECT.
9. REVIEW BY THE GEOTECHNICAL ENGINEER OR HIS AUTHORIZED REPRESENTATIVE, IS REQUIRED :
   (A) OBSERVATION OF THE TEMPORARY CONSTRUCTION CUT SLOPE, (B) OBSERVATION OF DRILLED, CAST-IN-PLACE CONCRETE SHAFT EXCAVATIONS (C) OBSERVATION OF BOTTOM LAGGING (WOOD LAGGING OR CONCRETE FOOTING) EXTENDING BELOW GRADE PER THE PLANS. (D) OBSERVATION AND TESTING OF ALL COMPACTED ENGINEERED FILL, (E) OBSERVATION OF RETAINING WALL BACKDRAINS, (F) FINAL DRAINAGE OBSERVATION.
10. AFTER THE EARTHWORK OPERATIONS HAVE BEEN COMPLETED AND THE GEOTECHNICAL ENGINEER HAS FINISHED THEIR OBSERVATION OF THE WORK, NO FURTHER EARTHWORK OPERATIONS SHALL BE PERFORMED EXCEPT WITH THE APPROVAL OF AND UNDER THE OBSERVATION OF THE GEOTECHNICAL ENGINEER.
11. WHEN CONSTRUCTION IS COMPLETE, THE GEOTECHNICAL ENGINEER SHALL SUBMIT A FINAL OBSERVATION LETTER TO THE COUNTY OF SANTA CLARA.

SPECIAL INSPECTION:

1. IN ADDITION TO THE GEOTECHNICAL OBSERVATIONS AS OUTLINED IN POINT #9 ABOVE INTHE *EXCAVATION, BACKFILL, AND GRADING NOTES*, THE GEOTECHNICAL ENGINEER SHALL PERFORM SPECIAL INSPECTIONS FOR THE DRILLED, CAST-IN-PLACE CONCRETE SHAFTS EXCAVATIONS PER TABLE 1705.8 OF THE 2016 CALIFORNIA BUILDING CODE.

DATE	REVISION	BY
9-10-17	1 PLAN CHECK	ALG

CMAG ENGINEERING, INC.
62 HANGAR WAY, SUITE A
WATSONVILL, CALIFORNIA 95076
831.475.1411

MP204 REPAIR - RETAINING WALL
BEAR CREEK REDWOODS ROADS AND TRAILS
SANTA CLARA COUNTY, CALIFORNIA

PROJECT NO: 16-120-SCL

DATE: MAY 17, 2017

DRAWN BY: ALG

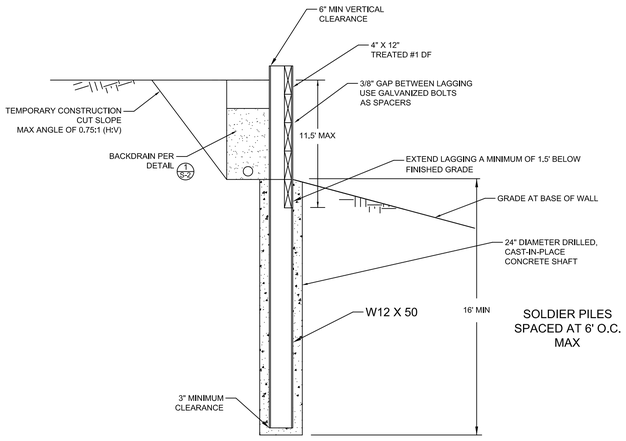
SCALE: AS SHOWN

SHEET

S-1

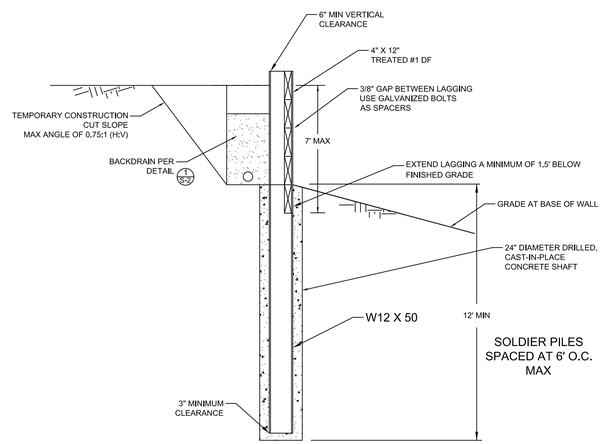
TYPICAL WALL SECTION 11.5 FT MAX RETAINED

NOT TO SCALE



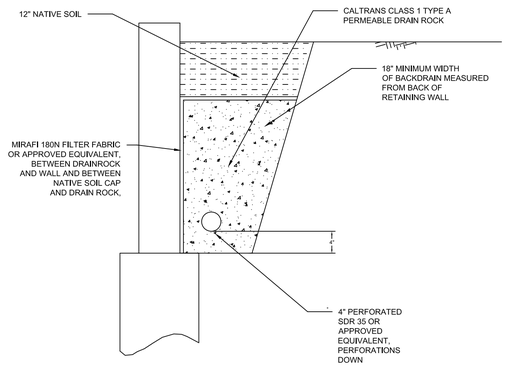
TYPICAL WALL SECTION 7 FT MAX RETAINED

NOT TO SCALE



DETAIL 1 - RETAINING WALL BACKDRAIN

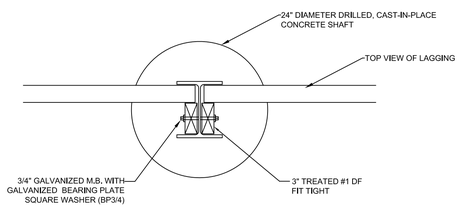
NOT TO SCALE



NOTES:
1. 2± PERCENT TO PIPE AND TRENCH BOTTOM
2. PERFORATED SDR 35 PVC PIPE, OR APPROVED EQUIVALENT, CONNECTED TO CLOSED CONDUITS THAT DISCHARGE TO AN APPROVED LOCATION
3. INSTALL CLEAN OUTS AT APPROVED LOCATIONS

DETAIL 3 - LAGGING CONNECTION - UPPER (2) I-BEAMS

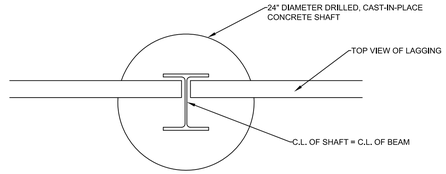
NOT TO SCALE



NOTES:
1. TOP 2 LAGGING TO BE HELD IN PLACE LATERALLY WITH 3" TREATED #1 DF CUT TIGHT AND BOLTED WITH 3/4" M.B WITH SIMPSON 3/4" BEARING PLATE SQUARE WASHER OR EQUIVALENT.

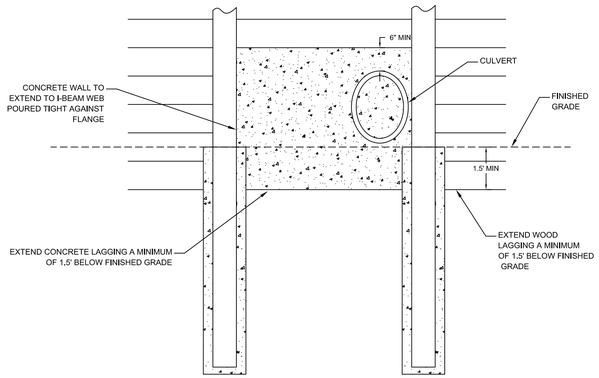
DETAIL 2 - WALL SECTION

NOT TO SCALE



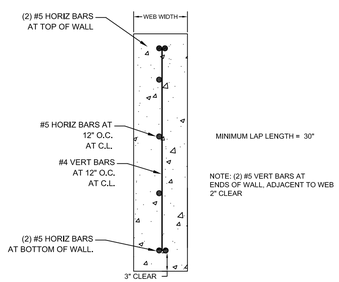
DETAIL 4 - CONCRETE LAGGING AT CULVERT

NOT TO SCALE



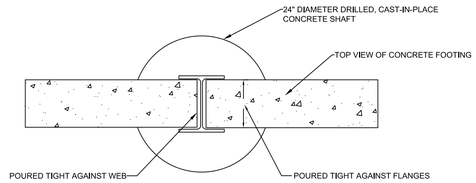
CONCRETE LAGGING SECTION

NOT TO SCALE



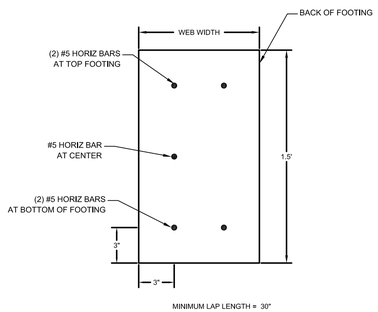
DETAIL 5 - OPTIONAL STEPPED CONCRETE FOOTING FOR BURIED LAGGING

NOT TO SCALE



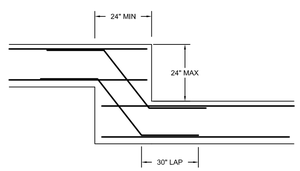
CONCRETE FOOTING DETAIL

NOT TO SCALE



STEPPED FOOTING DETAIL

NOT TO SCALE



DATE	REVISION	BY

CMAG ENGINEERING, INC.
62 HANGAR WAY, SUITE A
WATSONVILL, CALIFORNIA 95076
831.475.1411

MP204 REPAIR - RETAINING WALL

BEAR CREEK REDWOODS ROADS AND TRAILS
SANTA CLARA COUNTY, CALIFORNIA

PROJECT NO: 16-120-SCL

DATE: MAY 17, 2017

DRAWN BY: ALG

SCALE: AS SHOWN

SHEET

S-2

Project Plans B: Parking Area and Trailhead

ALMA COLLEGE PARKING AREA AND TRAILHEAD

BEAR CREEK REDWOODS OPEN SPACE PRESERVE

SANTA CLARA COUNTY, CALIFORNIA

GENERAL NOTES

1. **DESIGN INTENT:** THESE DRAWINGS REPRESENT THE GENERAL DESIGN INTENT TO BE IMPLEMENTED ON THE SITE. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ENGINEER FOR ANY ADDITIONAL CLARIFICATION OR DETAILS NECESSARY TO ACCOMMODATE SITE CONDITIONS.

2. **CONTRACTORS' JOB SITE CONDITIONS:** CONTRACTOR AGREES TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE LANDSCAPE ARCHITECT HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE LANDSCAPE ARCHITECT.

3. **COMPOSITE BASE SHEET:** THE PROPOSED IMPROVEMENTS SHOWN ON THESE DRAWINGS ARE SUPERIMPOSED ON A BASE SHEET. THIS BASE SHEET IS COMPILED FROM THE TOPOGRAPHIC SURVEY, ENGINEERING DOCUMENTS, ARCHITECTURAL DOCUMENTS AND OTHER DATA AS MADE AVAILABLE TO THE LANDSCAPE ARCHITECT, WHO SHALL NOT BE HELD LIABLE FOR CHANGES, INACCURACIES, OMISSIONS OR OTHER ERRORS ON THE DOCUMENTS NOT PREPARED BY THE LANDSCAPE ARCHITECT OR SUB-CONSULTANTS. THE COMPOSITE BASE SHEET IS PROVIDED AS AN AID ONLY AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING THESE DOCUMENTS AND INCORPORATING/ INTEGRATING ALL CONSTRUCTION AS REQUIRED TO ACCOMMODATE SAME. THE BASE SHEET SOURCE FOR THIS PROJECT IS:

   EDMUNDSON & ASSOCIATES LAND SURVEYING
   1512 SEABRIGHT AVENUE SANTA CRUZ, CA 95062
   TEL: (831) 425-1796
   SHEET NAME: TOPOGRAPHIC SURVEY MAP
   DATE: JULY 31, 2017

4. **UTILITIES:** A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES. THE CONTRACTOR IS CAUTIONED THAT ONLY EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATION AND DEPTHS OF SUCH UNDERGROUND UTILITIES. HOWEVER, THE LANDSCAPE ARCHITECT CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF SUCH UNDERGROUND UTILITIES, NOR FOR THE EXISTENCE OF OTHER BURIED OBJECTS OR UTILITIES WHICH ARE NOT SHOWN ON THESE DRAWINGS. PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE UTILITY COMPANIES INVOLVED AND REQUESTING A VISUAL VERIFICATION OF THE LOCATIONS OF THEIR UNDERGROUND FACILITIES. THE UTILITY COMPANIES ARE MEMBERS OF THE UNDERGROUND SERVICE ALERT (U.S.A.) ON-CALL PROGRAM. THE CONTRACTOR OR ANY SUBCONTRACTOR FOR THIS CONTRACT SHALL NOTIFY MEMBERS OF THE U.S.A., (800) 227-2600 AND THE DISTRICT AT LEAST 48 HOURS (2 WORKING DAYS) PRIOR TO BEGINNING ANY EXCAVATION IN THE VICINITY OF UNDERGROUND FACILITIES. EXCAVATION IS DEFINED AS BEING 18 OR MORE INCHES IN DEPTH BELOW THE EXISTING SURFACE.

5. **UNAUTHORIZED CHANGES AND USES:** ALL PROPOSED CHANGES TO THE PLANS MUST BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT IN WRITING AND MUST BE APPROVED BY THE LANDSCAPE ARCHITECT IN ADVANCE. LANDSCAPE ARCHITECT WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO, OR USE OF, THESE PLANS. ALL COMMUNICATION WITH LANDSCAPE ARCHITECT IS TO GO THROUGH DISTRICT'S REPRESENTATIVE.

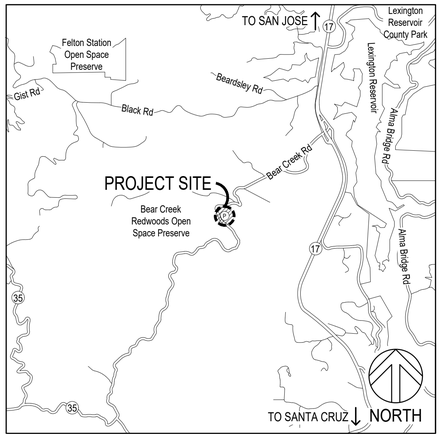
6. **TREE PROTECTION:** PROVIDE TREE PROTECTION AS SPECIFIED FOR ALL EXISTING TREES TO REMAIN.

7. CONTRACTOR TO CONFIRM CONSTRUCTION STAGING LOCATION AND COORDINATE WITH DISTRICT.

8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL PRIVATE PROPERTY AS NECESSARY. ANY PRIVATE PROPERTY DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED TO THE OWNER'S SATISFACTION AT CONTRACTOR'S OWN EXPENSE.

ABBREVIATIONS

AGL	ABOVE GROUND LEVEL	GALV	GALVANIZED	RRFB	RECTANGULAR RAPID
CLR	CLEARANCE	GB	GRADE BREAK		FLASHING BEACONS
CONC	CONCRETE	HP	HIGH POINT	SIM	SIMILAR
CONT	CONTINUOUS	HT	HEIGHT	SPECS	SPECIFICATIONS
CP	CENTER POINT	HORIZ	HORIZONTAL	SCD	SEE CIVIL DRAWINGS
DIA	DIAMETER	L	LENGTH	SF	SQUARE FOOT
DWG	DRAWING	LOW	LIMIT OF WORK	SSD	SEE STRUCTURAL
(E)	EXISTING	LP	LOW POINT		DRAWINGS
EHS	EXTRA HIGH STRENGTH	MFR	MANUFACTURER	STD	STANDARD
EL	ELEVATION	(N)	NEW	TBD	TO BE DETERMINED
EQ	EQUAL	NIC	NOT IN CONTRACT	TBR	TO BE REMOVED
EW	EACH WAY	NTS	NOT TO SCALE	TR	TO REMAIN
FG	FINISHED GRADE	OC	ON CENTER	TYP	TYPICAL
FL	FLOW LINE	PIP	PROTECT IN PLACE	VERT	VERTICAL
FS	FINISHED SURFACE	POB	POINT OF BEGINNING	VIF	VERIFY IN FIELD
FTG	FOOTING	R	RADIUS		



LOCATION MAP
NTS

SHEET INDEX

GENERAL

T1.0	COVER SHEET

SURVEY

-	TOPOGRAPHIC SURVEY MAP

LANDSCAPE

L1.1 - L1.2	DEMOLITION PLAN

CIVIL

C0.0	CIVIL INFO
C1.0	CONSTRUCTION ACCESS AND STAGING PLAN - POND LAYOUT
C1.1	CONSTRUCTION ACCESS AND STAGING PLAN - PARKING LOT LAYOUT
C2.0	HORIZONTAL CONTROL PLAN - POND LAYOUT
C2.1	HORIZONTAL CONTROL PLAN - PARKING LOT LAYOUT
C2.2	HORIZONTAL CONTROL PLAN - TABLES
C3.0	SIGNAGE, STRIPING, AND PAVEMENT PLAN - PARKING LOT LAYOUT
C4.0	GRADING AND DRAINAGE PLAN - POND LAYOUT
C4.1	GRADING AND DRAINAGE PLAN - PARKING LOT LAYOUT
C4.2	GRADING AND DRAINAGE PLAN - PARKING LOT SECTIONS AND PROFILES
C4.3	GRADING AND DRAINAGE PLAN - PATH SECTIONS AND PROFILES
C4.4	GRADING AND DRAINAGE PLAN - PLAZA AREA ENLARGEMENT
C5.0	CIVIL DETAILS - PARKING LOT DETAILS
C5.1	CIVIL DETAILS - GATE AND DRIVEWAY DETAILS
C6.0	EROSION CONTROL PLAN - POND LAYOUT
C6.1	EROSION CONTROL PLAN - PARKING LOT LAYOUT
C6.2	EROSION CONTROL PLAN - DETAILS AND NOTES
C7.0	STORMWATER CONTROL PLAN

LANDSCAPE

L2.1 - L2.2	SITE CONSTRUCTION PLAN
L3.1 - L3.2	LANDSCAPE LAYOUT PLAN
L4.1 - L4.2	PLANTING PLAN
L5.1 - L5.4	CONSTRUCTION DETAILS

TRAFFIC

E-1	RRFB CROSSWALK SYSTEM INSTALLATION NOTES AND DETAILS
E-2	RRFB CROSSWALK SYSTEM INSTALLATION
SS-1	CROSSWALK INSTALLATION SIGNING AND STRIPING

OWNER

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022
(650) 691-1200
CONTACT: MATT BRUNNINGS, CAPITAL PROJECT MANAGER

PRIME CONSULTANT

HARRIS DESIGN LANDSCAPE ARCHITECTURE
755 FOLGER AVENUE
BERKELEY, CA 94710
(510) 647-3792
CONTACT: BILL HARRIS

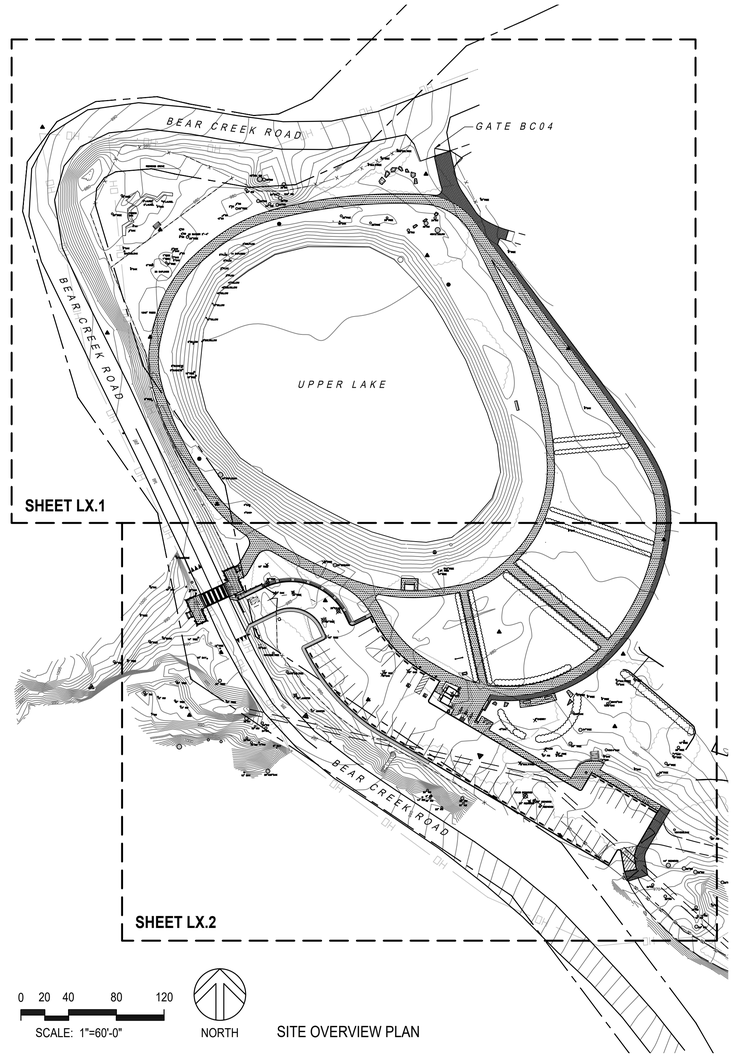
SUBCONSULTANTS

CIVIL ENGINEER
FALL CREEK ENGINEERING, INC.
1525 SEABRIGHT AVENUE
SANTA CRUZ, CA 95062
(831) 426-9054
CONTACT: ROBYN COOPER

GEOTECHNICAL ENGINEER
BUTANO GEOTECHNICAL ENGINEERING, INC.
231 GREEN VALLEY ROAD, SUITE E
FREEDOM, CA 95019
(831) 724-2612
CONTACT: GREG BLOOM

LAND SURVEYOR
EDMUNDSON & ASSOCIATES LAND SURVEYING
1512 SEABRIGHT AVENUE
SANTA CRUZ, CA 95062
(831) 425-1796
CONTACT: OLIN S. EDMUNDSON

TRAFFIC ENGINEER
HEXAGON TRANSPORTATION CONSULTANTS, INC.
4 NORTH SECOND STREET, SUITE 400
SAN JOSE, CA 95113
(408) 971-6100
CONTACT: JEFF ELIA



0 20 40 80 120
SCALE: 1"=60'-0"
NORTH
SITE OVERVIEW PLAN

Midpeninsula Regional Open Space District

Alma College Parking Area and Trailhead

Bear Creek Redwoods Open Space Preserve
Santa Clara County, CA

HARRIS DESIGN

Landscape Architecture
Park & Recreation Planning
Urban Design

755 Folger Avenue
Berkeley, CA 94710
t: 510.647.3792
f: 501.647.3712
www.hd-la.com

Issued for	Rev Date	Appr
50% CD	6/16/17	BH
90% CD	10/10/17	BH
100% CD	02/02/18	BH

Seals and Signatures

LICENSED LANDSCAPE ARCHITECT
WILLIAM S. HARRIS #2438
08-31-19
RENEWAL DATE
STATE OF CALIFORNIA

William S Harris

Drawn by : ZD
Checked by : BH
Drawing Title :

COVER SHEET

Date : 02/02/18
Scale : N.A.
Project Number : 16.04
Sheet Number : T1.0

EDMUNDSON & ASSOCIATES LAND SURVEYING
1512 SEABRIGHT AVENUE
SANTA CRUZ, CA 95062
PHONE (831) 425-1796
FAX (831) 425-1795

TOPOGRAPHIC SURVEY MAP

OF ASSESSOR'S PARCEL NO. 544-330-01

Scale 1" = 20'	Santa Clara County California	File 16096T.DWG
June 27, 2017		FB 194/17
Prepared for **Harris Design**		
Sheet 1 of 4		Job #16096

Elevations shown are NAVD88 datum as established from network RTK GPS readings. Not confirmed with a local benchmark.

NOTE: This is not a boundary survey. No property lines are shown.

Note: Map displays contours at a 1' interval. Except in relatively flatter areas accuracy is mapped to a 2' contour interval. Contours shown between edge of pond and top of slope around pond are approximate only. No trees have been located in this area.

LEGEND

- Survey control point found as noted
- Survey control point set as noted
- Top / toe of slope
- Overhead utility line
- Structure line
- Fence
- Edge of pavement
- Tree

COORDINATE LISTING OF CONTROL POINTS

1	1892990.761	6123514.207	976.097
2	1892844.489	6123633.644	976.434
3	1892948.993	6123391.098	979.250
4	1893025.888	6123529.521	975.893
5	1893030.115	6123192.635	992.844
6	1892857.617	6123247.042	992.811
7	1892589.633	6123342.434	991.301
8	1892536.983	6123315.845	987.294
9	1892922.535	6123515.253	978.450
10	1892673.635	6123521.459	975.110
11	1892898.202	6123533.005	978.665
12	1892854.080	6123283.008	980.399
13	1892944.186	6123291.339	980.392
14	1892751.991	6123324.164	982.858
15	1892714.264	6123339.091	984.339
16	1892633.092	6123429.798	983.604
17	1892550.042	6123465.803	982.679
18	1892606.959	6123575.598	980.061
19	1892588.255	6123679.591	981.531
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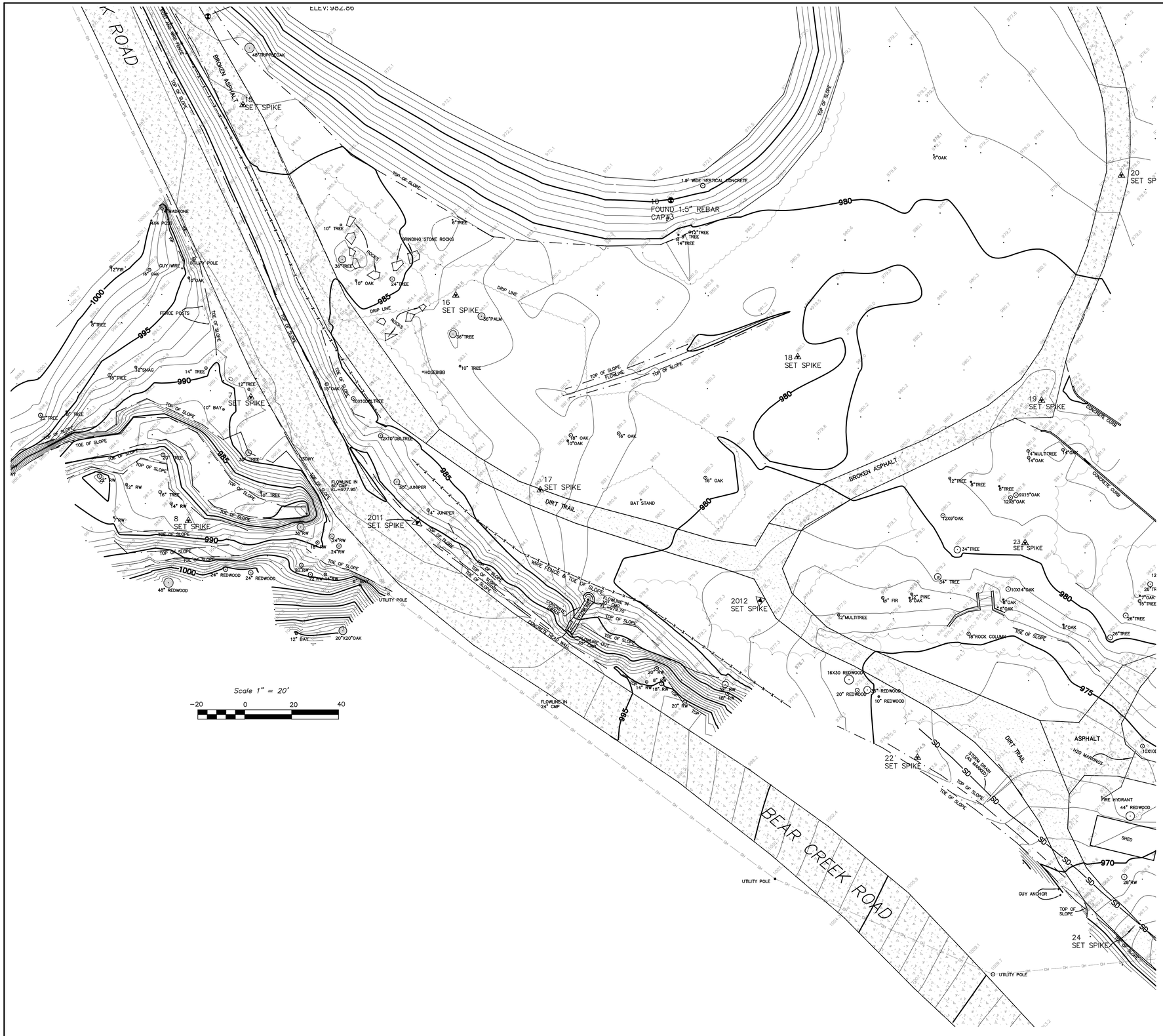
23	1892527.515	6123672.547	980.549
24	1892366.571	6123721.636	967.333
25	1892302.326	6123802.273	961.962
26	1892214.581	6123914.581	958.408

Scale 1" = 20'

−20 0 20 40

Scale 1" = 20'
Contour Interval 1'

LICENSED LAND SURVEYOR
OLIN S. EDMUNDSON
No. 8307
STATE OF CALIFORNIA



Elevations shown are NAVD88 datum as established from network RTK GPS readings. Not confirmed with a local benchmark.

NOTE: This is not a boundary survey. No property lines are shown.

Note: Map displays contours at a 1' interval. Except in relatively flatter areas accuracy is mapped to a 2' contour interval. Contours shown between edge of pond and top of slope around pond are approximate only. No trees have been located in this area.

LEGEND

- Survey control point found as noted
- Survey control point set as noted
- Top / toe of slope
- Overhead utility line
- Structure line
- Fence
- Edge of pavement
- Tree

EDMUNDSON & ASSOCIATES LAND SURVEYING
1512 SEABRIGHT AVENUE
SANTA CRUZ, CA 95062
PHONE (831) 425-1796
FAX (831) 425-1795

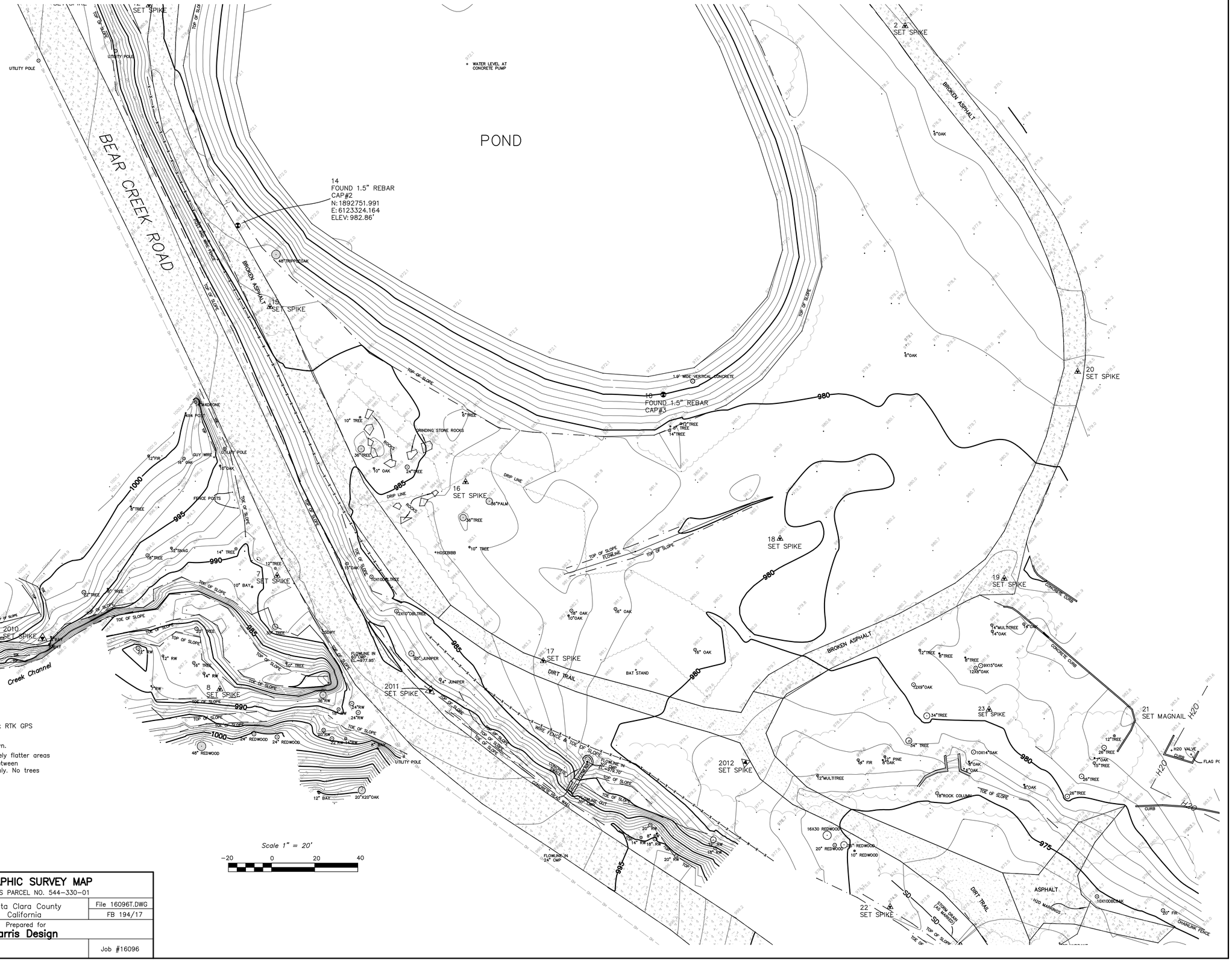
TOPOGRAPHIC SURVEY MAP

OF ASSESSOR'S PARCEL NO. 544-330-01

Scale 1" = 20'	Santa Clara County California	File 16096T.DWG
June 27, 2017		FB 194/17

Prepared for
Harris Design

Sheet 2 of 4	Job #16096



Elevations shown are NAVD88 datum as established from network RTK GPS readings. Not confirmed with a local benchmark.

NOTE: This is not a boundary survey. No property lines are shown.

Note: Map displays contours at a 1' interval. Except in relatively flatter areas accuracy is mapped to a 2' contour interval. Contours shown between edge of pond and top of slope around pond are approximate only. No trees have been located in this area.

LEGEND

- Survey control point found as noted
- Survey control point set as noted
- Top / toe of slope
- Overhead utility line
- Structure line
- Fence
- Edge of pavement
- Tree

Scale 1" = 20'

−20 0 20 40

EDMUNDSON & ASSOCIATES LAND SURVEYING

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SANTA CRUZ, CA 95062
PHONE (831) 425-1796
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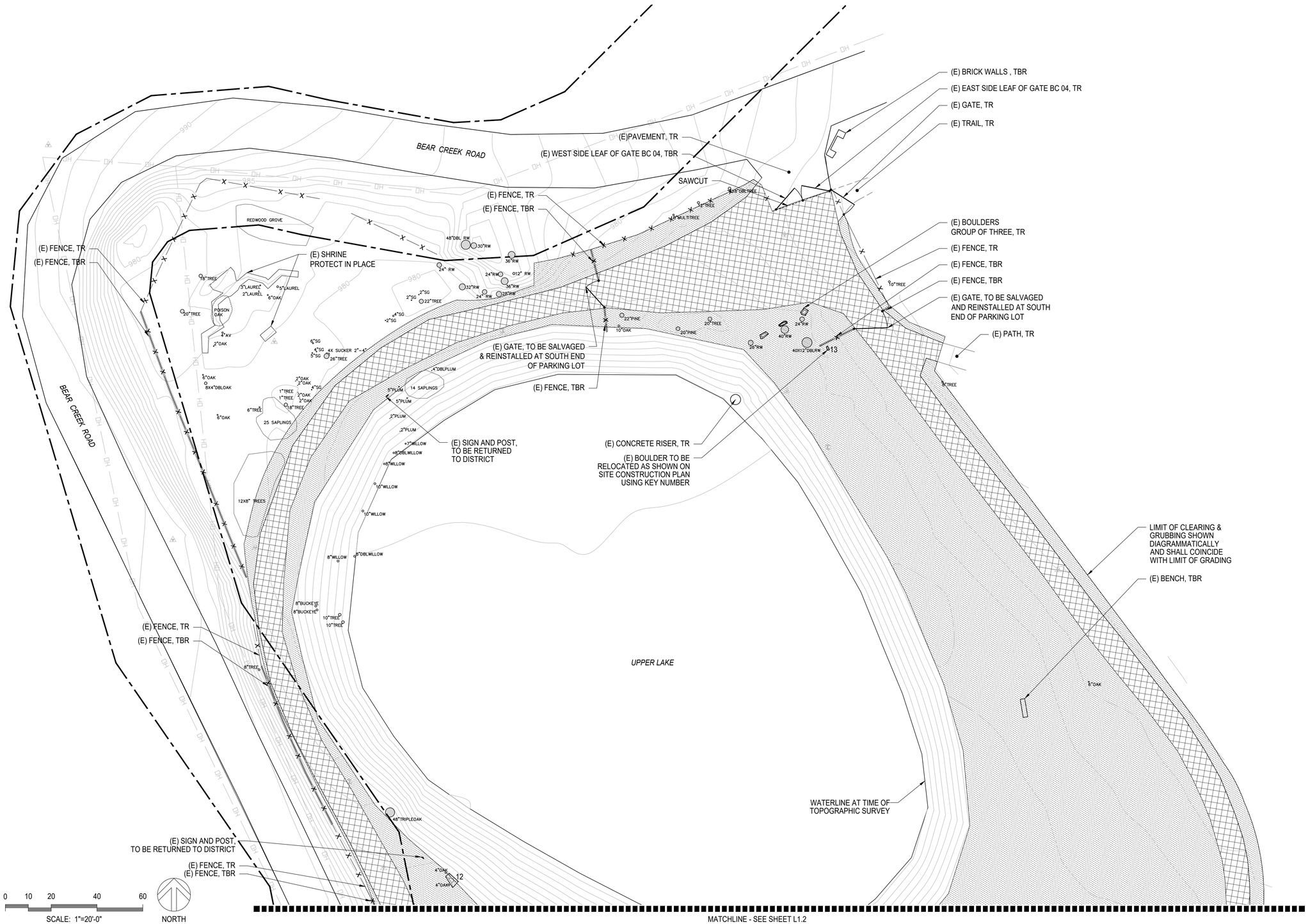
TOPOGRAPHIC SURVEY MAP

OF ASSESSOR'S PARCEL NO. 544-330-01

Scale 1" = 20'	Santa Clara County	File 16096T.DWG
June 27, 2017	California	FB 194/17

Prepared for
Harris Design

Sheet 4 of 4	Job #16096



SEE SHEET L1.2 FOR LEGEND & NOTES

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50% CD		6/16/17	BH
90% CD		10/10/17	BH
100% CD		02/02/18	BH

Seals and Signatures

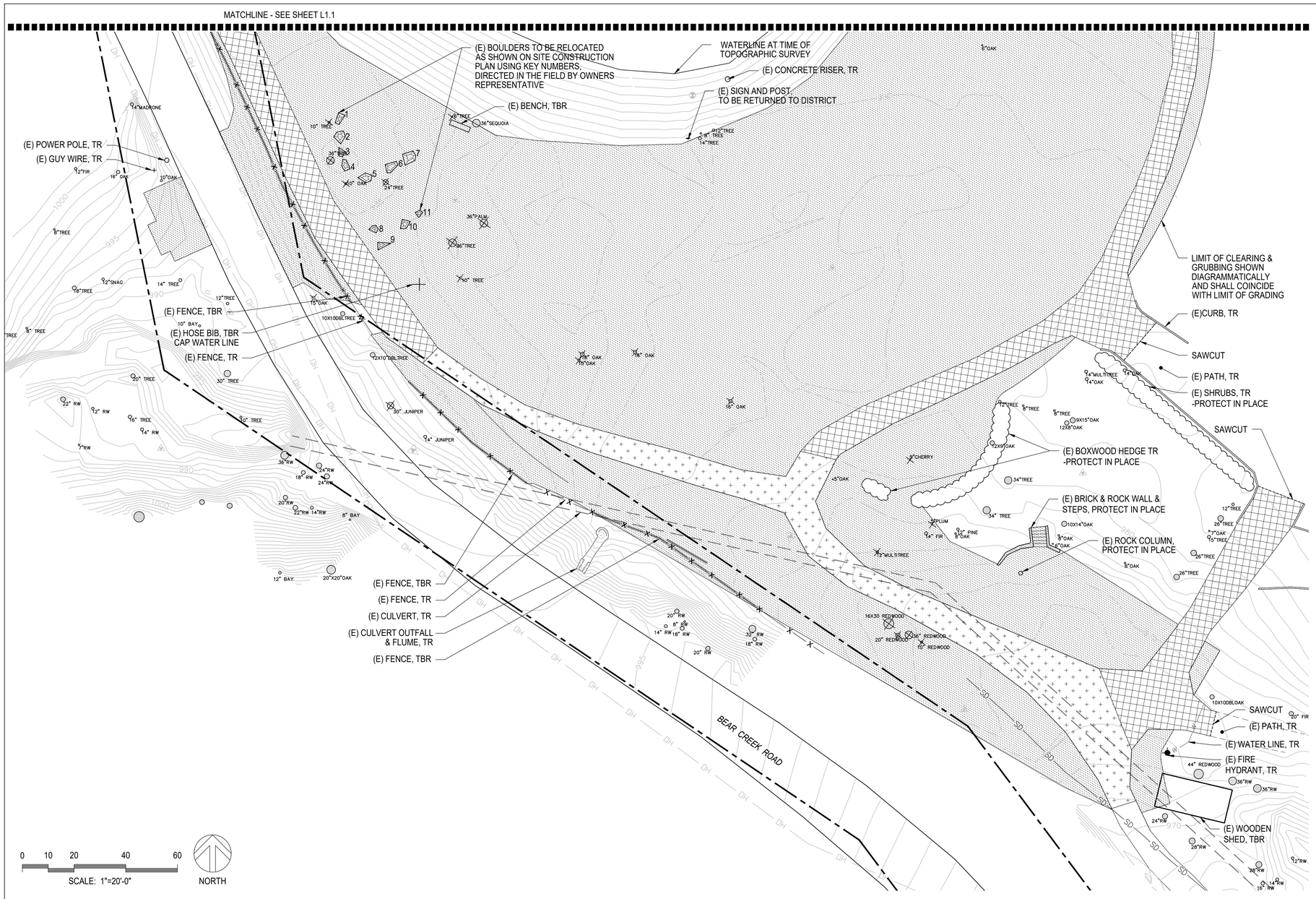
LICENSED LANDSCAPE ARCHITECT
WILLIAM S. HARRIS 2428
08-31-18
STATE OF CALIFORNIA

Drawn by : ZD
Checked by : BH
Drawing Title :

DEMOLITION PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04

Sheet Number : L1.1



DEMOLITION LEGEND

- AC PAVING & BASE, TO BE REMOVED OR RECYCLED ON SITE FOR CLASS 2 AGGREGATE BASE - ASSUME A MINIMUM OF 2 INCHES AC OVER 4 INCHES AB
- CLEARING & GRUBBING
- EXISTING GRAVEL ROAD TO BE SCARIFIED AND COMPACTED
- EXISTING WIRE FENCE, TR
- EXISTING WIRE FENCE TO BE REMOVED
- WATER LINE, TR
- STORM DRAIN LINE, TR
- OVERHEAD LINES, TR
- BEAR CREEK ROAD RIGHT OF WAY PLOTTED FROM RECORD INFORMATION.
- EXISTING TREE TO REMAIN
- EXISTING TREE TO BE REMOVED, NOT IN CONTRACT - BY DISTRICT
- KEY NUMBER — BOULDER, TO BE RELOCATED SEE SITE CONSTRUCTION PLAN FOR NEW LOCATIONS ASSIGNED BY KEY NUMBER
- (E) — EXISTING
- TBR — TO BE REMOVED
- TR — TO REMAIN
- TYP — TYPICAL
- PIP — PROTECT IN PLACE

DEMOLITION NOTES

1. EXISTING CONDITIONS ARE SHOWN AS A HALF-TONE SCREEN,EXCEPT FOR THOSE ITEMS TO BE REMOVED.
2. IF UTILITIES ARE ENCOUNTERED IN THE FIELD THAT ARE NOT SHOWN ON THIS PLAN, CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY. THE CONTRACTOR IS CAUTIONED THAT ONLY EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATION, AND DEPTHS OF UNDERGROUND UTILITIES. THE LANDSCAPE ARCHITECT CAN ASSUME NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THE DELINEATION OF SUCH UNDERGROUND UTILITIES, NOR FOR THE EXISTENCE OF OTHER BURIED OBJECTS OR UTILITIES WHICH ARE NOT SHOWN ON THESE DRAWINGS.
3. CONTRACTOR IS RESPONSIBLE TO LEGALLY DISPOSE OF ALL REMOVED MATERIAL AT CONTRACTOR'S OWN EXPENSE.
4. CONTRACTOR SHALL PROVIDE CONSTRUCTION FENCING AT CONTRACTOR'S OPTION. NO ADDITIONAL PAYMENT SHALL BE MADE FOR CONSTRUCTION FENCING, OBTAIN OWNERS REPRESENTATIVE'S APPROVAL PRIOR TO INSTALLATION.
5. ALL TREES TO REMAIN SHALL BE PROTECTED PER SPECS.
6. REMOVE ALL TREE STUMPS TO 3 FEET BELOW PROPOSED FINISH GRADES.
7. REMOVE ALL FOOTINGS IN THEIR ENTIRETY.
8. CONTRACTOR IS CAUTIONED THAT POISON OAK IS PRESENT. REMOVE POISON OAK FROM BOULDERS AND OTHER AREAS TO BE OPEN TO THE PUBLIC. REVIEW LIMITS WITH ENGINEER.
9. CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL WOOD, METAL, CONCRETE, DEBRIS, AND OTHER EXISTING SHED MATERIALS INCLUDING FOUNDATION.
10. CONTRACTOR SHALL CONTACT USA NORTH 811 PRIOR TO ANY EXCAVATION.
11. ALL TREE REMOVAL IS NOT IN CONTRACT. DISTRICT INTENDS TO HAVE ALL TREES REMOVED PRIOR TO THE BEGINNING OF CONSTRUCTION.

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Seals and Signatures

LICENSED LANDSCAPE ARCHITECT — WILLIAM S. HARRIS 2498 — 08-31-18 — STATE OF CALIFORNIA

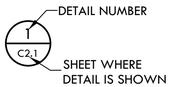
Drawn by : ZD
Checked by : BH
Drawing Title :

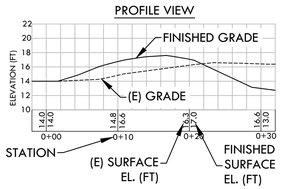
DEMOLITION PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04
Sheet Number : L1.2

DRAWING NOTATIONS

- EXISTING STORM DRAIN AREA INLET
- SIGN
- BOLLARD
- SINGLE GATE
- DOUBLE GATE
- SURFACE FLOW ARROW
- SET SPIKE FOR SURVEY





CIVIL LINE TYPES

- PROPERTY LINE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- LIMIT OF DISTURBANCE
- FLOWLINE (FL)
- STORMDRAIN PIPE (SD)
- EXISTING ELECTRICAL CONDUIT (E)
- NEW ELECTRICAL CONDUIT (E)
- EXISTING OVERHEAD POWER LINE (OH)
- TREE COVER OR DENSE VEG.
- RIVER, STREAM, GULCH, OR CREEK
- SAWCUT LINE
- PROJECT BOUNDARY
- EXISTING FENCE
- EASEMENT
- GUY POST AND WIRE FENCING (P)
- GRADE BREAK
- NEW PERMANENT FENCE
- RESOURCE PROTECTION FENCING (TEMPORARY)
- STRAW BALES (TEMPORARY)
- ALIGNMENT

ABBREVIATIONS

AC	ASPHALT CONCRETE	EQ.	EQUIDISTANT	(P)	PROPOSED
ADA	AMERICAN DISABILITIES ACT	EVCE	ENDING VERTICAL CURVE ELEVATION	SCH	SCHEDULE
AGG	AGGREGATE	EVCS	ENDING VERTICAL CURVE STATION	SD	STORM DRAIN SYSTEM
AI	AREA INLET	(E)	EXISTING	SF	SQUARE FEET
AWG	AMERICAN WIRE GAUGE	FG	FINISHED GRADE	STA	STATION
B-#	STORMWATER BASIN #	HYD	HYDRANT	STN	STATION
BCR	BEAR CREEK ROAD	INF	INFILTRATION	SW	STORMWATER
BCROP	BEAR CREEK REDWOODS OPEN PRESERVE	K	OAK	T	TREE
BLDG	BUILDING	L#	LINE #	TBR	TO BE REMOVED
BOC	BOTTOM OF CURB	LAT	LATERAL	TOC	TOP OF CURB
BVCE	BEGINNING VERTICAL CURVE ELEVATION	LEN	LENGTH	TOW	TOP OF WALL/TWISTED
BVCS	BEGINNING VERTICAL CURVE STATION	LVI	LENGTH OF VERTICAL CURVE	TPZ	TREE PROTECTION ZONE
CIP	CAST-IN-PLACE	MAX	MAXIMUM	TR	TO REMAIN
C#	CURVE #	MIN	MINIMUM	TS	TOP OF STAIRS
C&G	CURB & GUTTER	(N)	NEW	TYP	TYPICAL
℄	CENTERLINE	NTS	NOT TO SCALE	UG	UNDERGROUND
CL	CENTERLINE	O.C.	ON CENTER	VC	VERTICAL CURVE
DIA	DIAMETER	O.D.	OUTER DIAMETER	VEG	VEGETATED
DG	DECOMPOSED GRANITE	OFF	OFFSET	WW	WASTEWATER
DI	DROP INLET	PED	PEDESTRIAN	XX-(#)	INFRASTRUCTURE IDENTIFICATION
EL.	ELEVATION	PVI	POINT OF VERTICAL INTERSECTION		
EP	EDGE OF PAVEMENT				

GENERAL NOTES

1. AREA OF DISTURBANCE: APPROXIMATELY 1.7 ACRES.
2. CONTRACTOR MUST COMPLY WITH REQUIREMENTS OF ALL APPLICABLE PERMITS.
3. IF THE PROJECT DISTURBS MORE THAN ONE ACRE, A SWPPP MUST BE DEVELOPED. FALL CREEK ENGINEERING SHALL PREPARE THE SWPPP. MROSD SHALL SUBMIT TO THE STATE FOR APPROVAL. CONTRACTOR SHALL FOLLOW THE REQUIREMENTS OF THE SWPPP.

TECHNICAL REFERENCES

1. GEOTECHNICAL INVESTIGATION DESIGN PHASE FOR ALMA COLLEGE PARKING AREA AND TRAILHEAD, SANTA CLARA COUNTY, CALIFORNIA, JULY 2017.
2. C.3 STORMWATER HANDBOOK, SANTA CLARA VALLEY URBAN RUNOFF POLLUTION PREVENTON PROGRAM, JUNE 2016.
3. STORMWATER DRAINAGE REPORT, PREPARED BY FALL CREEK ENGINEERING, OCTOBER 2017.
4. TOPOGRAPHIC SURVEY, CONDUCTED BY EDMUNSON & ASSOCIATES LAND SURVEYING, JULY 18, 2016
   - 4.1. ELEVATIONS SHOWN ARE NAVD88 DATUM AS ESTABLISHED FROM NETWORK RTK GPS READINGS. NOT CONFIRMED WITH A LOCAL BENCHMARK

MATERIALS LEGEND

- ASPHALT CONCRETE (AC) PAVEMENT
- (E) AC PAVING AND BASE TO BE REMOVED
- EROSION CONTROL - EROSION CONTROL BLANKET
- EROSION CONTROL - SEED AND MULCH
- (E) GRAVEL PATH TO BE REMOVED
- UNDISTURBED EARTH
- PERMEABLE CONCRETE
- PERMEABLE CONCRETE WITH MACROFIBER
- AGGREGATE BASE
- RESIN PAVING
- COMPACTED SUBGRADE
- TRUNCATED DOMES
- DEMO EXISTING FEATURE
- CLEAR AND GRUB AREA
- STAGING AREA
- STABILIZED ENTRANCE - METAL PLATES
- STABILIZED ENTRANCE - GRAVEL
- ACCESS RAMP

CIVIL SHEET LIST TABLE

Sheet Description	Sheet Title
C0.0	CIVIL INFO
C1.0	CONSTRUCTION ACCESS AND STAGING PLAN- POND LAYOUT
C1.1	CONSTRUCTION ACCESS AND STAGING- PARKING LOT LAYOUT
C2.0	HORIZONTAL CONTROL PLAN - POND LAYOUT
C2.1	HORIZONTAL CONTROL PLAN- PARKING LOT LAYOUT
C2.2	HORIZONTAL CONTROL PLAN- TABLES
C3.0	SIGNAGE, STRIPING, AND PAVEMENT PLAN-PARKING LOT LAYOUT
C4.0	GRADING AND DRAINAGE PLAN - POND LAYOUT
C4.1	GRADING AND DRAINAGE PLAN- PARKING LOT LAYOUT
C4.2	GRADING AND DRAINAGE PLAN- PARKING LOT SECTIONS AND PROFILES
C4.3	GRADING AND DRAINAGE PLAN- PATH SECTIONS AND PROFILES
C4.4	GRADING AND DRAINAGE PLAN- PLAZA AREA ENLARGEMENT
C5.0	CIVIL DETAILS- PARKING LOT DETAILS
C5.1	CIVIL DETAILS- GATE AND DRIVEWAY DETAILS
C6.0	EROSION CONTROL PLAN - POND LAYOUT
C6.1	EROSION CONTROL PLAN- PARKING LOT LAYOUT
C6.2	EROSION CONTROL PLAN - DETAILS AND NOTES
C7.0	STORMWATER CONTROL PLAN

GRADING NOTES

APPROXIMATE GRADING VOLUMES			
SITE	**CUT (CY)**	**FILL (CY)**	**NET (CY)**
PROJECT IMPROVEMENTS	187.8	892.5	704.7
TOTAL VOLUMES	187.8	892.5	704.7

SITE BALANCE NOTES:

1. CUT AND FILL VOLUMES ON THIS PROJECT ARE ESTIMATES AND SHALL BE VERIFIED BY THE CONTRACTOR.
2. A VOLUME OF 665.2 CU. YD. HAS BEEN REMOVED FROM THE FILL VOLUME REFLECTING THE 1' DEPTH OF PERMEABLE CONCRETE AND AGGREGATE BASE BELOW THE PARKING LOT FINISHED GRADE.
3. CONTRACTOR MUST HAUL ALL EXCESS SOIL OFFSITE AND IMPORT ANY REQUIRED BORROW FROM OFFSITE.

GRADING NOTES:

1. A COMPACTION FACTOR OF 95% HAS NOT BEEN APPLIED TO THE GRADING FILL VOLUMES.
2. THE PERVIOUS PAVEMENT SECTION HAS BEEN REMOVED FROM THE GRADING VOLUME. GRADING VOLUMES DO NOT ACCOUNT FOR OTHER PAVEMENT SECTIONS.
3. ALL RECOVERY SLOPES SHALL NOT EXCEED 3:1 (H:V).
4. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING TOPOGRAPHY AND GRADING VOLUMES AS EXISTING SOIL IS SANDY AND SUBJECT TO CHANGING CONDITIONS.
5. ALL SITE GRADING SHALL COMPLY WITH THE RECOMMENDATIONS OF THE PROJECT'S GEOTECHNICAL ENGINEERING REPORT.

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100% SUBMITTAL		02/06/2018	

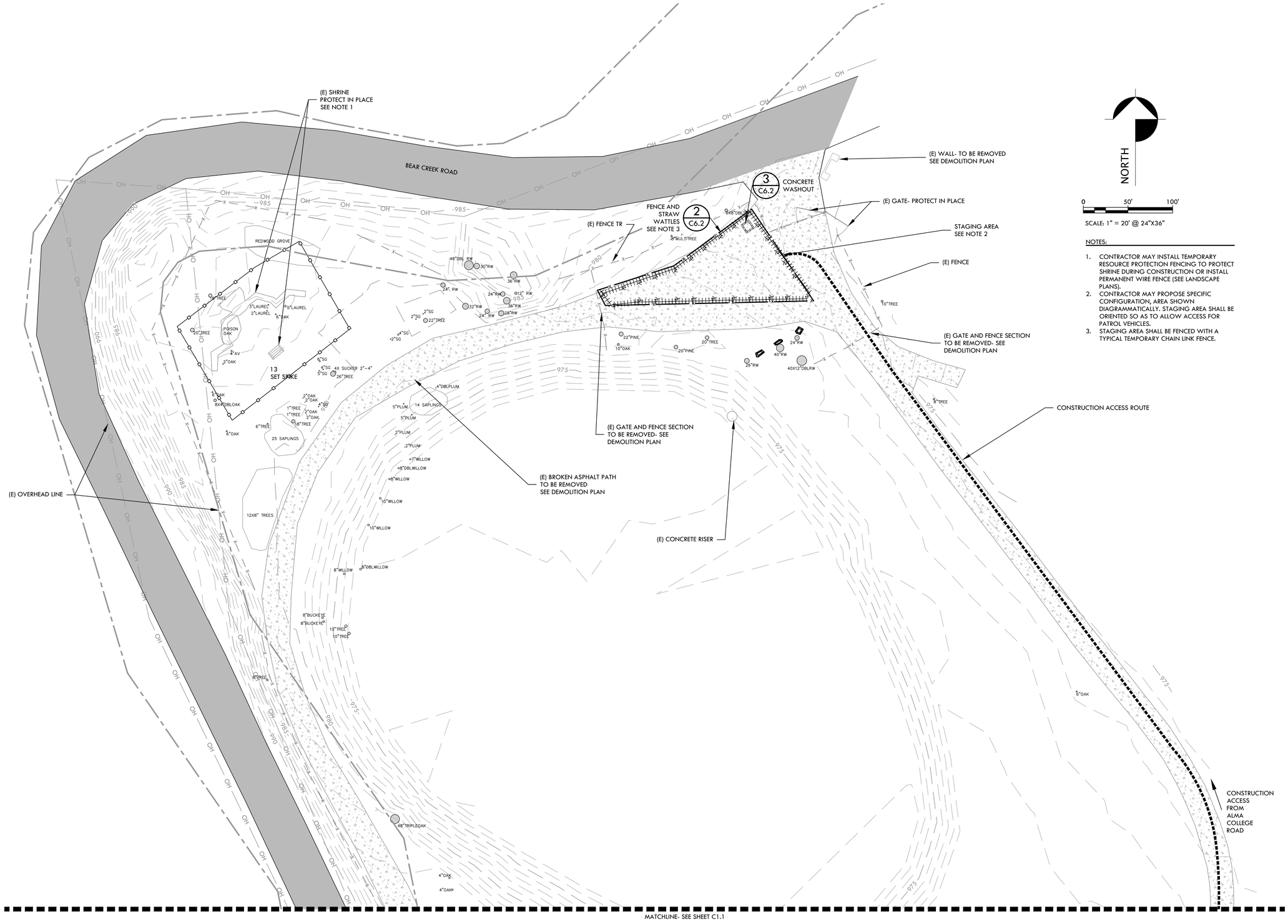
Seals and Signatures

FALL CREEK ENGINEERING, INC.
1525 SEABRIGHT AVE
SANTA CRUZ, CA
95062
(831) 426-9054

Drawn by : ARS
Checked by : RLC
Drawing Title :

CIVIL INFO

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C0.0



1 CONSTRUCTION ACCESS AND STAGING PLAN- POND LAYOUT

SCALE: 1" = 20' @ 24"X36"

NORTH

0 50' 100'

SCALE: 1" = 20' @ 24"X36"

NOTES:

1. CONTRACTOR MAY INSTALL TEMPORARY RESOURCE PROTECTION FENCING TO PROTECT SHRINE DURING CONSTRUCTION OR INSTALL PERMANENT WIRE FENCE (SEE LANDSCAPE PLANS).
2. CONTRACTOR MAY PROPOSE SPECIFIC CONFIGURATION, AREA SHOWN DIAGRAMMATICALLY. STAGING AREA SHALL BE ORIENTED SO AS TO ALLOW ACCESS FOR PATROL VEHICLES.
3. STAGING AREA SHALL BE FENCED WITH A TYPICAL TEMPORARY CHAIN LINK FENCE.

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Seals and Signatures

REGISTERED PROFESSIONAL ENGINEER
ROBYN L. COOPER
NO. 73041
EXP. 12/31/18
CIVIL
STATE OF CALIFORNIA

FALL CREEK ENGINEERING, INC.

1525 SEABRIGHT AVE
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(831) 426-9054

Drawn by : ARS
Checked by : RLC

Drawing Title :

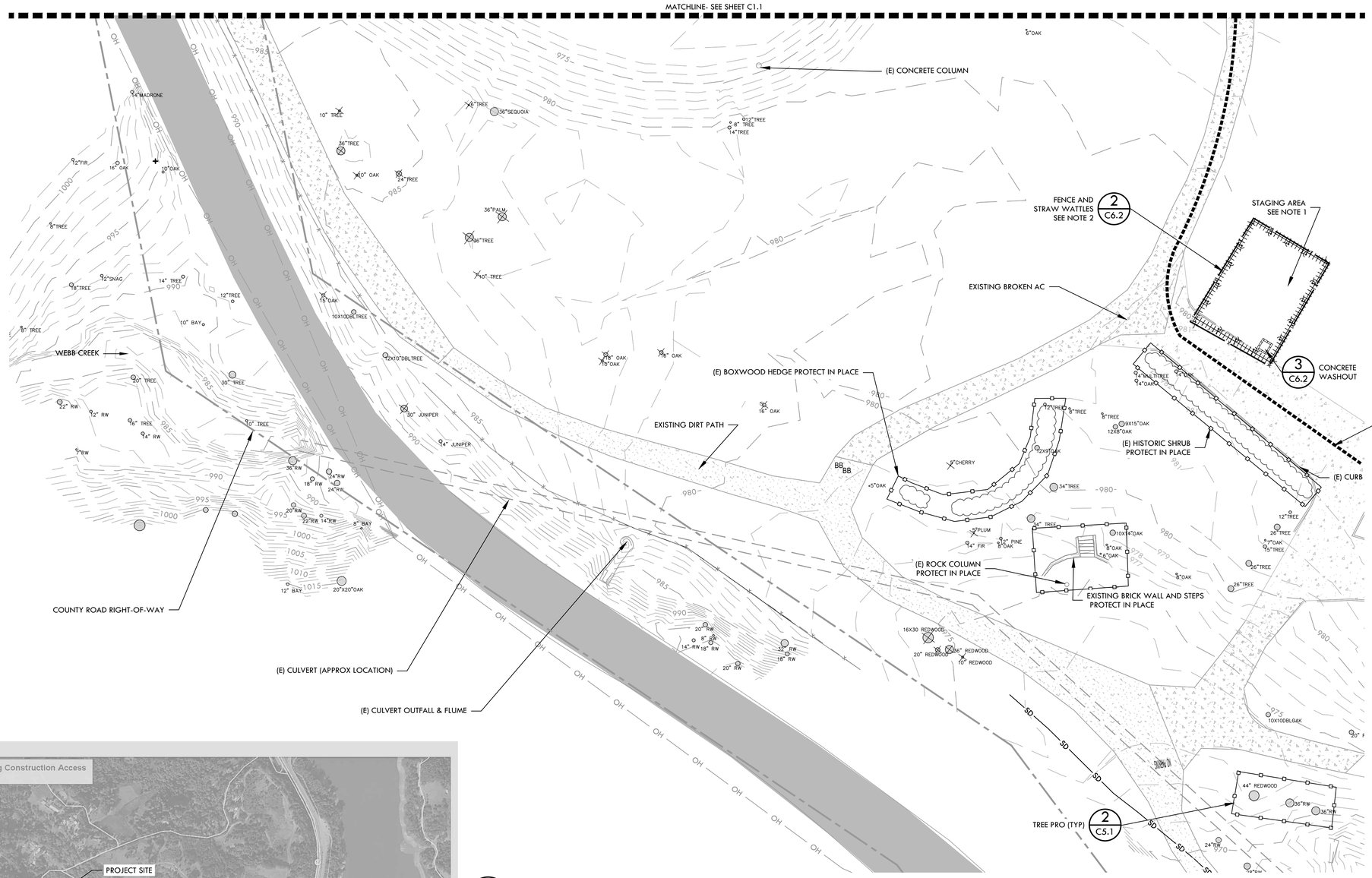
CONSTRUCTION ACCESS AND STAGING PLAN- POND LAYOUT

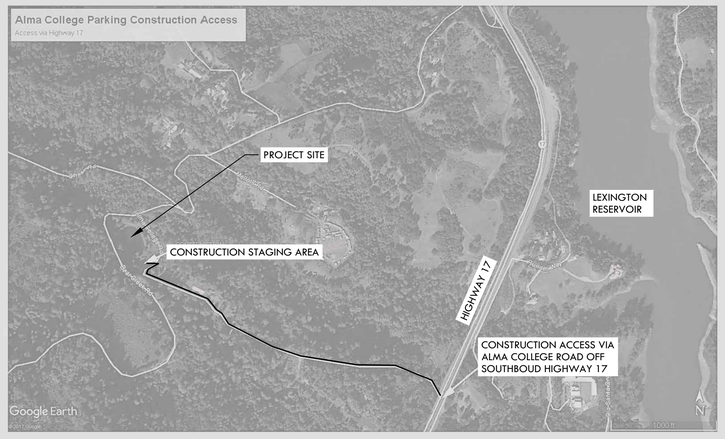
Date : 2/6/18

Scale : AS SHOWN

Project Number : 16.04

Sheet Number : C1.0





1 CONSTRUCTION ACCESS AND STAGING- PARKING LOT LAYOUT

SCALE: 1" = 20' @ 24"X36"

NORTH

0 50' 100'

SCALE: 1" = 20' @ 24"X36"

LEGEND:

CONCRETE WASHOUT

STRAW WATTLE

RESOURCE PROTECTIVE FENCING (TEMPORARY)

NOTES:

1. CONTRACTOR MAY PROPOSE SPECIFIC CONFIGURATION, AREA SHOWN DIAGRAMMATICALLY.
2. STAGING AREA SHALL BE FENCED WITH A TYPICAL TEMPORARY CHAIN LINK FENCE.

2 CONSTRUCTION ACCESS ROUTE VIA ALMA COLLEGE ROAD

SCALE AS DIMENSIONED

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Seals and Signatures

REGISTERED PROFESSIONAL ENGINEER ROBIN L. COOPER NO. 73041 EXP. 12/31/18 CIVIL STATE OF CALIFORNIA

FALL CREEK ENGINEERING, INC.

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SANTA CRUZ, CA
95062

(831) 426-9054

Drawn by : ARS
Checked by : RLC

Drawing Title :

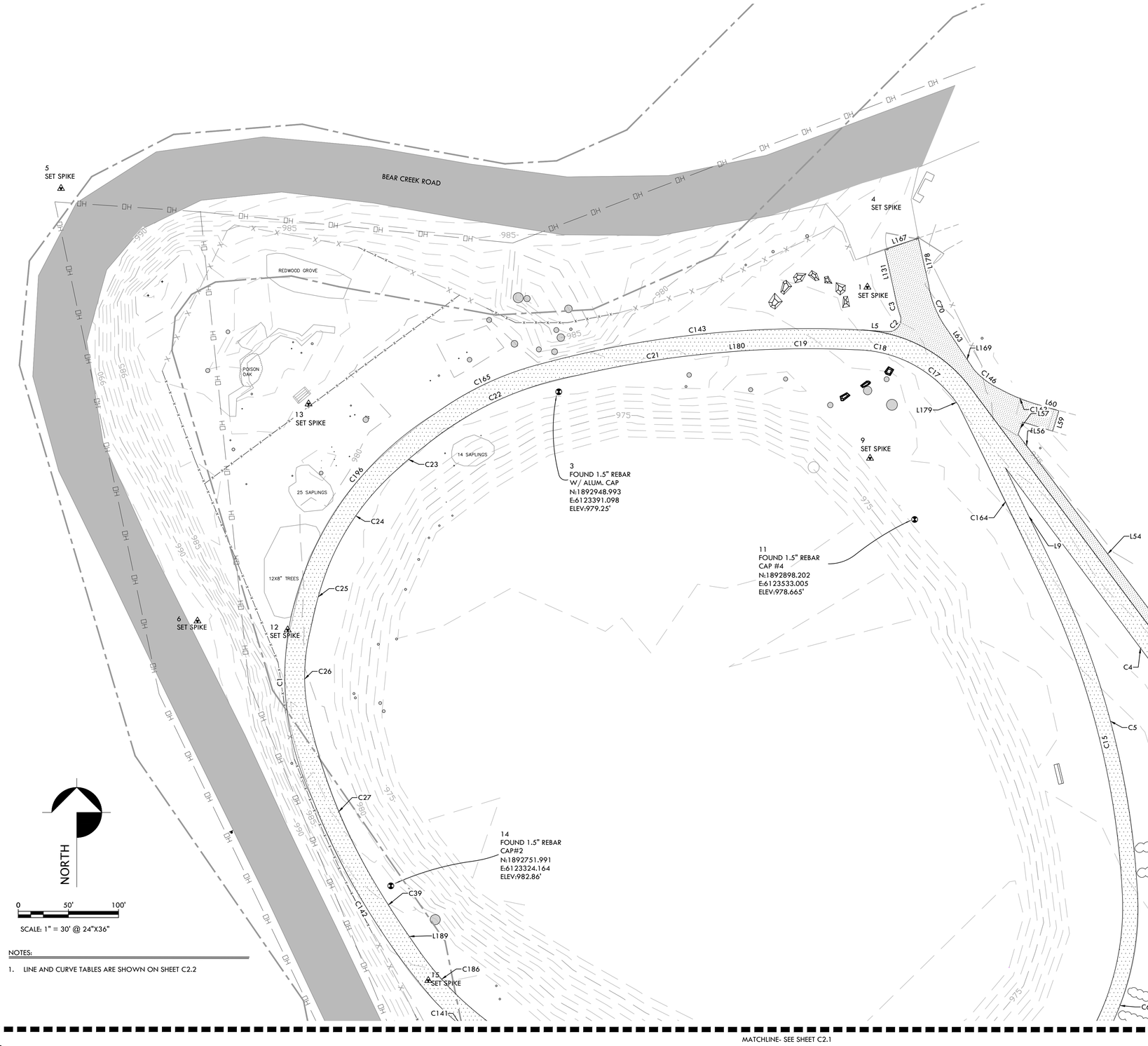
CONSTRUCTION ACCESS AND STAGING- PARKING LOT LAYOUT

Date : 2/6/18

Scale : AS SHOWN

Project Number : 16.04

Sheet Number : C1.1



SCALE: 1" = 30' @ 24"X36"

⚠ COORDINATE LISTING OF CONTROL POINTS			
CONTROL POINT	EASTING	NORTHING	ELEVATION
1	1892990.761	6123514.207	976.097
2	1892844.489	6123633.644	976.434
3	1892948.993	6123633.644	979.250
4	1893025.880	6123529.521	975.893
5	1893030.115	6123192.635	992.844
6	1892857.617	6123247.042	992.811
7	1892589.633	6123342.434	991.301
8	1892536.983	6123315.845	987.294
9	1892922.535	6123515.253	978.450
10	1892673.635	6123521.459	975.110
11	1892898.202	6123533.005	978.665
12	1892854.080	6123283.008	980.399
13	1892944.186	6123291.339	980.392
14	1892751.264	6123324.164	982.858
15	1892714.264	6123339.091	984.339
16	1892633.092	6123429.798	983.604
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24	1892366.571	6123721.636	967.333
25	1892302.326	6123802.273	961.962
26	1892214.581	6123914.473	958.408

NOTES:

1. LINE AND CURVE TABLES ARE SHOWN ON SHEET C2.2

MATCHLINE- SEE SHEET C2.1

1 HORIZONTAL CONTROL PLAN - POND LAYOUT

SCALE: 1" = 30' @ 24"X36"

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REGISTERED PROFESSIONAL ENGINEER
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EXP. 12/31/18
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STATE OF CALIFORNIA

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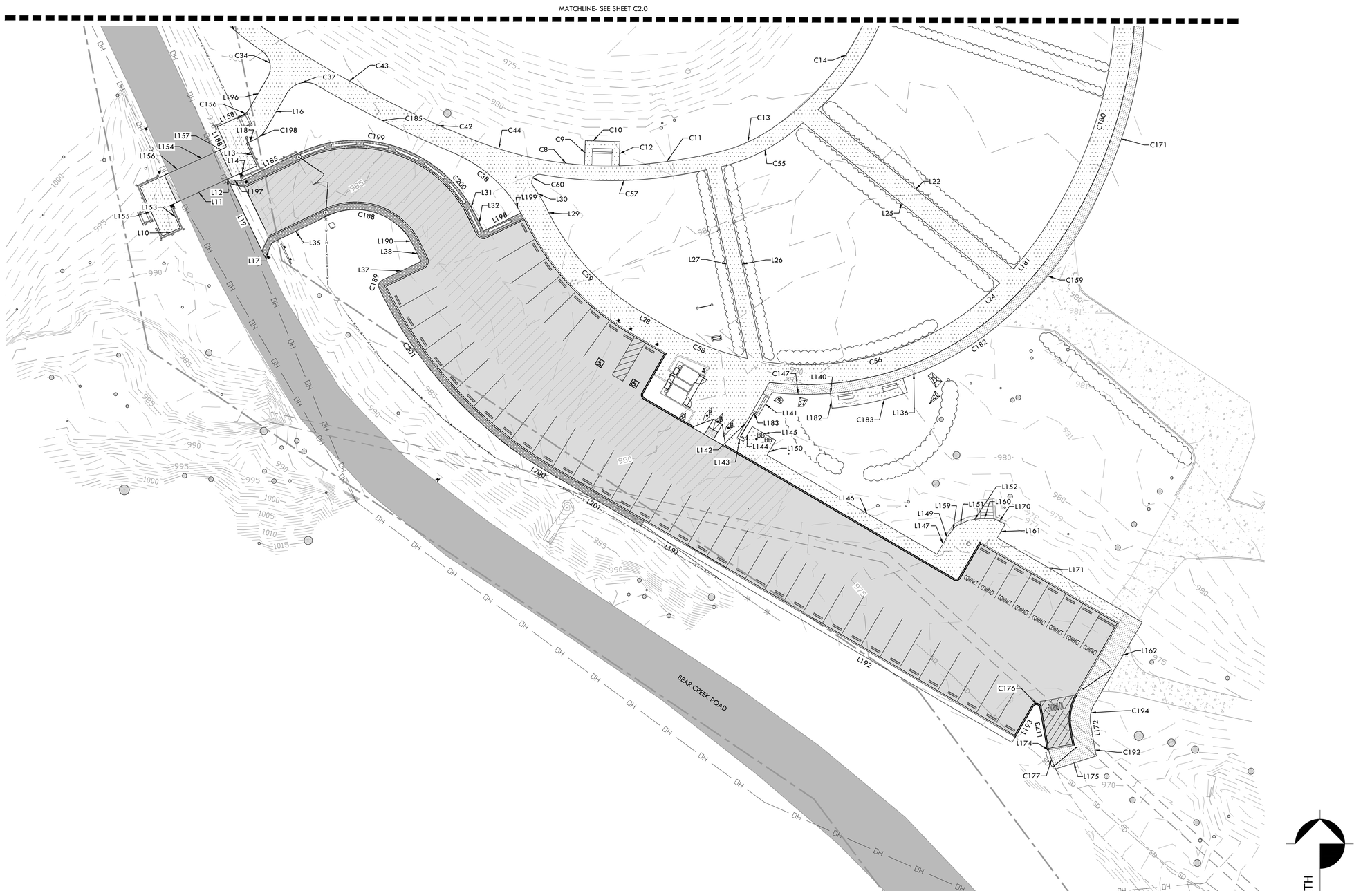
Drawn by : ARS
Checked by : RLC
Drawing Title :

HORIZONTAL CONTROL PLAN - POND LAYOUT

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C2.0



NOTES:

1. LINE AND CURVE TABLES ARE SHOWN ON SHEET C2.2

SCALE: 1" = 20' @ 24"X36"

1 HORIZONTAL CONTROL PLAN- PARKING LOT LAYOUT
SCALE: 1" = 20' @ 24"X36"

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HORIZONTAL CONTROL PLAN- PARKING LOT LAYOUT

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C2.1

Parcel Table				
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	DELTA
C13	65.33	28.77	S65° 30' 34.99"W	25° 13' 55"
C11	229.30	38.83	S82° 20' 40.99"W	9° 42' 10"
C12	391.21	9.76	N02° 00' 05.81"E	1° 25' 45"
C10	561.31	14.00	N88° 03' 02.14"W	1° 25' 45"
C9	397.58	9.92	S02° 00' 02.80"W	1° 25' 45"
C8	150.00	15.07	N83° 08' 46.91"W	5° 45' 17"
C44	152.96	40.47	N72° 36' 47.65"W	15° 09' 39"
C42	58.79	11.83	N66° 22' 42.71"W	11° 31' 42"
C43	438.39	68.67	N61° 07' 09.48"W	8° 58' 30"
C186	125.20	45.99	N46° 06' 30.76"W	21° 02' 48"
L189		15.81	N34° 27' 25.82"W	
C39	401.53	14.35	N32° 18' 19.88"W	2° 02' 50"
C27	217.39	70.04	N22° 36' 38.46"W	18° 27' 33"
C26	76.87	39.73	N00° 39' 06.74"W	29° 36' 39"
C25	144.24	26.93	N15° 55' 50.08"E	10° 41' 49"
C24	102.38	44.66	N34° 52' 59.20"E	24° 59' 37"
C23	182.59	17.15	N49° 25' 15.07"E	5° 22' 55"
C22	133.39	67.87	N65° 14' 19.10"E	29° 09' 10"
C21	387.74	60.99	N81° 14' 39.81"E	9° 00' 42"
L180		6.92	N85° 16' 28.99"E	
C19	426.76	43.34	N89° 34' 38.87"E	5° 49' 07"
C18	49.39	19.39	S78° 27' 33.03"E	22° 29' 39"
C17	51.82	26.73	S52° 10' 15.61"E	29° 33' 09"
L179		2.35	S36° 50' 37.71"E	
C164	3286.38	86.01	S25° 40' 23.51"E	1° 29' 58"
C15	327.79	121.68	S13° 29' 07.03"E	21° 16' 09"
C14	103.18	104.80	S26° 07' 27.46"W	58° 11' 33"
C196	127.89	80.39	N40° 24' 00.35"E	36° 00' 59"
C165	123.35	44.46	N64° 32' 25.49"E	20° 39' 10"
C143	410.29	131.10	N83° 50' 47.80"E	18° 18' 27"
L5		10.19	S86° 17' 17.70"E	
C2	4.96	8.80	N44° 07' 04.10"E	101° 36' 31"
C3	80.34	10.53	N14° 23' 22.10"W	7° 30' 24"
L131		17.34	N12° 31' 49.21"W	
L167		14.10	N70° 43' 31.63"E	
L178		19.37	S12° 31' 49.21"E	
C70	40.56	19.03	S22° 38' 31.53"E	26° 52' 52"
L63		9.69	S33° 36' 56.12"E	
L169		9.68	S33° 40' 23.77"E	
C163	73.17	17.53	S68° 13' 09.78"E	13° 43' 40"

Parcel Table				
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	DELTA
L60		7.48	S73° 14' 41.96"E	
C146	31.08	13.14	S53° 21' 51.39"E	24° 13' 42"
L59		8.44	S16° 55' 41.58"W	
L57		5.31	S19° 39' 08.31"W	
L58		12.54	N73° 10' 30.17"W	
L56		11.22	S37° 33' 37.84"E	
L54		96.61	S36° 45' 38.09"E	
L55		83.34	S36° 43' 21.92"E	
C170	246.65	27.35	S33° 03' 39.27"E	6° 21' 12"
C159	140.67	61.54	S35° 18' 53.77"W	25° 03' 50"
C171	178.33	71.41	S14° 03' 00.93"W	22° 56' 39"
C169	246.65	27.35	S33° 03' 39.27"E	6° 21' 12"
C182	122.25	43.65	S56° 30' 14.21"W	20° 27' 22"
L136		9.47	S68° 59' 20.60"W	
C183	128.00	31.18	S78° 14' 17.10"W	13° 57' 28"
L140		0.00	???	
C147	133.83	23.61	N89° 10' 17.89"W	10° 06' 27"
L141		10.80	S30° 14' 12.90"W	
L142		12.12	S30° 14' 12.84"W	
L143		3.00	S59° 45' 47.03"E	
L144		7.00	N30° 14' 12.97"E	
L145		11.00	S59° 45' 47.03"E	
L150		7.00	S30° 14' 12.97"W	
L146		79.53	S59° 45' 32.78"E	
L147		7.28	N30° 14' 12.97"E	
L149		1.25	N31° 49' 02.02"E	
C188	26.74	40.23	N79° 22' 36.36"W	86° 11' 50"
L35		21.42	S64° 08' 34.41"W	
L17		6.47	S23° 59' 42.12"W	
L13		10.01	S24° 37' 39.02"E	
L14		13.01	S65° 28' 30.37"W	
L12		0.00	???	
L11		25.59	S65° 27' 32.66"W	
L153		10.00	S24° 27' 04.26"E	
L10		8.00	S65° 26' 15.06"W	
L155		22.00	N24° 27' 04.26"W	
L156		33.56	N65° 27' 34.09"E	
L154		33.56	N65° 27' 34.09"E	
L157		5.00	N65° 24' 05.01"E	
L188		9.00	N24° 37' 36.27"W	

Parcel Table				
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	DELTA
L158		10.77	N65° 24' 05.01"E	
C156	5.32	3.83	N51° 08' 27.85"E	41° 14' 12"
L196		15.32	N30° 01' 31.49"E	
C34	8.00	11.98	N12° 51' 33.15"W	85° 46' 09"
C142	276.25	94.54	N31° 14' 06.95"W	19° 36' 31"
C1	114.26	97.20	N01° 15' 28.67"W	48° 44' 33"
C141	133.20	27.40	N49° 51' 04.07"W	11° 47' 07"
L32		8.09	S26° 57' 03.86"E	
L31		5.38	S29° 51' 58.03"E	
L198		16.64	N64° 08' 16.16"E	
L185		27.86	N64° 18' 02.90"E	
C199	54.22	59.26	S81° 26' 52.62"E	62° 37' 27"
C200	57.45	16.25	S41° 06' 04.28"E	16° 12' 25"
L37		17.52	N64° 08' 00.94"E	
L38		7.03	N25° 49' 39.28"W	
C189	2.46	3.87	N18° 17' 48.02"E	90° 17' 44"
L190		4.27	N28° 06' 13.61"W	
L197		5.55	S86° 11' 16.85"E	
L199		4.65	N29° 57' 21.82"W	
C38	57.71	34.26	N51° 33' 33.76"W	34° 00' 58"
C185	453.24	59.75	N63° 34' 11.28"W	7° 33' 14"
L16		18.15	S30° 15' 43.12"W	
C37	9.00	13.51	S77° 13' 17.19"W	86° 01' 49"
C198	10.84	6.09	S51° 32' 30.09"W	32° 10' 55"
L19		34.92	N25° 40' 49.25"W	
L18		2.99	S65° 22' 36.15"W	
C179	56392.91	179.82	S36° 47' 28.02"E	0° 10' 58"
C180	170.80	96.93	S22° 27' 11.82"W	32° 30' 55"
L181		5.87	S40° 26' 44.31"W	
L179		2.35	S36° 50' 37.71"E	
L180		6.92	N85° 16' 28.99"E	
C186	125.20	45.99	N46° 06' 30.76"W	21° 02' 48"
L189		15.81	N34° 27' 25.82"W	
C57	167.29	67.61	N88° 22' 09.46"E	23° 09' 27"
L27		78.09	S12° 11' 13.73"E	
C58	113.31	39.47	N67° 32' 35.47"W	19° 57' 31"
L28		9.36	N59° 36' 25.55"W	
C59	99.97	48.54	N44° 03' 04.41"W	27° 49' 10"
L29		10.59	N27° 47' 44.02"W	
L30		7.09	N32° 26' 38.97"W	

Parcel Table				
NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	DELTA
C60	3.00	7.24	N31° 18' 55.76"E	138° 05' 31"
L178		19.37	S12° 31' 49.21"E	
C181	101.12	57.36	S16° 15' 35.07"E	32° 29' 58"
C182	122.25	43.65	S56° 30' 14.21"W	20° 27' 22"
C183	128.00	31.18	S78° 14' 17.10"W	13° 57' 28"
L182		6.00	N06° 07' 33.63"W	
L183		3.00	N59° 45' 47.10"W	
L185		27.86	N64° 18' 02.90"E	
L32		8.09	S26° 57' 03.86"E	
C37	9.00	13.51	S77° 13' 17.19"W	86° 01' 49"
C38	57.71	34.26	N51° 33' 33.76"W	34° 00' 58"
C185	453.24	59.75	N63° 34' 11.28"W	7° 33' 14"
L188		9.00	N24° 37' 36.27"W	
L19		34.92	N25° 40' 49.25"W	
C188	26.74	40.23	N79° 22' 36.36"W	86° 11' 50"
L190		4.27	N28° 06' 13.61"W	
L201		35.55	N59° 51' 11.62"W	
L191		45.00	N59° 43' 38.82"W	
L192		135.73	N59° 44' 42.31"W	
L193		16.89	S30° 06' 09.69"W	
C176	1.50	3.66	N79° 50' 25.43"W	139° 50' 43"
C192	28.44	4.64	S12° 19' 24.75"E	9° 20' 26"
L174		0.53	S80° 16' 52.54"W	
C177	31.72	8.30	N20° 03' 09.01"W	14° 59' 32"
C194	13.50	5.88	S10° 39' 33.61"W	24° 58' 34"
C196	127.89	80.39	N40° 24' 00.35"E	36° 00' 59"
L196		15.32	N30° 01' 31.49"E	
C198	10.84	6.09	S51° 32' 30.09"W	32° 10' 55"
L197		5.55	S86° 11' 16.85"E	
C199	54.22	59.26	S81° 26' 52.62"E	62° 37' 27"
C200	57.45	16.25	S41° 06' 04.28"E	16° 12' 25"
L198		16.64	N64° 08' 16.16"E	
L199		4.65	N29° 57' 21.82"W	
C201	175.17	73.33	N37° 49' 12.90"W	23° 59' 12"

1 HORIZONTAL CONTROL PLAN- TABLES
NO SCALE

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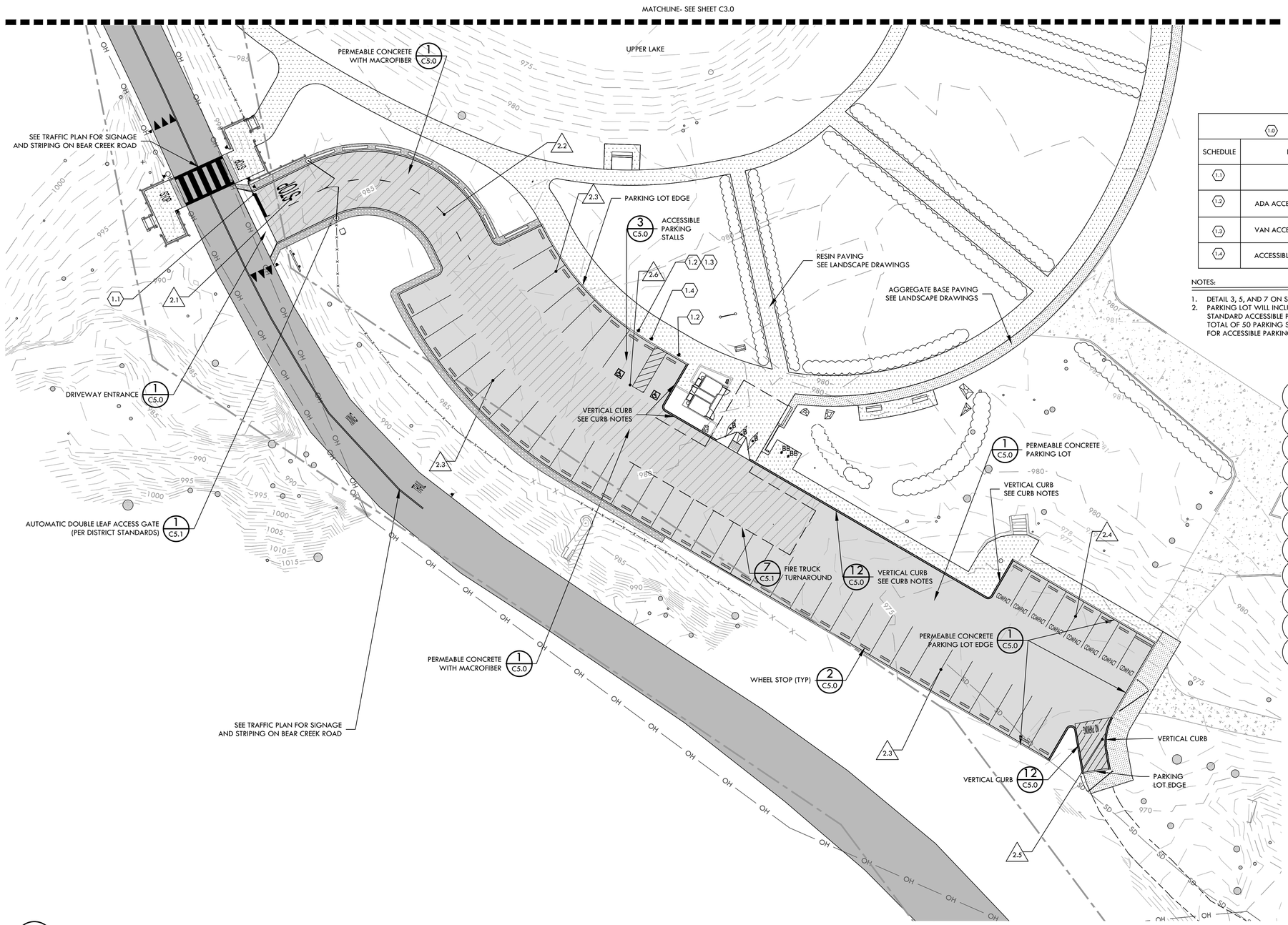
Drawing Title :

HORIZONTAL CONTROL PLAN- TABLES

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C2.2



1 SIGNAGE, STRIPING, AND PAVEMENT PLAN-PARKING LOT LAYOUT

SCALE: 1" = 20' @ 24"X36"

1.0 VEHICULAR SIGN SCHEDULE				
SCHEDULE	DESCRIPTION	CA MUTCD DESIGNATION	NO. SIGNS	SIZE (W X H, INCHES)
1.1	STOP	R1-1	1	30 X 30
1.2	ADA ACCESSIBLE PARKING STALL	R99 AND R99B	2	8.5 X 8.5 AND 4.25 X 8.5
1.3	VAN ACCESSIBLE PARKING STALL	R7-8b	1	4.25 X 8.5
1.4	ACCESSIBLE PARKING AREA SIGN	R100B	1	17 X 22

NOTES:

1. DETAIL 3, 5, AND 7 ON SHEET C5.0 PROVIDES DETAILS ON SIGN MATERIALS AND INSTALLATION.
2. PARKING LOT WILL INCLUDE 40 STANDARD PARKING STALLS, 8 COMPACT PARKING STALLS, ONE STANDARD ACCESSIBLE PARKING STALL, AND ONE ACCESSIBLE VAN PARKING STALL. THERE WILL BE A TOTAL OF 50 PARKING STALLS, TWO OF WHICH SHALL CONFORM TO CBC SECTION 11B STANDARDS FOR ACCESSIBLE PARKING.

2.0 PAVEMENT STRIPING SCHEDULE			
SCHEDULE	DESCRIPTION	NO.	DETAIL # SHEET #
2.1	STOP	1	5 C5.1
2.2	CENTERLINE DRIVEWAY	1	4 C5.1
2.3	PARKING STRIPE	40	4 C5.0
2.4	COMPACT PARKING STRIPE	8	6 C5.0
2.5	NO PARKING	1	6 C5.1
2.6	ACCESSIBLE PARKING STALLS	1	3 C5.0

NOTES:

1. FOR PARKING LETTERING, SEE THE FOLLOWING:
   1.1. ACCESSIBLE PARKING STALLS: DETAIL 3 C5.0
   1.2. PARKING STRIPE: DETAIL 4 C5.0
   1.3. COMPACT PARKING STRIPE: DETAIL 6 C5.0

NORTH

0 20' 40'

SCALE: 1" = 20' @ 24"X36"

CURB NOTES:

1. THE CURB IMMEDIATELY LEFT OF THE COMPACT PARKING STALLS SHALL TRANSITION UNIFORMLY FROM A 6" TALL VERTICAL CURB IN THE SOUTHWEST CORNER TO A FLUSH CURB IN THE NORTHEAST CORNER.
2. THE CURB TO THE RIGHT OF THE ACCESSIBLE PARKING SPACES SHALL TRANSITION FROM A 6" VERTICAL CURB TO A FLUSH CURB AT SEVERAL LOCATIONS, INCLUDING ON BOTH SIDES OF THE CURB RAMP AND AT THE UPPER RIGHT CORNER OF THE ACCESSIBLE PARKING STALL. SEE C4.4 FOR SPOT ELEVATIONS.

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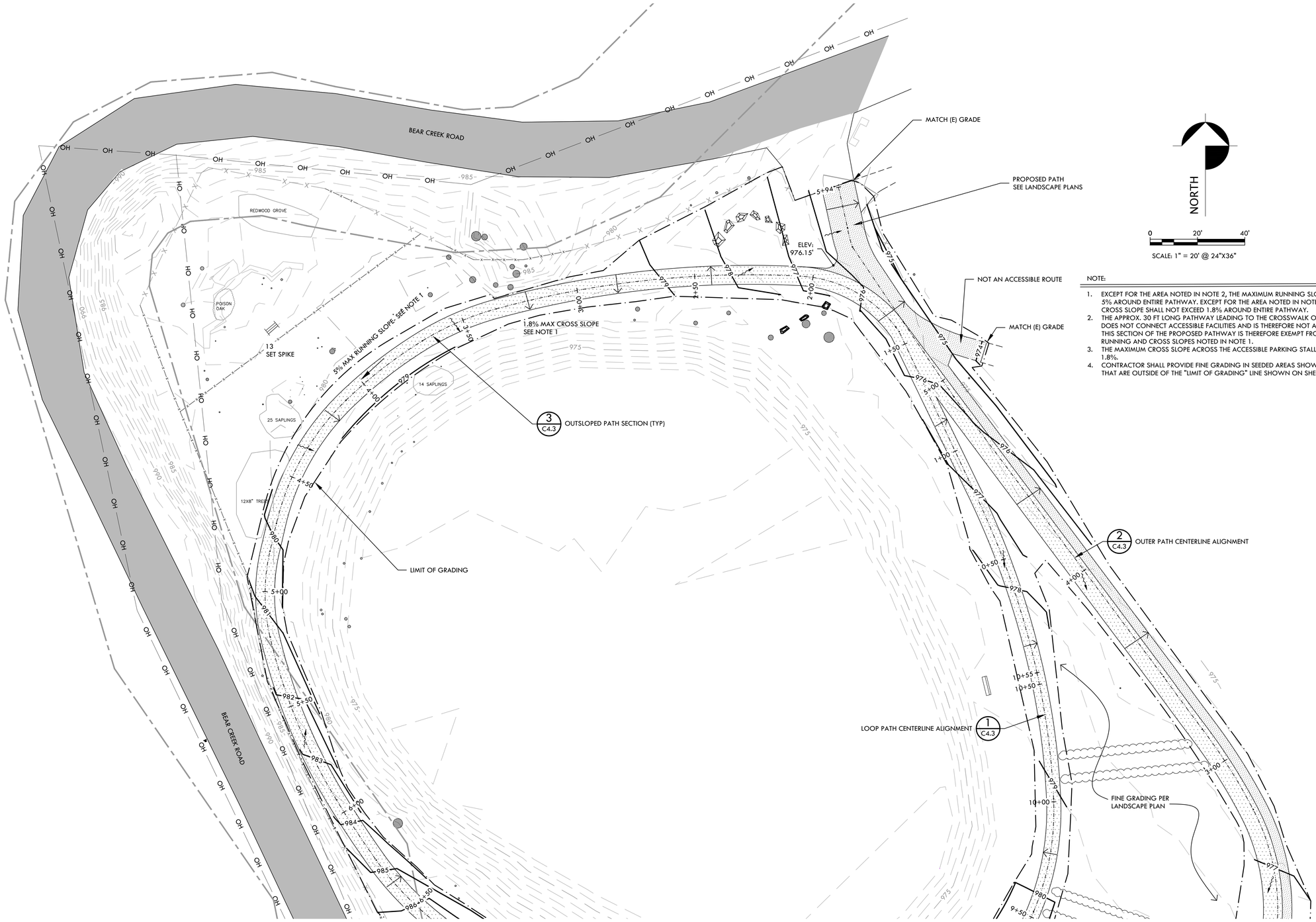
Scale : AS SHOWN

Project Number : 16.04

Sheet Number : C3.0



NORTH

0 20' 40'

SCALE: 1" = 20' @ 24"X36"

NOTE:

1. EXCEPT FOR THE AREA NOTED IN NOTE 2, THE MAXIMUM RUNNING SLOPE SHALL NOT EXCEED 5% AROUND ENTIRE PATHWAY. EXCEPT FOR THE AREA NOTED IN NOTE 2, THE MAXIMUM CROSS SLOPE SHALL NOT EXCEED 1.8% AROUND ENTIRE PATHWAY.
2. THE APPROX. 30 FT LONG PATHWAY LEADING TO THE CROSSWALK ON BEAR CREEK ROAD DOES NOT CONNECT ACCESSIBLE FACILITIES AND IS THEREFORE NOT AN ACCESSIBLE ROUTE. THIS SECTION OF THE PROPOSED PATHWAY IS THEREFORE EXEMPT FROM THE MAXIMUM RUNNING AND CROSS SLOPES NOTED IN NOTE 1.
3. THE MAXIMUM CROSS SLOPE ACROSS THE ACCESSIBLE PARKING STALL SHALL NOT EXCEED 1.8%.
4. CONTRACTOR SHALL PROVIDE FINE GRADING IN SEEDED AREAS SHOWN IN PLANTING PLAN THAT ARE OUTSIDE OF THE "LIMIT OF GRADING" LINE SHOWN ON SHEET C4.0 AND C4.1

1 GRADING AND DRAINAGE PLAN - POND LAYOUT

SCALE: 1" = 20' @ 24"X36"

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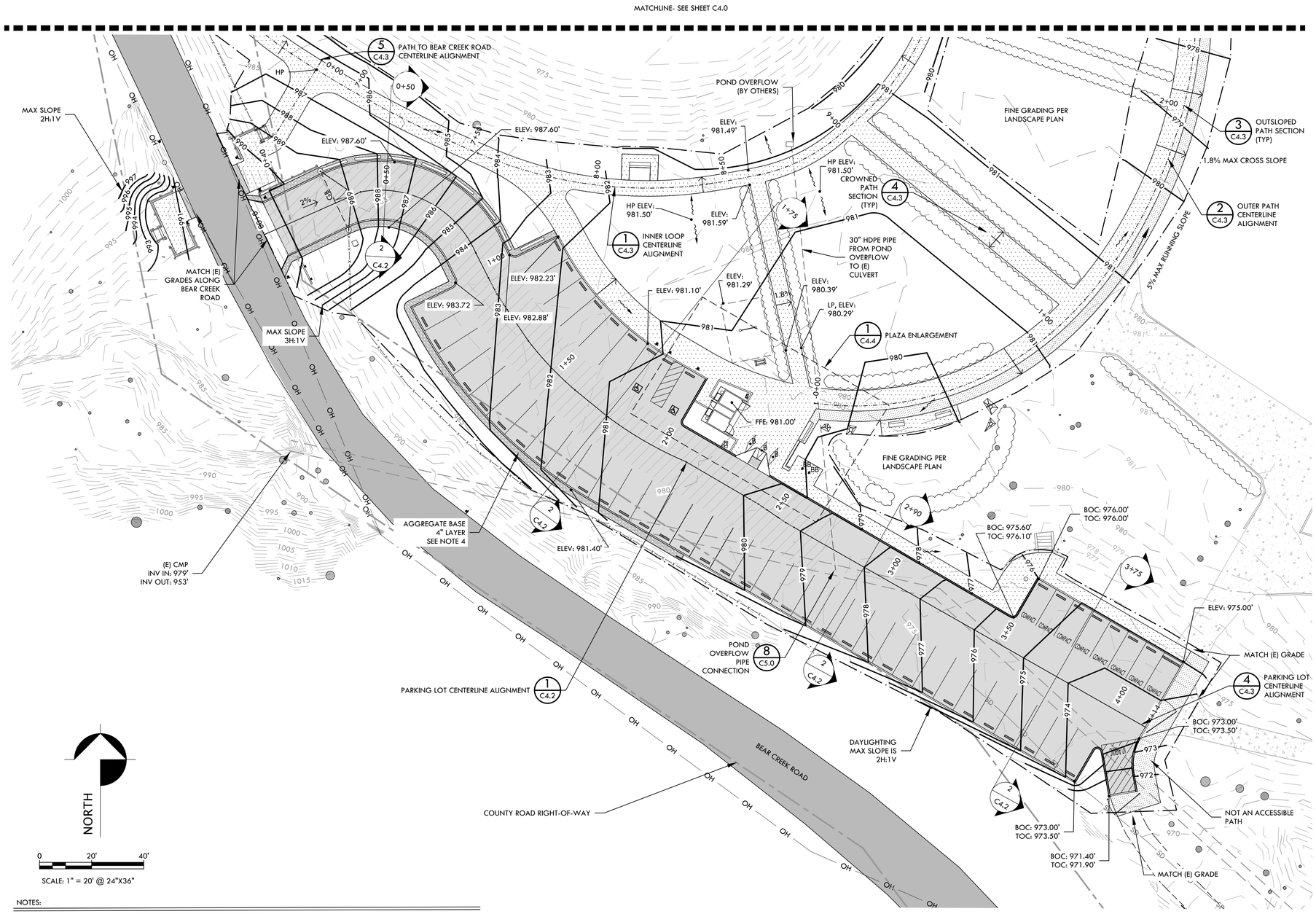

NOTES:

1. EXCEPT FOR THE AREAS NOTED IN NOTE 2, THE MAXIMUM RUNNING SLOPE SHALL NOT EXCEED 5% ON ALL PATHWAYS. EXCEPT FOR THE AREAS NOTED IN NOTE 2, THE MAXIMUM CROSS SLOPE SHALL NOT EXCEED 1.8% ON ALL PATHWAYS.
2. THE APPROX. 30 FT LONG PATHWAY LEADING TO THE CROSSWALK ON BEAR CREEK ROAD DOES NOT CONNECT ACCESSIBLE FACILITIES AND IS THEREFORE NOT AN ACCESSIBLE ROUTE. THIS SECTION OF THE PROPOSED PATHWAY IS THEREFORE EXEMPT FROM THE MAXIMUM RUNNING AND CROSS SLOPES NOTED IN NOTE 1. THE SAME IS TRUE FOR THE CONNECTION TO THE EXISTING SERVICE ROAD AT THE EAST END OF THE PARKING LOT AND FOR THE CONNECTION TO THE EXISTING SERVICE ROAD NEAR STATION 1+50 ON SHEET C4.0.
3. THE MAXIMUM CROSS SLOPE ACROSS THE ACCESSIBLE PARKING STALLS AND AISLE SHALL NOT EXCEED 1.8% IN ANY DIRECTION.
4. A 2'-6" WIDE 4" DEEP AGGREGATE BASE STRIP SHALL BE PLACED ALONG THE PERMEABLE CONCRETE PARKING LOT EDGE ON THE SOUTHERN END OF THE PARKING LOT IN ALL LOCATIONS WHERE THE PARKING LOT ELEVATION IS LOWER THAN THE TOE OF THE HILLSIDE. THE INTENT OF THIS STRIP IS TO PREVENT RUNOFF AND SEDIMENT FROM THE HILLSLOPE FROM ENTERING AND POTENTIALLY CLOGGING THE PERMEABLE PAVEMENT. THE AGGREGATE BASE STRIP IS NOT NEEDED WHERE THE PARKING LOT ELEVATION IS HIGHER THAN THE ADJACENT TOE OF THE HILLSLOPE.

1 GRADING AND DRAINAGE PLAN- PARKING LOT LAYOUT

SCALE: 1" = 20' @ 24"X36"

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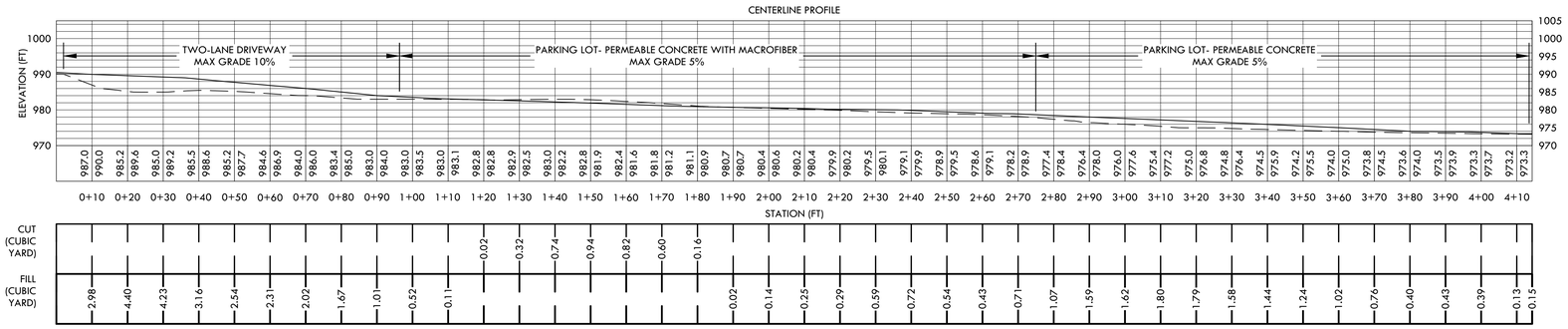
Date : 2/6/18

Scale : AS SHOWN

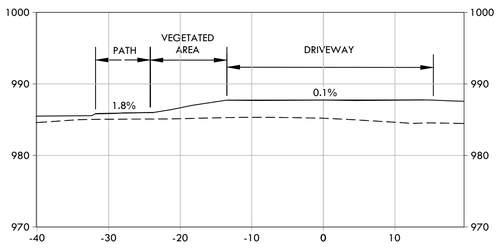
Project Number : 16.04

Sheet Number : C4.1

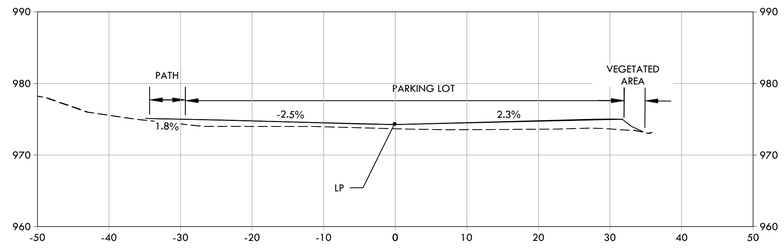


1 PARKING LOT AISLE CENTERLINE PROFILE

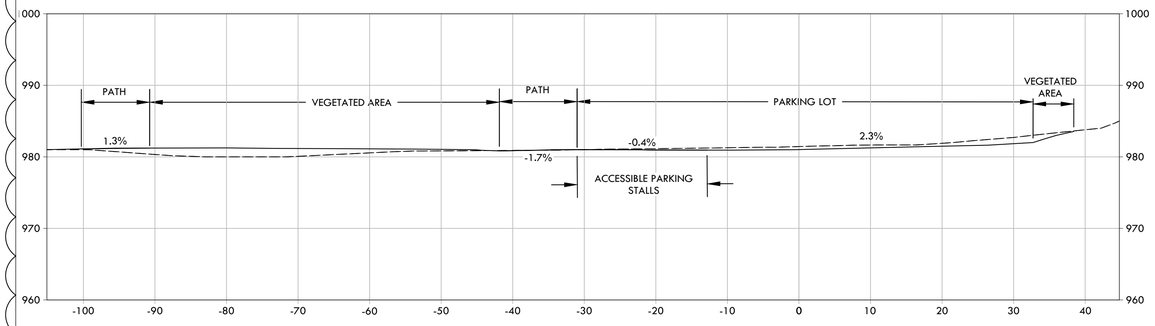
NO SCALE



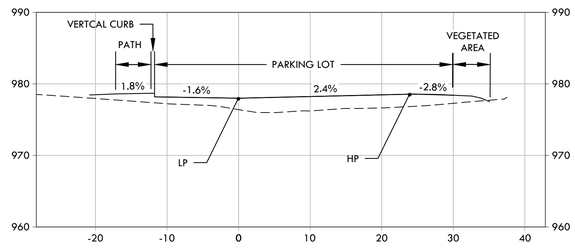
TYP DRIVEWAY ENTRANCE SECTION FOR STATIONS 0+00 TO 1+00



TYP PARKING SECTION FOR STATIONS 3+50 TO 4+00



TYP PARKING SECTION FOR STATIONS 1+00 TO 2+00



TYP PARKING SECTION WITH 6" CURB FOR STATIONS 2+00 TO 3+50

2 PARKING LOT CROSS SECTIONS (TYP)

NO SCALE

Midpeninsula Regional Open Space District

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Seals and Signatures

REGISTERED PROFESSIONAL ENGINEER
ROBYN L. COOPER
NO. 73041
EXP. 12/31/18
CIVIL
STATE OF CALIFORNIA

FALL CREEK ENGINEERING, INC.

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(831) 426-9054

Drawn by : ARS
Checked by : RLC

Drawing Title :

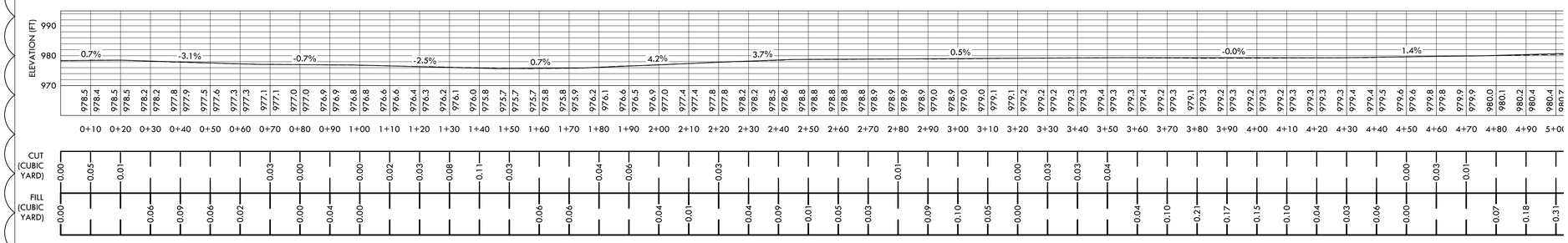
GRADING AND DRAINAGE PLAN- PARKING LOT SECTIONS AND PROFILES

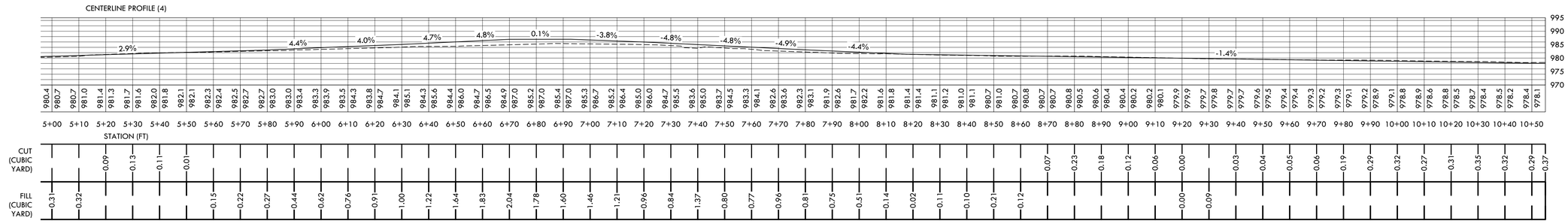
Date : 2/6/18

Scale : AS SHOWN

Project Number : 16.04

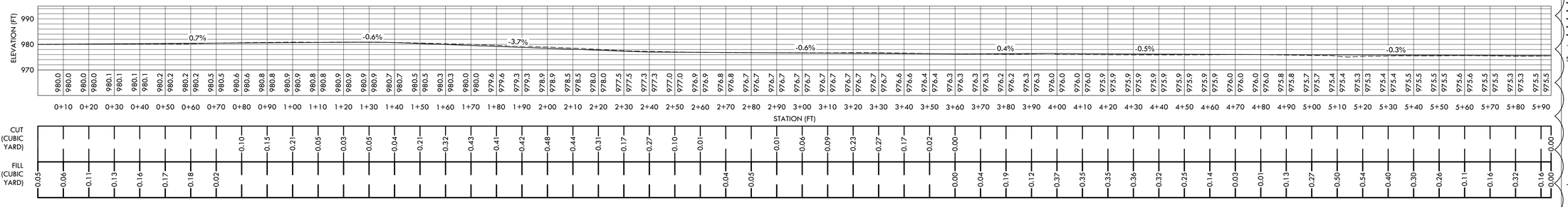
Sheet Number : C4.2





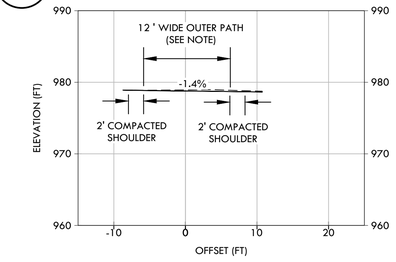
1 LOOP PATH CENTERLINE PROFILE

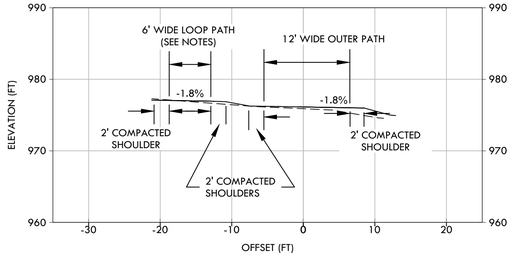
NO SCALE



2 OUTER PATH CENTERLINE PROFILE

NO SCALE



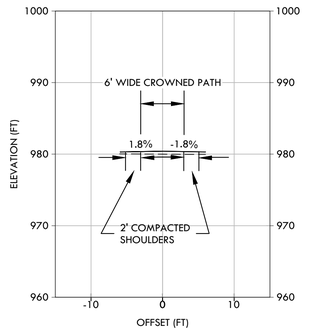


NOTES:

1. THE 12' WIDE OUTER PATH SHALL CONTAIN 8' OF RESIN PAVING AND 4' OF DG PAVING AND IS TYPICAL FROM STATIONS 0+00 TO 4+95 ALONG THE OUTER PATH CENTERLINE ALIGNMENT.
2. THE 6' WIDE LOOP PATH SHALL CONTAIN 6' OF RESIN PAVING AND IS TYPICAL FROM STATIONS 0+00 TO 1+24 AND STATIONS 7+93 TO 10+55 ALONG THE LOOP PATH CENTERLINE ALIGNMENT.
3. THE 8' WIDE LOOP PATH SHALL CONTAIN 8' OF RESIN PAVING AND IS TYPICAL FROM STATIONS 2+05 TO 6+70 AND STATIONS 6+90 TO 7+60 ALONG THE LOOP PATH CENTERLINE ALIGNMENT.
4. THE CROWNED PATH SHALL BE 6' WIDE RESIN PAVING.
5. THE PATH TO BEAR CREEK ROAD SHALL BE 10' WIDE RESIN PAVING.
6. A 2' COMPACTED SHOULDER SHALL BE INCLUDED ADJACENT TO ALL PATH SECTIONS EXCEPT WHERE IT WOULD INTERFERE WITH A STEEP SLOPE. AREAS WHERE THERE SHALL NOT BE A 2' SHOULDER ARE AT THE FOLLOWING LOCATIONS:
   - 6.1. ON THE NORTH SIDE OF THE PATH FROM STATIONS 3+00 TO 3+36 ON THE LOOP PATH ALIGNMENT.
   - 6.2. ON THE WEST SIDE OF THE PATH FROM STATIONS 5+00 TO 6+10 ON THE LOOP PATH ALIGNMENT.
7. AT LOCATION WHERE MULTIPLE PATHS INTERSECT, CONTRACTOR SHALL ENSURE A SMOOTH TRANSITION BETWEEN VARYING PATH WIDTHS AND SHALL MAINTAIN THE REQUIRED GRADES.

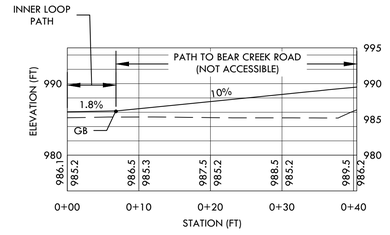
3 OUT SLOPPED PATH SECTIONS (TYP)

NO SCALE



4 CROWNED PATH SECTIONS (TYP)

NO SCALE



5 PATH TO BEAR CREEK ROAD CENTERLINE PROFILE

NO SCALE

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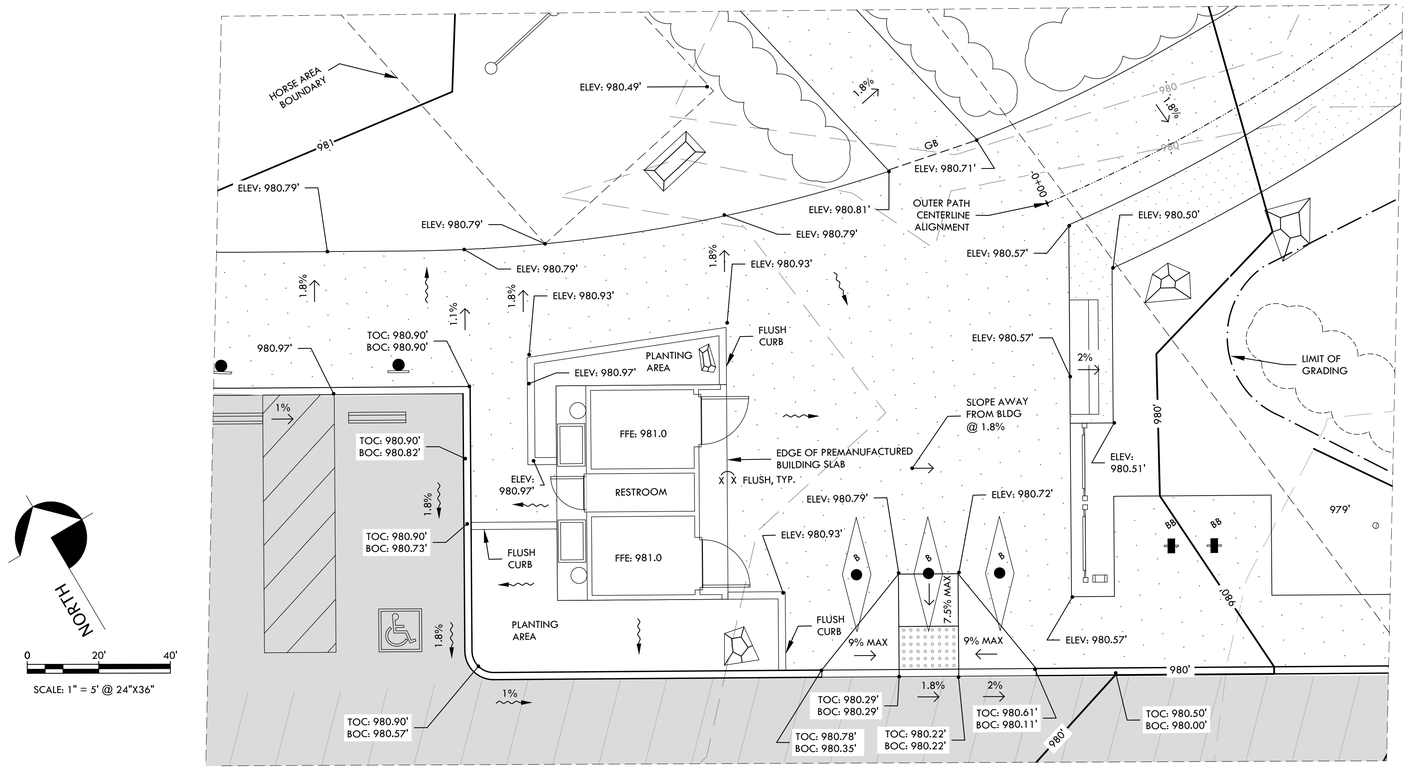
Drawn by : ARS
Checked by : RLC
Drawing Title :

GRADING AND DRAINAGE PLAN- PATH SECTIONS AND PROFILES

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C4.3



1 GRADING AND DRAINAGE PLAN- PLAZA AREA ENLARGEMENT

SCALE: 1" = 5' @ 24"X36"

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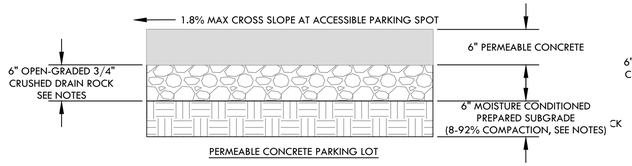
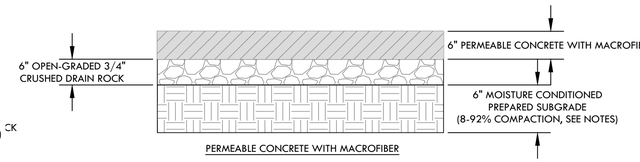
GRADING AND DRAINAGE PLAN- PLAZA AREA ENLARGEMENT

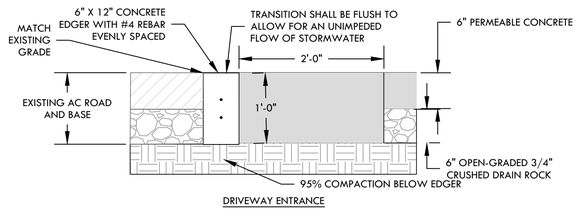
Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C4.4



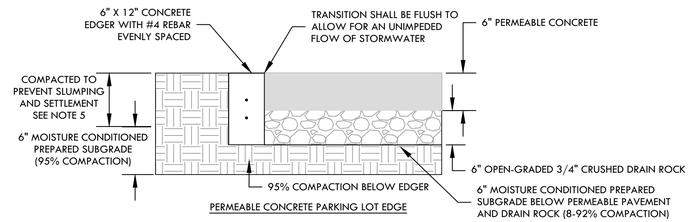
PERMEABLE CONCRETE PARKING LOT



PERMEABLE CONCRETE WITH MACROFIBER



DRIVEWAY ENTRANCE



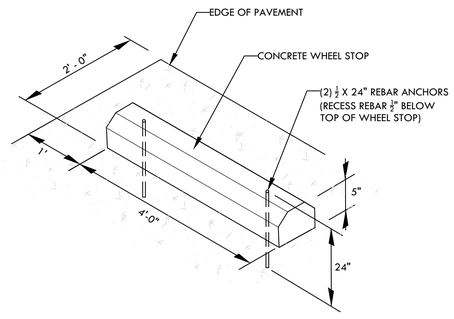
PERMEABLE CONCRETE PARKING LOT EDGE

NOTES:

1. OPEN-GRADED 3/4" CRUSHED DRAIN ROCK SHALL HAVE APPROXIMATELY 40% VOIDS TO ALLOW FOR STORMWATER INFILTRATION.
2. OPEN-GRADED CRUSHED DRAIN ROCK DOES NOT MOISTURE COMPACT. CONTRACTOR SHALL CONSOLIDATE THE DRAIN ROCK WITH A VIBRATORY COMPACTOR OR ROLLER.
3. SUBGRADE COMPACTION SHALL NOT EXCEED 92%. AT 95% COMPACTION AND HIGHER, THE SOIL BECOMES IMPERMEABLE AND WILL NOT EFFECTIVELY DRAIN STORMWATER, THUS UNDERMINING THE EFFECTIVENESS OF THE PERMEABLE PAVEMENT.
4. ALL PARKING LOT PAVEMENT SHALL BE CAPABLE OF WITHSTANDING THE LOAD OF A 75,000 LB VEHICLE.
5. PERMEABLE CONCRETE PARKING LOT EDGE SHALL BE USED ALONG ALL FLUSH EDGES OF THE PARKING LOT PERIMETER EXCEPT FOR THE DRIVEWAY ENTRANCE. WHERE THE EDGE CONNECTS THE PERMEABLE PARKING LOT TO ADJACENT RESIN PAVING/AGGREGATE BASE PAVING, THE RESIN PAVING/AGGREGATE BASE PAVING SHALL CONFORM TO THE DETAIL FOR RESIN PAVING/ AGGREGATE BASE PAVING AS SHOWN IN THE LANDSCAPE PLANS.

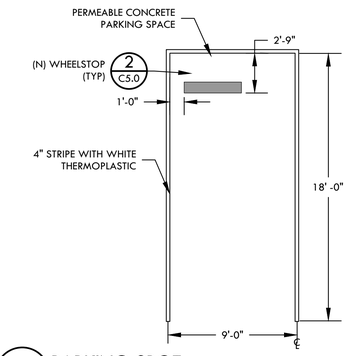
1 PAVING AND PARKING SECTIONS

SCALE: AS DIMENSIONED



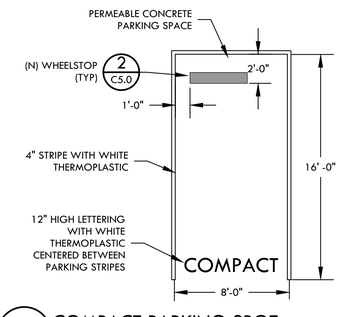
2 WHEEL STOP

SCALE: AS DIMENSIONED



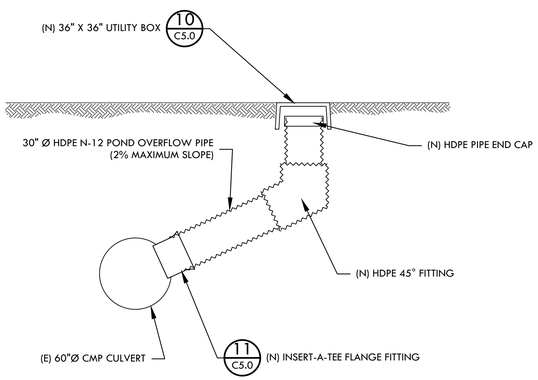
4 PARKING SPOT

SCALE: AS DIMENSIONED



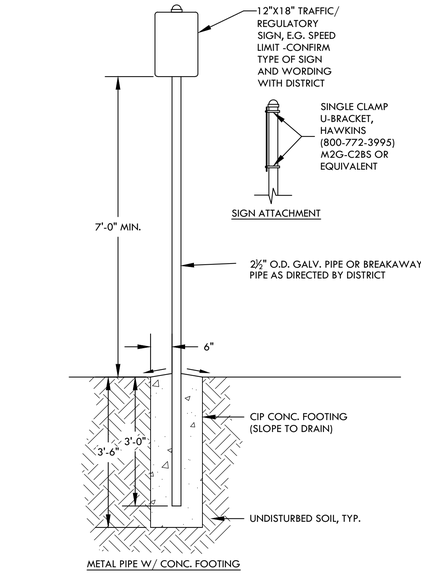
6 COMPACT PARKING SPOT

SCALE: AS DIMENSIONED



8 POND OVERFLOW PIPE CONNECTION

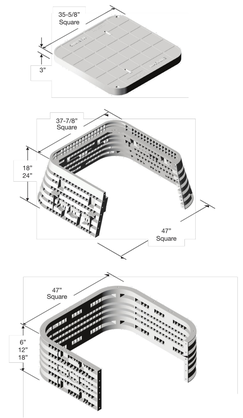
SCALE: AS DIMENSIONED



METAL PIPE W/ CONC. FOOTING

7 SIGN INSTALLATION

SCALE: AS DIMENSIONED

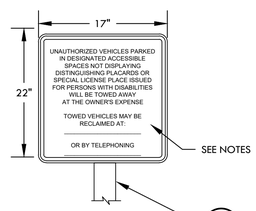


10 UTILITY BOX

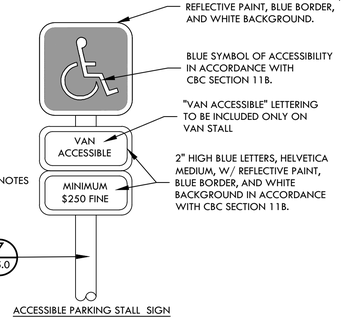
SCALE: AS DIMENSIONED

3 ACCESSIBLE PARKING STALLS

SCALE: AS DIMENSIONED



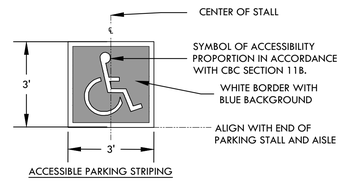
ACCESSIBLE PARKING AREA SIGN



ACCESSIBLE PARKING STALL SIGN

NOTES:

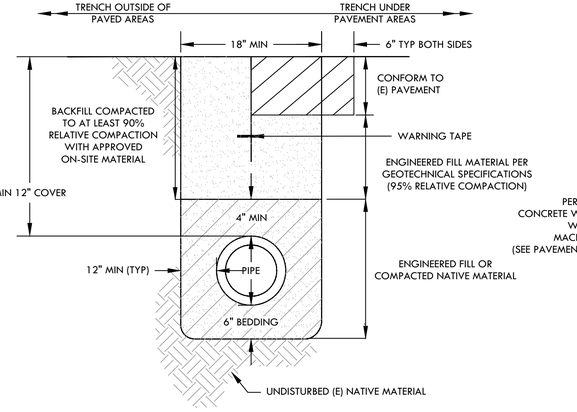
1. ACCESSIBLE PARKING STALL PAVEMENT STRIPING SHALL CONFORM TO CBC FIGURE 11B-502.3.3 (A)
2. PRIOR TO FABRICATION AND INSTALLATION OF THE ACCESSIBLE PARKING AREA SIGN, CONTRACTOR SHALL VERIFY WITH MROSD THE REQUIRED ADDRESS AND TELEPHONE NUMBER TO BE PERMANENTLY PLACED ON THE SIGN AND SHALL PROVIDE A SIGN WITH THOSE NUMBERS.
3. ACCESSIBLE PARKING AREA SIGN LETTERING SHALL BE 1" HIGH WHITE LETTER HELVETICA NARROW STYLE . LETTERING AND SIGN SHALL CONFORM TO CBC SECTION 11B-502.8.



ACCESSIBLE PARKING STRIPING

5 ACCESSIBLE PARKING SIGN AND STRIPING

SCALE: AS DIMENSIONED



9 TYPICAL TRENCH DETAIL

SCALE: AS DIMENSIONED

A. BELL END ACCEPTS CORRUGATED HDPE/PP DUAL WALL PIPE--ADS/HANCOR INC. SPECIFICATIONS IN 4", 6", 8", 10", 12", 15", 18", 21", 24", AND 30" SIZES.

B. CURVATURE VARIES WITH MAINLINE DIAMETERS.

C. SPIGOT END PVC SDR 35, ASTM D3034 DIAMETERS: 4", 6", 8", 10", 12", 15", 18", 21", 24" AND 30"

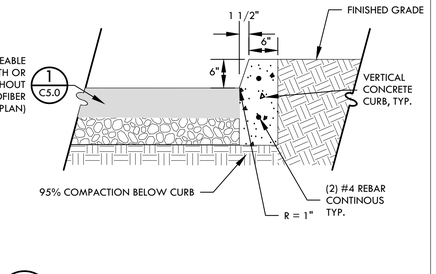
PART	PART NAME	MATERIALS
1	HUB ADAPTOR	PVC SDR 26 ASTM D3034
2	SECURING CLAMP*	BAND SS #301 SCREW SS #305 HOUSING SS #301 ASTM F477
3	RUBBER SLEEVE (AVAILABLE IN NITRILE AND EPDM BY SPECIAL ORDER)	
3A	UPPER SEGMENT**	
3B	LOWER SEGMENT***	
4	(NOT SHOWN) ADS/HANCOR INC. SUPPLIES VALLEY GASKET	

* OPTIONAL; #316 STAINLESS STEEL BAND, SCREW AND HOUSING
** DISTANCE BETWEEN 4A AND 4B WILL VARY BY PRODUCT TYPE
*** WILL NOT APPEAR ON RUBBER SLEEVES FOR CONCRETE OR CLAY PIPE

INSERT-A TEE SIZE	HOLE DIAMETER
4" (100 mm)	4.5" (114 mm)
6" (150 mm)	6.5" (165 mm)
8" (200 mm)	8.75" (222 mm)
10" (250 mm)	10.75" (276 mm)
12" (300 mm)	12.75" (327 mm)
15" (375 mm)	15.75" (402 mm)
18" (450 mm)	19.75" (503 mm)
21" (525 mm)	22.75" (573 mm)
24" (600 mm)	25.75" (643 mm)
30" (750 mm)	32.75" (826 mm)

11 INSERT-A-TEE FLANGE FITTING

SCALE: AS DIMENSIONED



12 VERTICAL CURB DETAIL

SCALE: AS DIMENSIONED

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95062

(831) 426-9054

Drawn by : ARS
Checked by : RLC

Drawing Title :

CIVIL DETAILS- PARKING LOT DETAILS

Date : 2/6/18

Scale : AS SHOWN

Project Number : 16.04

Sheet Number : C5.0

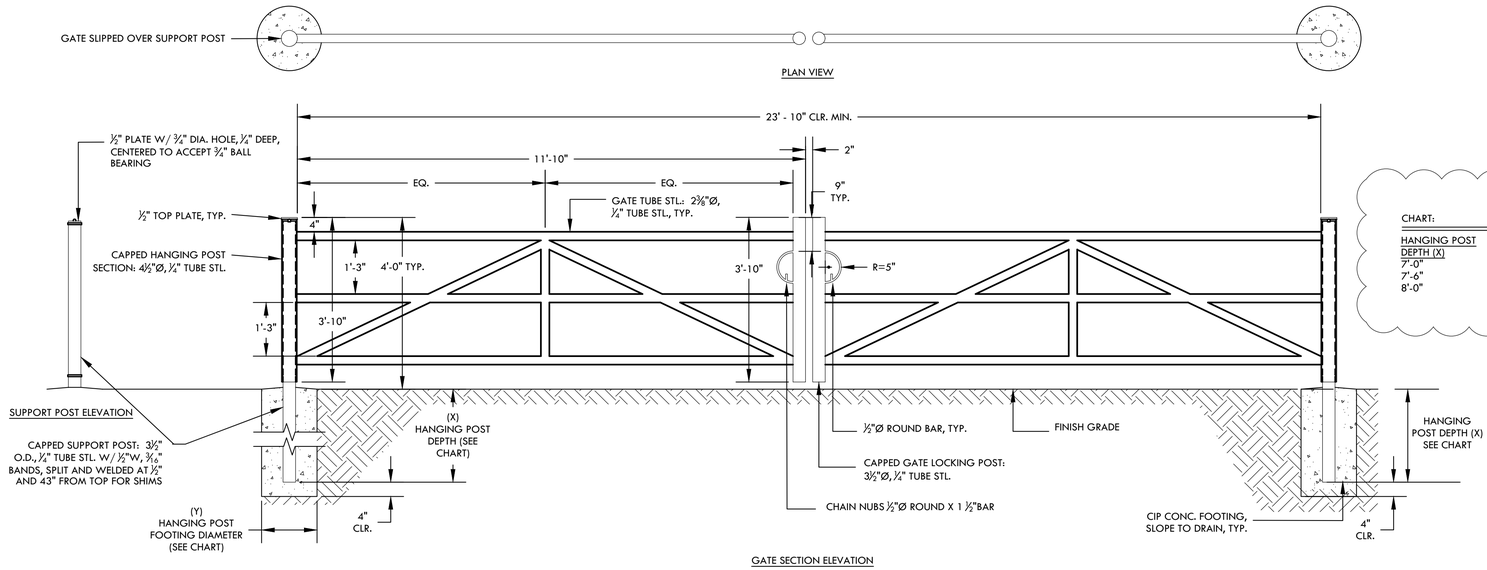
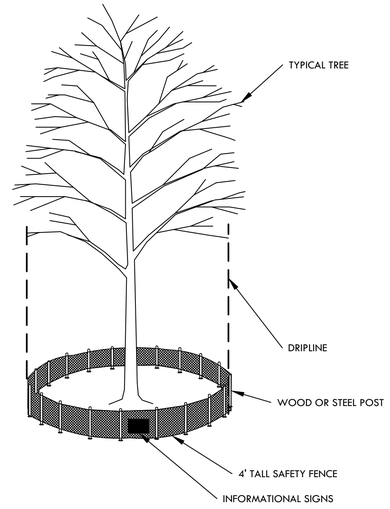


CHART:

HANGING POST DEPTH (X)	HANGING POST FOOTING DIA. (Y)
7'-0"	2'-0"
7'-6"	1'-6"
8'-0"	1'-0"

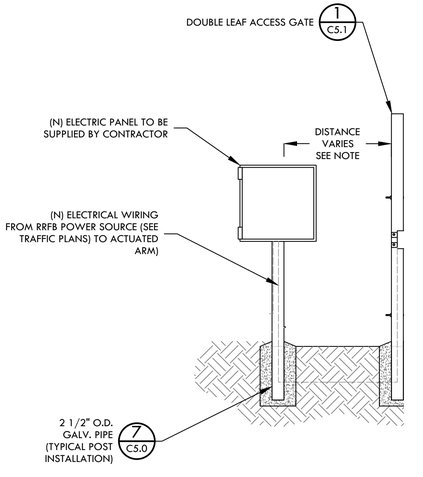


1 AUTOMATIC DOUBLE LEAF ACCESS GATE
SCALE: AS DIMENSIONED

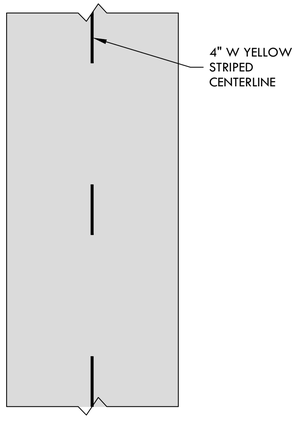
2 RESOURCE PROTECTION FENCING (TYP)
SCALE: NTS

NOTES:

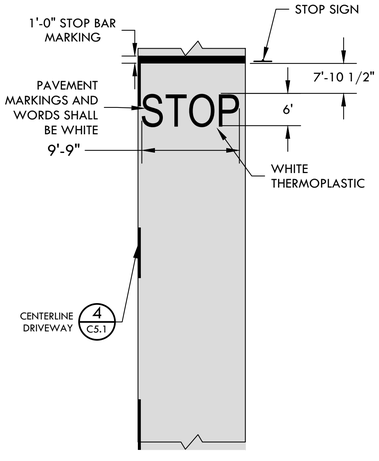
1. THE GATE CONTROLLER SHALL BE INSTALLED ON THE DOUBLE LEAF ACCESS GATE. THE LOCATION SHALL BE VERIFIED WITH MROSD BEFORE INSTALLATION.
2. ALL CONTROLLER COMPONENTS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS
3. THE LEAVES IN THE DOUBLE LEAF ACCESS GATE SHALL LOCK IN THE OPEN POSITION AT EACH SIDE OF THE DRIVEWAY.



3 GATE CONTROLLER
SENTRY 300 SOLAR POWERED GATE OPENER OR EQUIVALENT



4 CENTERLINE DRIVEWAY
SCALE: AS DIMENSIONED



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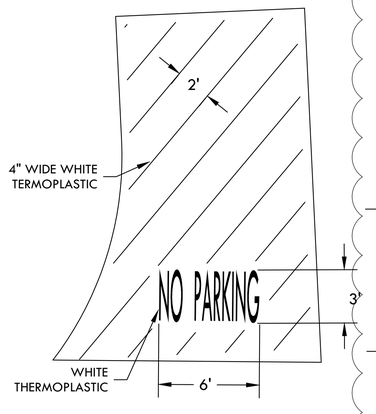

6 NO PARKING
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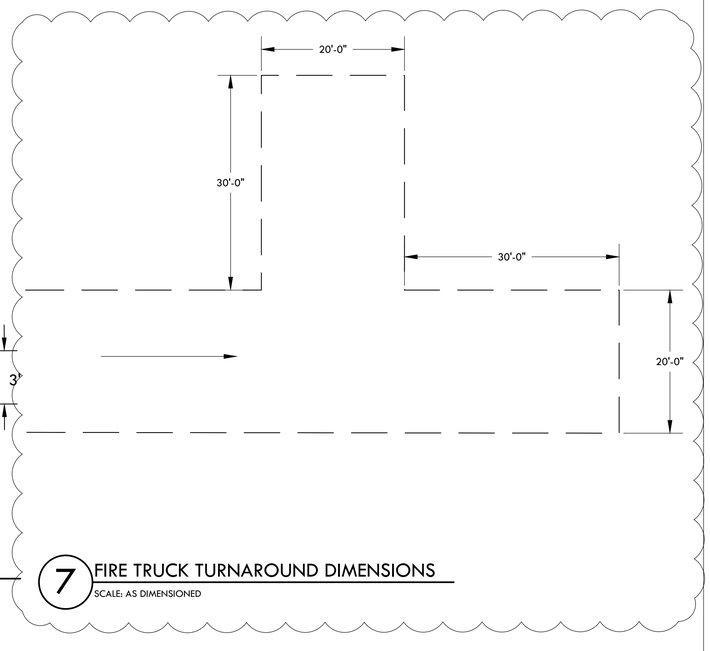

7 FIRE TRUCK TURNAROUND DIMENSIONS
SCALE: AS DIMENSIONED

Midpeninsula Regional Open Space District

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HARRIS DESIGN

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90% SUBMITTAL		10/10/2017	
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REGISTERED PROFESSIONAL ENGINEER
ROBYN L. COOPER
NO. 73041
EXP. 12/31/18
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STATE OF CALIFORNIA

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Drawn by : ARS
Checked by : RLC

Drawing Title :

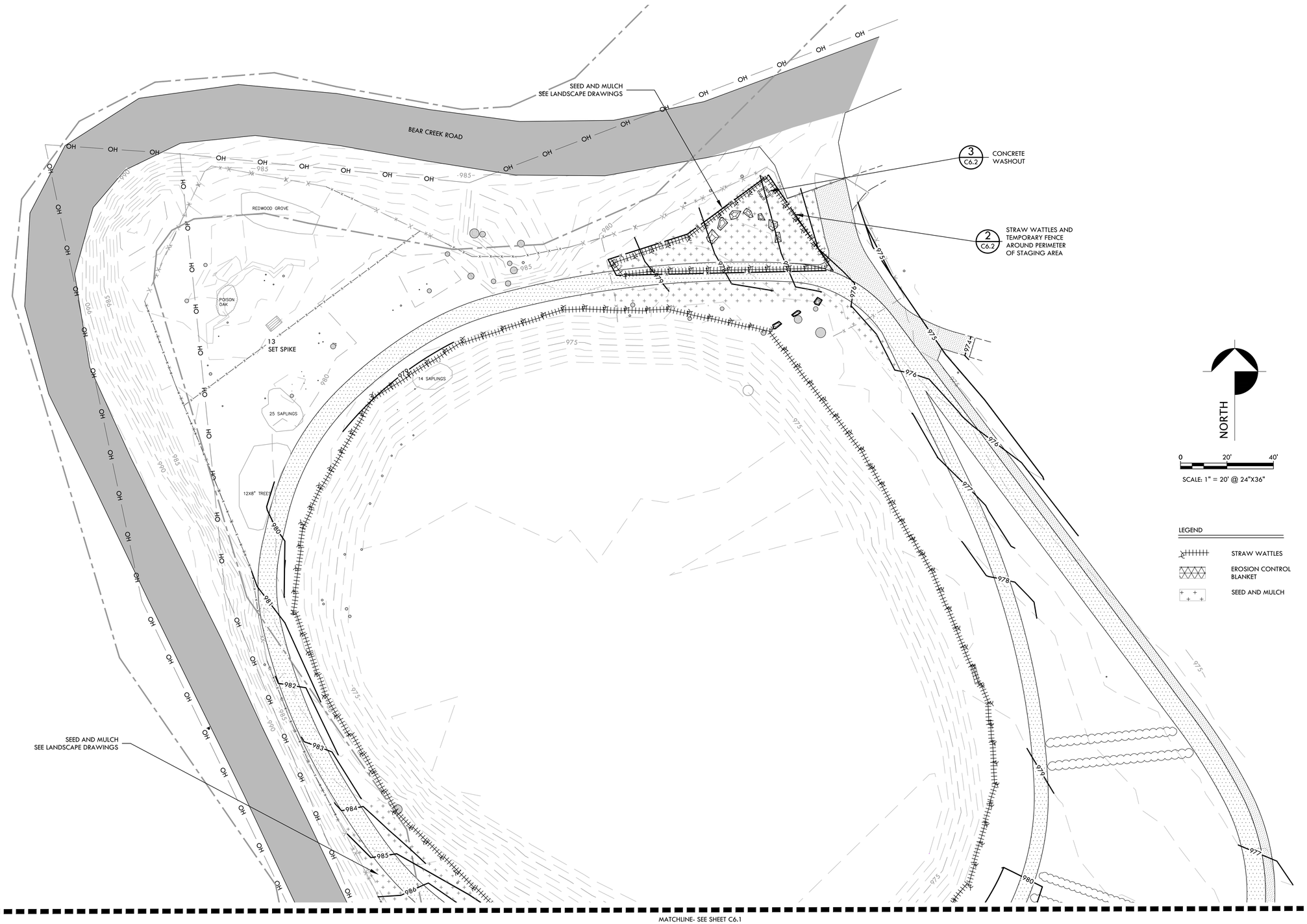
CIVIL DETAILS- GATE AND DRIVEWAY DETAILS

Date : 2/6/18

Scale : AS SHOWN

Project Number : 16.04

Sheet Number : C5.1



1 EROSION CONTROL PLAN - POND LAYOUT

SCALE: 1" = 20' @ 24"X36"

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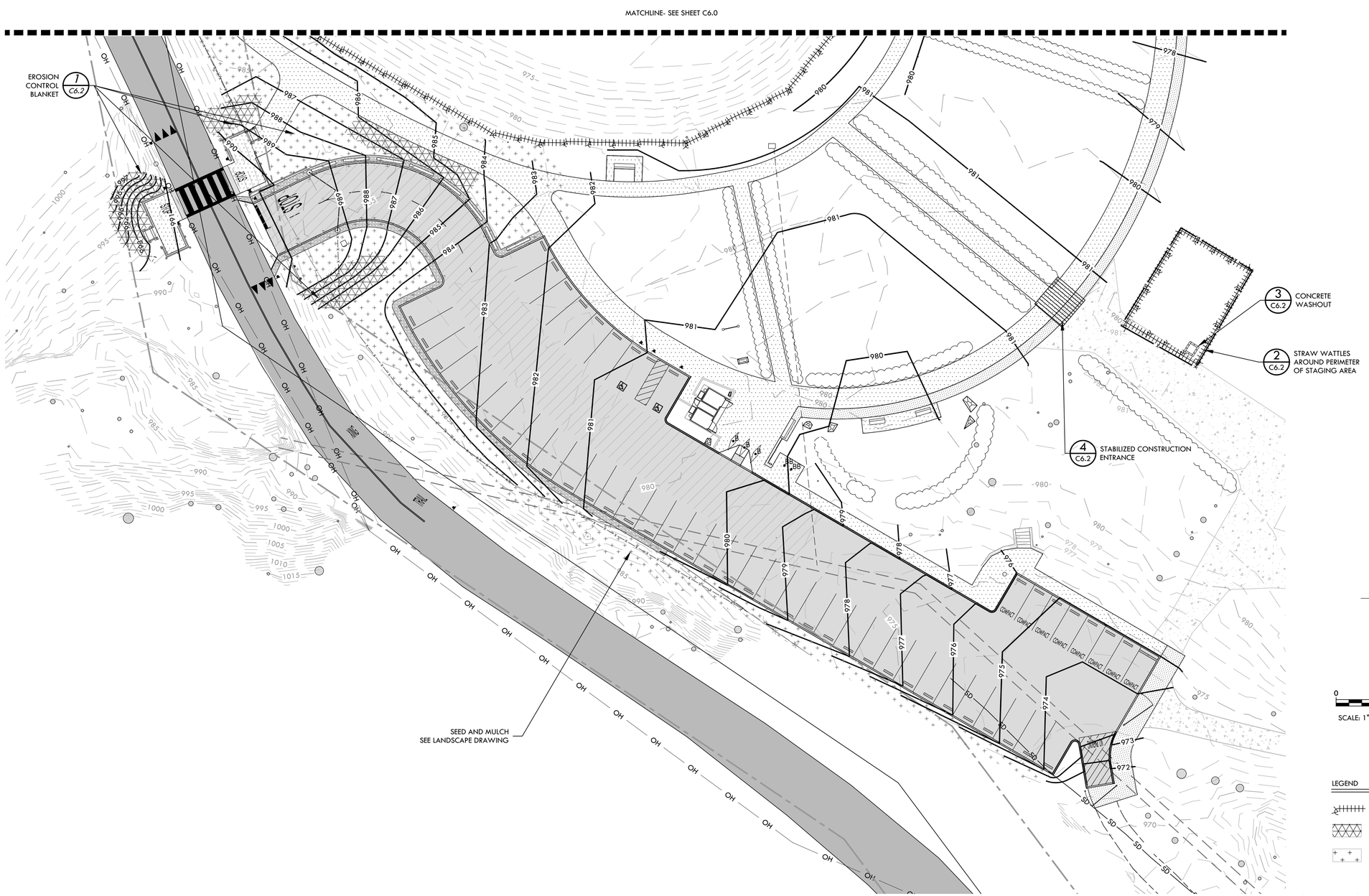
EROSION CONTROL PLAN - POND LAYOUT

Date : 2/6/18

Scale : AS SHOWN

Project Number : 16.04

Sheet Number : C6.0



1 EROSION CONTROL PLAN- PARKING LOT LAYOUT

SCALE: 1" = 20' @ 24"X36"

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Date : 2/6/18
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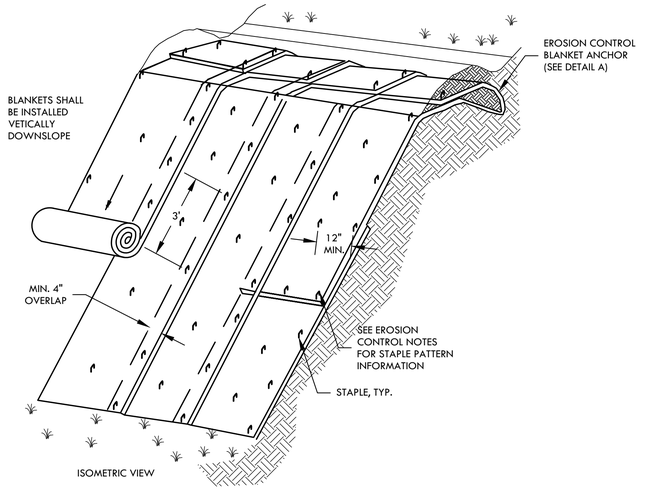
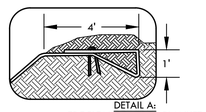
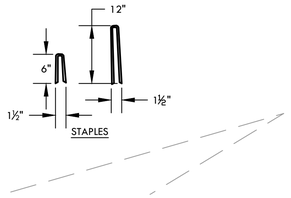
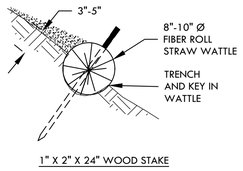




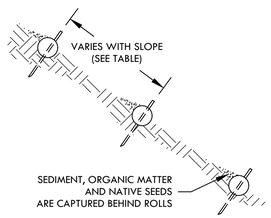


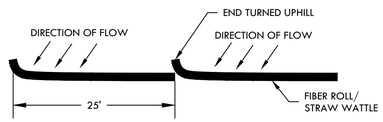
1 EROSION CONTROL BLANKET

SCALE: 1:2 @ 24"X36"



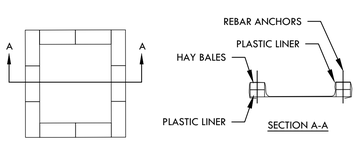
STRAW WATTLE MAX SPACING	
SLOPE (H:V)	SPACING (FT)
>1:1	5
2:1 - 1:1	10
4:1 - 2:1	20
6:1 - 4:1	25
<6:1	50





2 STRAW WATTLES

SCALE: ### @ 24"X36"

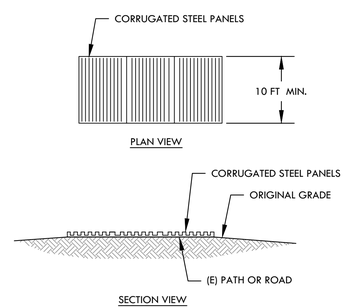


NOTES:

1. PLASTIC LINER SHALL BE WRAPPED AROUND AND TUCKED UNDER HAY BALES.
2. CONCRETE WASHOUT SHALL BE INSTALLED IN A LOCATION APPROVED BY THE PROJECT ENGINEER.

3 CONCRETE WASHOUT

SCALE: ### @ 24"X36"



4 STABILIZED CONSTRUCTION ENTRANCE

SCALE: ### @ 24"X36"

EROSION CONTROL NOTES:

1. GENERAL. THE CONTRACTOR SHALL INSTALL, MAINTAIN AND INSPECT TEMPORARY EROSION CONTROL AND TEMPORARY STORMWATER CONTROL MEASURES TO CONTROL SEDIMENT AND RUNOFF IN ACCORDANCE WITH THESE PLANS AND THE COUNTY OF SANTA CLARA REQUIREMENTS. REFER TO LANDSCAPE PLANS FOR PERMANENT LANDSCAPING.

1.1. THE CONSTRUCTION OF THIS PROJECT IS NOT EXPECTED TO OCCUR DURING THE RAINY SEASON.

1.2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY EROSION AND SEDIMENT CONTROL BMP INSTALLATION AND MAINTENANCE.

1.3. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED IN ALL AREAS WHERE SOIL IS DISTURBED.

1.4. EROSION IS TO BE CONTROLLED AT ALL TIMES ALTHOUGH SPECIFIC MEASURES SHOWN ARE TO BE IMPLEMENTED AT ANY TIME RAIN IS FORECASTED.

1.5. ALL EROSION CONTORL AND SOIL CONSERVATION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS ESTABLISHED BY SANTA CLARA COUNTY AND THE CALIFORNIA BUILDING CODE.

1.6. DISTURBED AREAS SHALL BE STRAWED AND SEEDED AT THE COMPLETION OF THE PROJECT.

1.7. CONTRACTOR SHALL COMPLY WITH ALL BEST-MANAGEMENT PRACTICES OUTLINED IN THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP).

1.8. DURING THE CONSTRUCTION PERIOD IF RAIN IS FORECASTED, ALL DISTURBED AREAS SHALL BE COVERED ACCORDING TO THE FOLLOWING GUIDELINES:

1.8.1. OBTAIN STERILE, WEED-FREE WHEAT, BARLEY, OAT, OR RICE STRAW IN ORDER TO PREVENT THE SPREAD OF NOXIOUS WEEDS. AVOID MOLDY, COMPACTED STRAW BECAUSE IT TENDS TO CLUMP AND IS NOT EVENLY DISTRIBUTED.
1.8.2. THE STRAW SHALL BE EVENLY DISTRIBUTED BY HAND OR MACHINE TO THE DESIRED DEPTH AND SHOULD COVER THE EXPOSED AREA TO A UNIFORM DEPTH.
1.8.3. AN APPLICATION RATE OF 2,000 POUNDS PER ACRE SHOULD BE USED.
1.8.4. THERE SHOULD BE A MINIMUM OF 3 - 4" OF STRAW OVER THE SOIL AND NO BARE SOIL SHOULD BE VISIBLE.
1.8.5. ON STEEP OR HIGH WIND SITES, EROSION CONTROL BLANKETS WILL BE USED FOR EROSION CONTROL AND PLACED ON ANY DISTURBED SOIL.

2. SEED AND MULCH. ALL AREAS ON- AND OFF-SITE EXPOSED DURING CONSTRUCTION ACTIVITIES, IF NOT PERMANENTLY LANDSCAPED PER PLAN, SHALL BE PROTECTED BY MULCHING AND/OR HAND BROADCASTING OF THE FOLLOWING SEED MIX AND INCORPORATED OVER ALL DISTURBED SLOPES:

BROMUS CARINATUS 10#/ACRE
LEYMUS TRITICOIDES 8#/AC.
HORDEUM BRACHYANTHERUM 5#/AC.
FESTUCA RUBRA 8#/AC.
DESCHAMPSIA CESPITOSA 8#/AC. (IF THE AREA IS SUNNY, REPLACE THIS SPECIES WITH STIPA PULCHRA & ELYMUS GLAUCUS).

ALL SEEDS SHALL BE SOURCED FROM THE SANTA CRUZ MOUNTAINS.

2.1 ALL EXCAVATED MATERIAL SHALL BE REMOVED TO AN APPROVED DISPOSAL SITE OR DISPOSED OF ON-SITE IN A MANNER THAT WILL NOT CAUSE EROSION.

2.2 ANY MATERIAL STOCKPILED ON-SITE SHALL BE COVERED WITH PLASTIC, ESPECIALLY DURING THE WINTER MONTHS OR DURING PERIODS OF RAIN.

2.3 SLOPES LESS THAN OR EQUAL TO 20% SHALL BE SEEDED AND COVERED WITH 2 INCHES OF STRAW MULCH.

2.4. EXPOSED SOIL ON SLOPES GREATER THAN 20% SHALL BE SEEDED, COVERED WITH 2 INCHES OF STRAW, AND AN EROSION CONTROL BLANKET. THE EROSION CONTROL BLANKET SHALL BE STAKED IN PLACE PER MANUFACTURERS RECOMMENDATIONS.

2.5 STRAW MULCH COVER SHALL BE SUFFICIENT SO THAT NO BARE SOIL IS VISIBLE.

2.6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ADDITIONAL MEASURES, NECESSARY TO CONTROL SITE EROSION AND PREVENT SEDIMENT TRANSPORT OFF-SITE ARE IMPLEMENTED.

3. STRAW WATTLE. STRAW WATTLES (OR FIBER ROLLS) SHALL BE INSTALLED ALONG THE CONTOUR OF THE SLOPE TO SLOW RUNOFF VELOCITY AND TRAP SEDIMENT. STRAW WATTLES SHALL BE INSTALLED WHEREVER THE DISTURBED SLOPE IS ADJACENT TO A STREAM OR DRAINAGE COURSE. TRENCH DEPTH SHALL BE ½ TO ½ OF THE THICKNESS OF THE WATTLE, AND THE WIDTH SHALL EQUAL THE WATTLE DIAMETER, IN ORDER TO PROVIDE AREA TO BACKFILL THE TRENCH. WOOD STAKES SHALL BE INSTALLED EVERY FOUR FEET THROUGH THE WATTLE AND THE END SHALL BE TURNED UP HILL TO PREVENT RUNOFF FORM GOING AROUND THE WATTLE.

4. CONCRETE WASHOUT. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE LOCATED A MINIMUM OF 50 FEET FROM STORM DRAIN INLETS, OPEN DRAINAGE FACILITIES, AND WATERCOURSES. THE CONCRETE WASHOUT FACILITY SHALL BE BELOW GRADE AND CONSTRUCTED WITH A MINIMUM LENGTH AND MINIMUM WIDTH OF 10 FEET. TEMPORARY CONCRETE FACILITIES SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS. THE WASHOUT SHALL HAVE A 10 MIL POLYETHYLENE PLASTIC LINER. WHEN CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE AND MATERIALS FOR THE WASHOUT SHALL BE REMOVED AND DISPOSED OF. HOLES, DEPRESSIONS, OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE CONCRETE WASHOUT SHOULD BE BACKFILLED AND REPAIRED.

5. EROSION CONTROL BLANKET. THE EROSION CONTROL BLANKET SHALL BE CONSTRUCTED OF JUTE FIBERS, CURLED WOOD FIBERS, STRAW, COCONUT FIBER, OR A COMBINATION OF THESE MATERIALS. NO PLASTIC MATERIAL WILL BE ACCEPTED.

5.1. CONSTRUCTION GUIDELINES

5.1.1 GRADE AND SHAPE AREA OF INSTALLATION

5.1.2 REMOVE ALL ROCK, CLODS, AND VEGETATIVE OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED BLANKET WILL HAVE DIRECT CONTACT WITH THE SOIL.

5.1.3 LOOSEN 2-3 INCHES OF TOPSOIL ABOVE FINAL GRADE

5.1.4 U-SHAPED WIRE STAPLES, METAL GEOTEXTILE STAKE PINS OR TRIANGULAR WOODEN STAKES CAN BE USED TO ANCHOR MATS TO THE GROUND SURFACE. WIRE STAPLES SHOULD BE A MINIMUM OF 11 GAUGE. METAL STAKE PINS SHOULD BE 3/16 INCH DIAMETER STEEL WITH A 1 ½ INCH STEEL WASHER AT THE HEAD OF THE PIN. WIRE STAPLES AND METAL STAKES SHOULD BE DRIVEN FLUSH TO THE SOIL SURFACE. ALL ANCHORS SHOULD BE 6-8 INCHES LONG AND HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER ANCHORS MAY BE REQUIRED FOR LOOSE SOILS.

5.1.5 EROSION CONTROL BLANKETS AND HYDROSEED SHALL BE INSTALLED ON ALL DISTURBED SLOPES WITH GREATER THAN 20% GRADES.

5.2. INSTALLATION ON SLOPE:

5.2.1 BEGIN AT THE TOP OF THE SLOPE AND ANCHOR THE BLANKET IN A 6 INCH DEEP BY 6 INCH WIDE TRENCH. BACKFILL TRENCH AND TAMP EARTH FIRMLY.

5.2.2 UNROLL BLANKET DOWNSLOPE IN THE DIRECTION OF WATER FLOW. BLANKET SHOULD BE UNROLLED SLOWLY IN A CONTROLLED MANNER TO ACHIEVE DIRECT CONTACT WITH THE SOIL.

5.2.3. THE EDGE OF ADJACENT PARALLEL ROLLS MUST BE OVERLAPPED 2-3 INCHES AND BE STAPLED EVERY 3 FEET.

5.2.4. WHEN BLANKETS MUST BE SPLICED, PLACE BLANKET END OVER END (SHINGLE STYLE) WITH 6 INCH OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12 INCHES APART.

5.2.5. LAY BLANKET LOOSELY AND MAINTAIN DIRECT CONTACT WITH THE SOIL, DO NOT STRETCH.

5.2.6. BLANKETS SHALL BE STAPLED SUFFICIENTLY TO ANCHOR BLANKET AND MAINTAIN CONTACT WITH THE SOIL. STAPLES SHALL BE PLACED DOWN THE CENTER AND STAGGERED WITH THE STAPLES PLACED ALONG THE EDGES. STEEP SLOPES, 1:1 TO 2:1 REQUIRE 2 STAPLES PER SQUARE YARD. MODERATE SLOPES, 2:1 TO 3:1, REQUIRE 1-2 STAPLES PER SQUARE YARD (1 STAPLE 3 O.C.). GENTLE SLOPES REQUIRE 1 STAPLE PER SQUARE YARD.

6. OTHER PROVISIONS

6.1. IF CONSTRUCTION OCCURS BETWEEN OCTOBER 1ST AND APRIL 15TH, THE SITE SHALL BE WINTERIZED AS REQUIRED BY THE SANTA CLARA COUNTY CODE OF ORDINANCES SEC. C12,. BETWEEN OCTOVER 1ST AND APRIL 15TH, ALL EXPOSED SOIL NOT INVOLVED IN IMMEDIATE CONSTRUCTION ACTIVITY SHALL BE PROTECTED FROM EROSION AT ALL TIMES. AFTER APRIL 15TH, EROSION CONTROL MEASURES SHALL BE IN PLACE DURING INCLEMENT WEATHER.

6.2. EROSION CONTROL MEASURES SHALL BE KEPT IN PLACE BY THE CONTRACTOR UNTIL NATIVE VEGETATION HAS BEEN ESTABLISHED AND PROVIDES NECESSARY SLOPE COVER (MINIMUM 70% COVER).

6.3 STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED ON DIRT ROAD JUST PRIOR TO PAVED SURFACE. THE INTENT OF THE STABILIZED CONSTRUCTION ENTRANCE IS TO PREVENT SEDIMENT/SOIL FROM TRACKING ONTO PAVED ROADS. CONTRACTOR IS RESPONSIBLE FOR LOCATING STABILIZED CONSTRUCTION ENTRANCE APPROPRIATELY.

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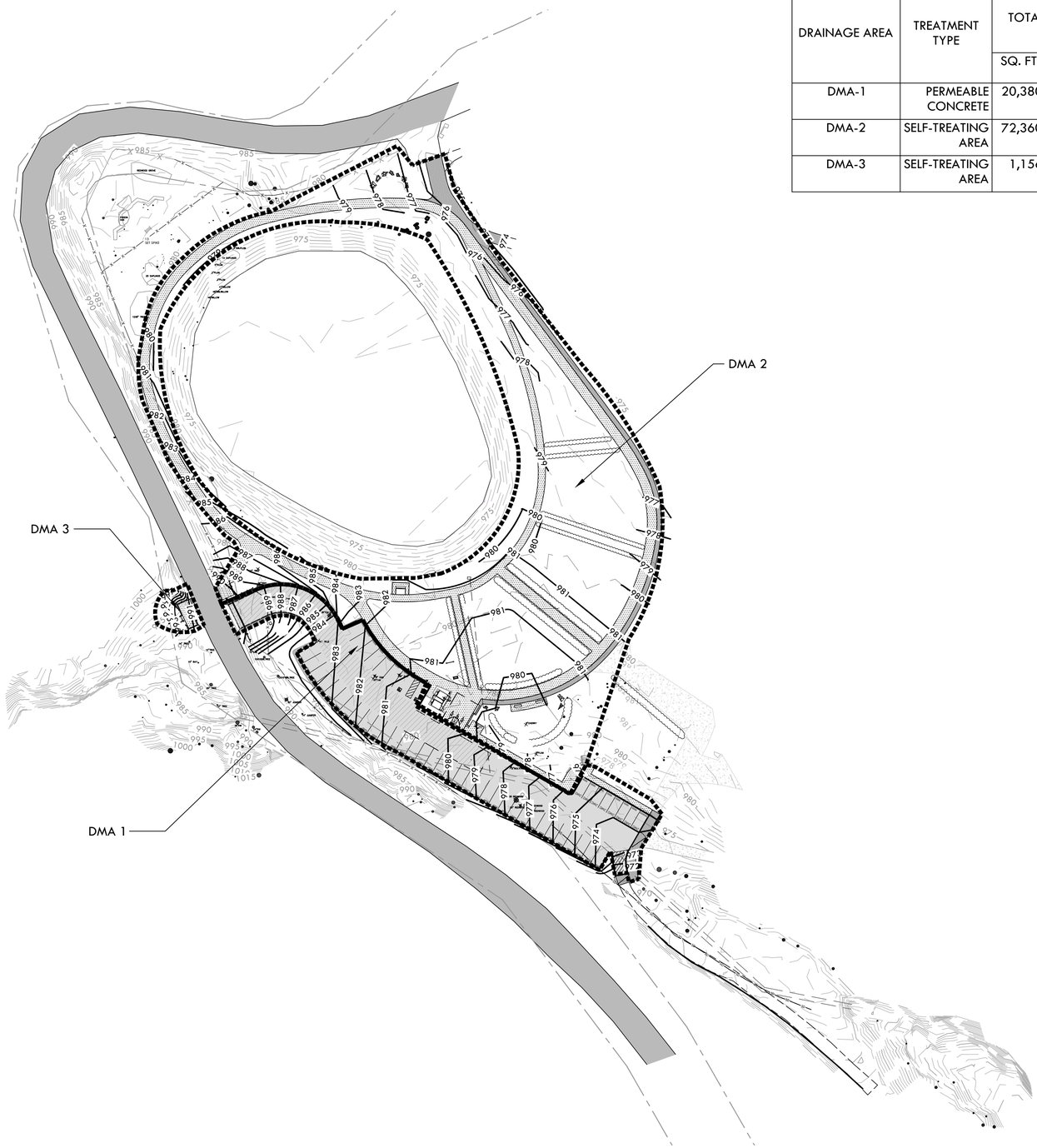
Drawn by : ARS
Checked by : RLC
Drawing Title :

EROSION CONTROL PLAN - DETAILS AND NOTES

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C6.2



STORMWATER DATA TABLE											
DRAINAGE AREA	TREATMENT TYPE	TOTAL AREA		IMPERVIOUS AREA		PERVIOUS AREA		PERCENT IMPERVIOUS	SIZING METHOD	RUNOFF COEFFICIENT, C	TREATMENT REQUIRED (CF)	TREATMENT PROVIDED (CF)
		SQ. FT	ACRES	SQ. FT	ACRES	SQ. FT	ACRES					
DMA-1	PERMEABLE CONCRETE	20,380	0.47	900	0.02	19,480	0.45	4.5%	VOLUME BASED	0.30	1,873	2,245
DMA-2	SELF-TREATING AREA	72,360	1.66	9,760	0.22	39,400	0.90	14.5%	N/A	0.10	N/A	N/A
DMA-3	SELF-TREATING AREA	1,156	0.03	236	0.00	920	0.02	20.0%	N/A	0.10	N/A	N/A

NORTH

0 50' 100'

SCALE: 1" = 50' @ 24"X36"

LEGEND:

DMA BOUNDARY

1 STORMWATER CONTROL PLAN

SCALE: 1" = 50' @ 24"X36"

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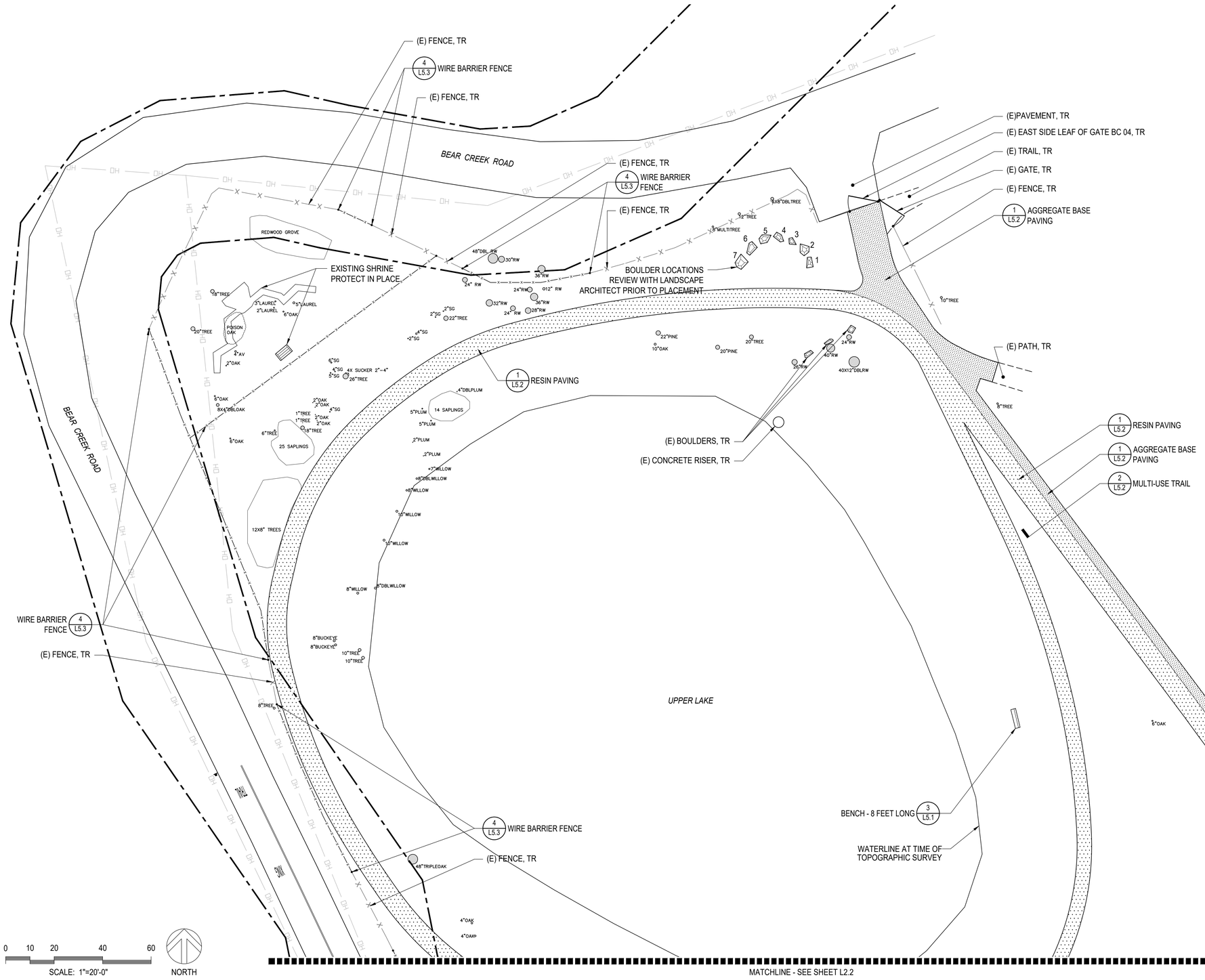
Drawn by : ARS
Checked by : RLC
Drawing Title :

STORMWATER CONTROL PLAN

Date : 2/6/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : C7.0



SEE SHEET L2.2 FOR LEGEND & NOTES

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LICENSED LANDSCAPE ARCHITECT
WILLIAM S. HARRIS #428
STATE OF CALIFORNIA
08-31-18

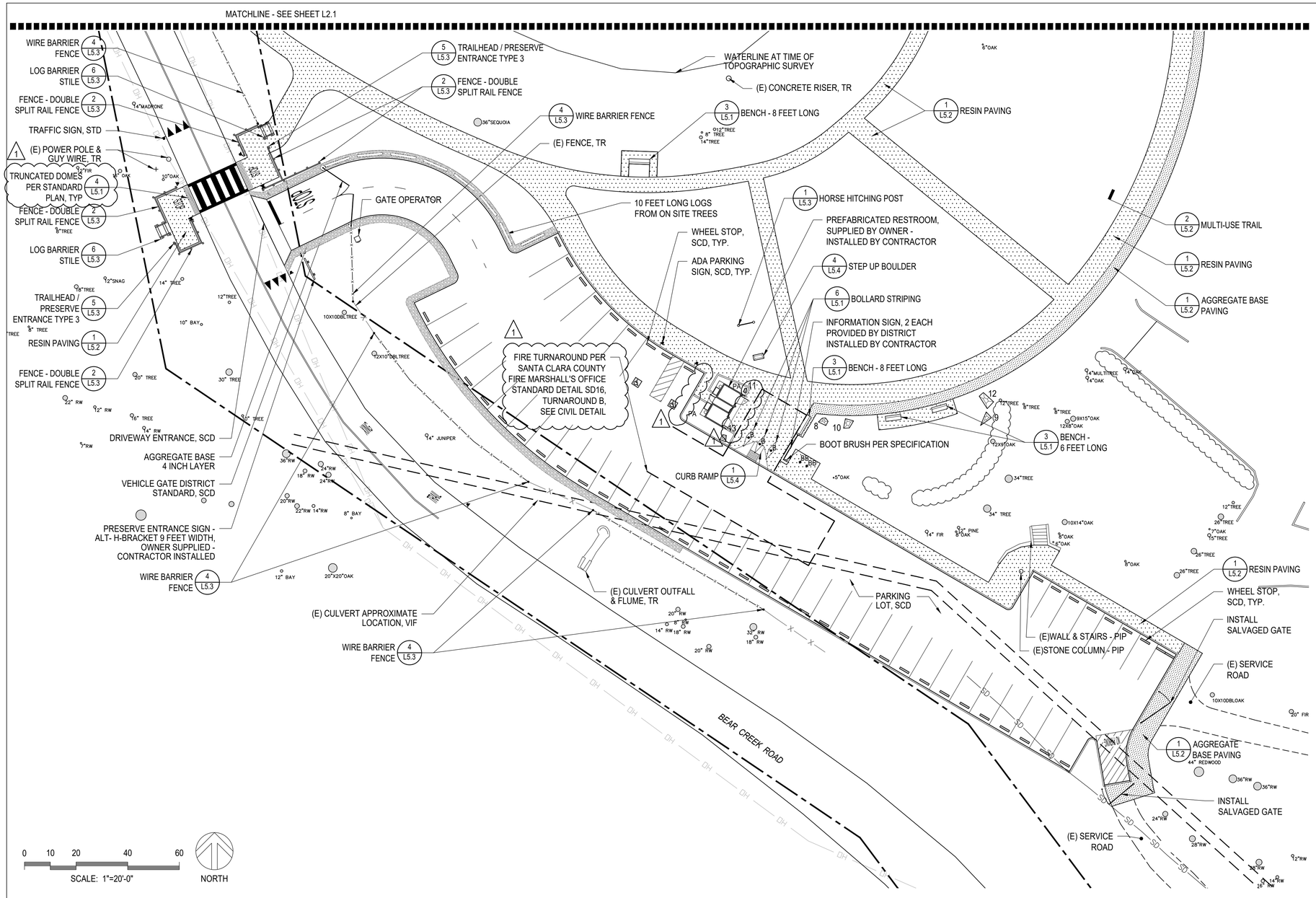
Drawn by : ZD
Checked by : BH

Drawing Title :

SITE CONSTRUCTION PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04

Sheet Number : L2.1



SITE CONSTRUCTION LEGEND

- RESIN PAVING — 1 L5.2
- AGGREGATE BASE PAVING — 1 L5.2
- TRUNCATED DOMES DETECTABLE WARNING SURFACE PER SPECIFICATIONS
- EXISTING WIRE FENCE
- PROPOSED WIRE FENCE — 4 L5.3
- BENCH, PER SPECIFICATIONS 8 FEET OR 6 FEET LONG AS SHOWN
- BB — BICYCLE BOLLARD PER SPECIFICATIONS
- 1 — NEW LOCATION FOR EXISTING BOULDER TO BE RELOCATED. SEE DEMOLITION PLAN FOR EXISTING LOCATIONS. — 5 L5.1
- •B — FOLDING BOLLARD — 2 L5.1
- EXISTING TREE TO REMAIN
- (E) — EXISTING
- PA — PLANTING AREA
- PIP — PROTECT IN PLACE
- SCD — SEE CIVIL DRAWINGS
- STD — SEE TRAFFIC DRAWINGS
- TR — TO REMAIN
- VIF — VERIFY IN FIELD
- BEAR CREEK ROAD RIGHT OF WAY PLOTTED FROM RECORD INFORMATION.

CONSTRUCTION NOTES

1. REFER TO SPECIFICATIONS FOR SITE FURNISHINGS.
2. SEE COVER SHEET FOR ADDITIONAL ABBREVIATIONS AND LEGEND.

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Santa Clara County, CA

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Seals and Signatures

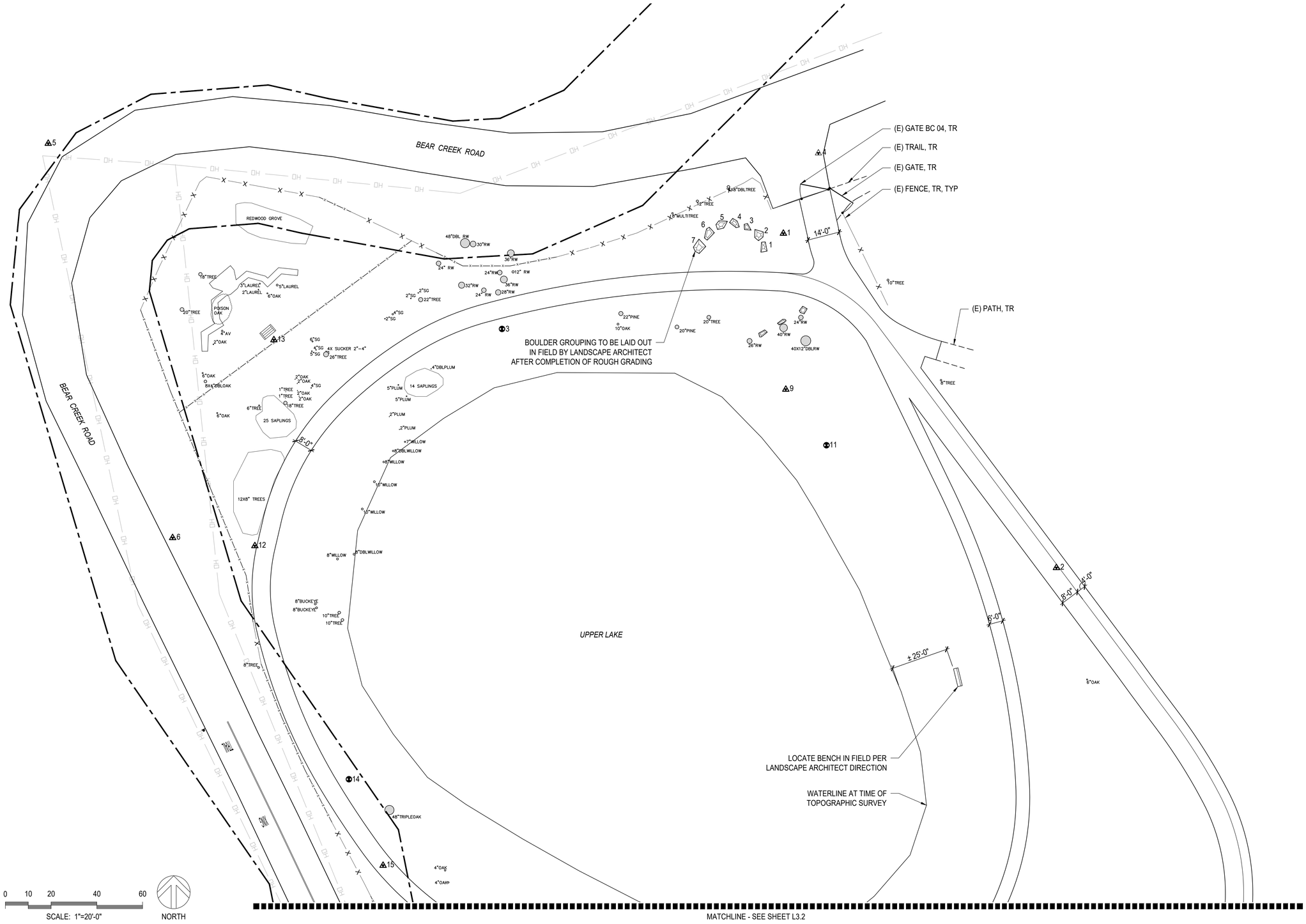
LICENSED LANDSCAPE ARCHITECT · WILLIAM S. HARRIS · 2439 · Signature 08-31-18 Renewal Date · STATE OF CALIFORNIA

Drawn by : ZD
Checked by : BH

Drawing Title :

SITE CONSTRUCTION PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04
Sheet Number : L2.2



SEE SHEET L3.2 FOR LEGEND & NOTES

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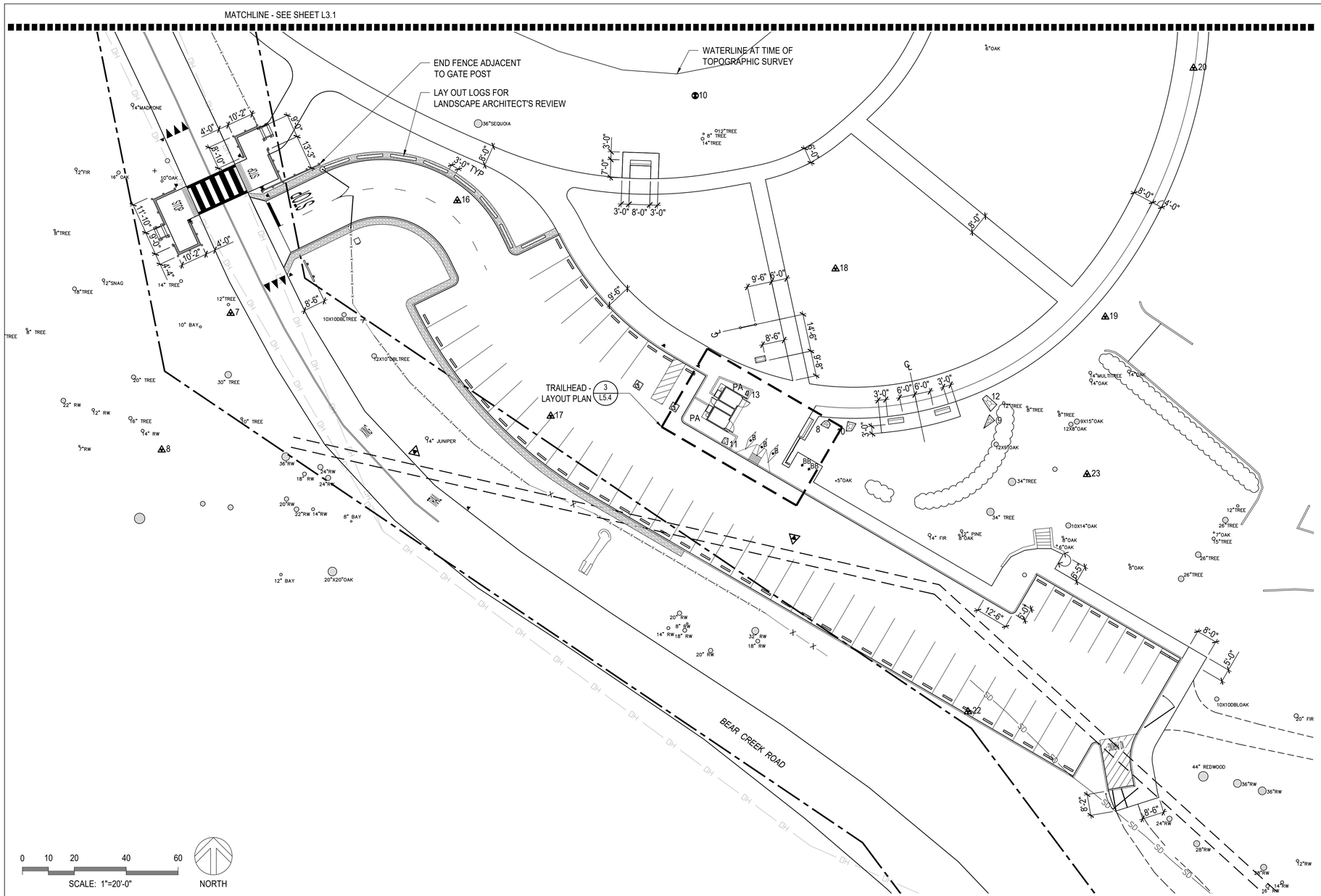
WILLIAM S. HARRIS #2438
08-31-18
RENEWAL DATE
STATE OF CALIFORNIA

Drawn by : ZD
Checked by : BH
Drawing Title :

LANDSCAPE LAYOUT PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04
Sheet Number : L3.1



LAYOUT LEGEND

⊿9	SURVEY MONUMENT (SET SPIKE) SEE TOPOGRAPHIC SURVEY MAP
⊿3	SURVEY MONUMENT (FOUND REBAR) SEE TOPOGRAPHIC SURVEY MAP
	ALIGN
	BEAR CREEK ROAD RIGHT OF WAY PLOTTED FROM RECORD INFORMATION.
EQ	EQUAL
PA	PLANTING AREA
TYP	TYPICAL

LAYOUT NOTES

1. WRITTEN DIMENSIONS SUPERCEDE SCALED DIMENSIONS.
2. ALL CURVES SHALL BE SMOOTH AND CONTINUOUS WITH CAREFULLY MATCHED TANGENTS.
3. LAY OUT BENCH LOCATIONS IN FIELD PER LANDSCAPE ARCHITECTS DIRECTION.
4. LAY OUT NUMBERED BOULDERS IN FIELD FOR LANDSCAPE ARCHITECT'S REVIEW PRIOR TO INSTALLATION.

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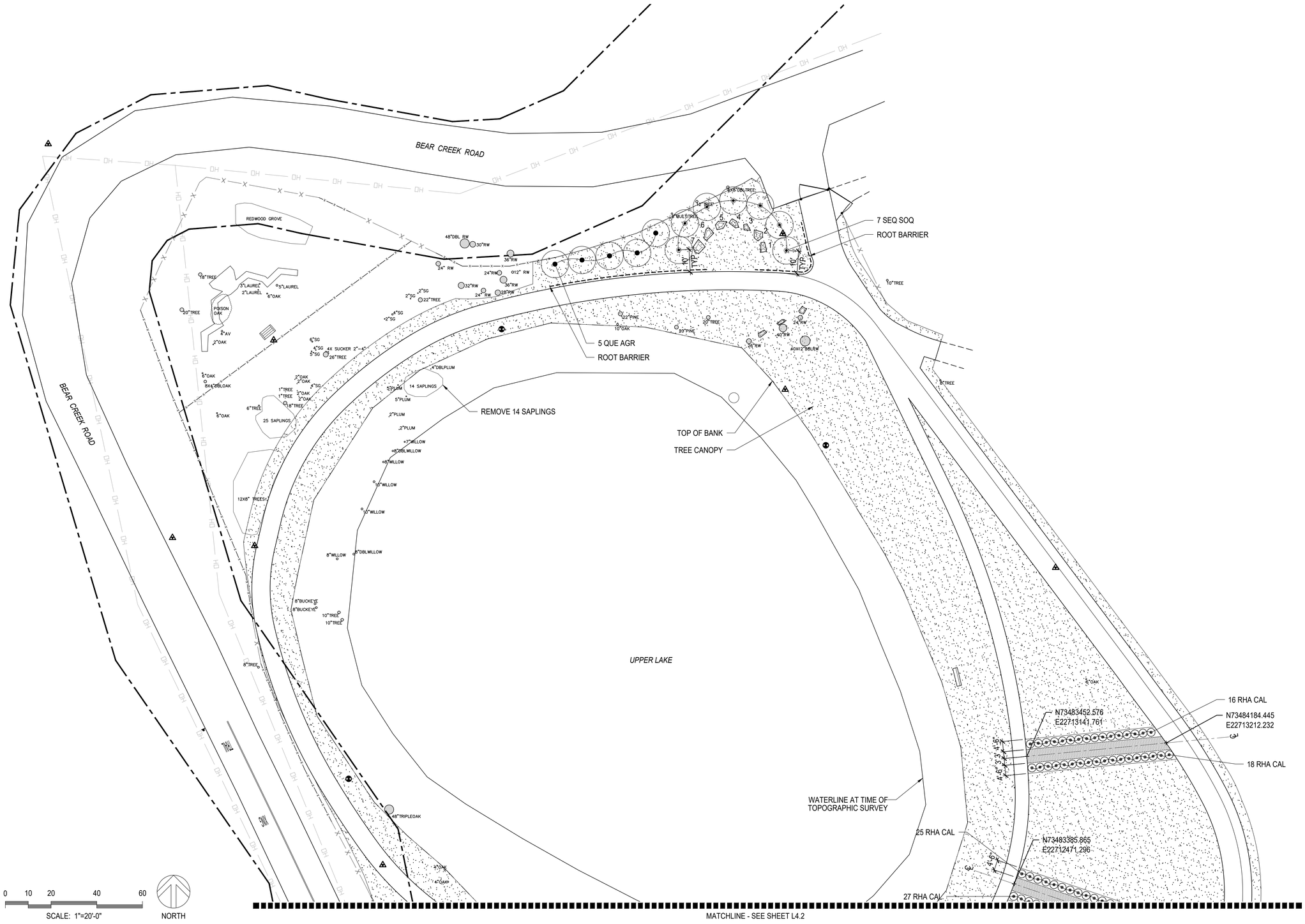

SEE SHEET L4.2 FOR LEGEND & NOTES

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WILLIAM S. HARRIS #428
STATE OF CALIFORNIA
08-31-18

Drawn by : ZD
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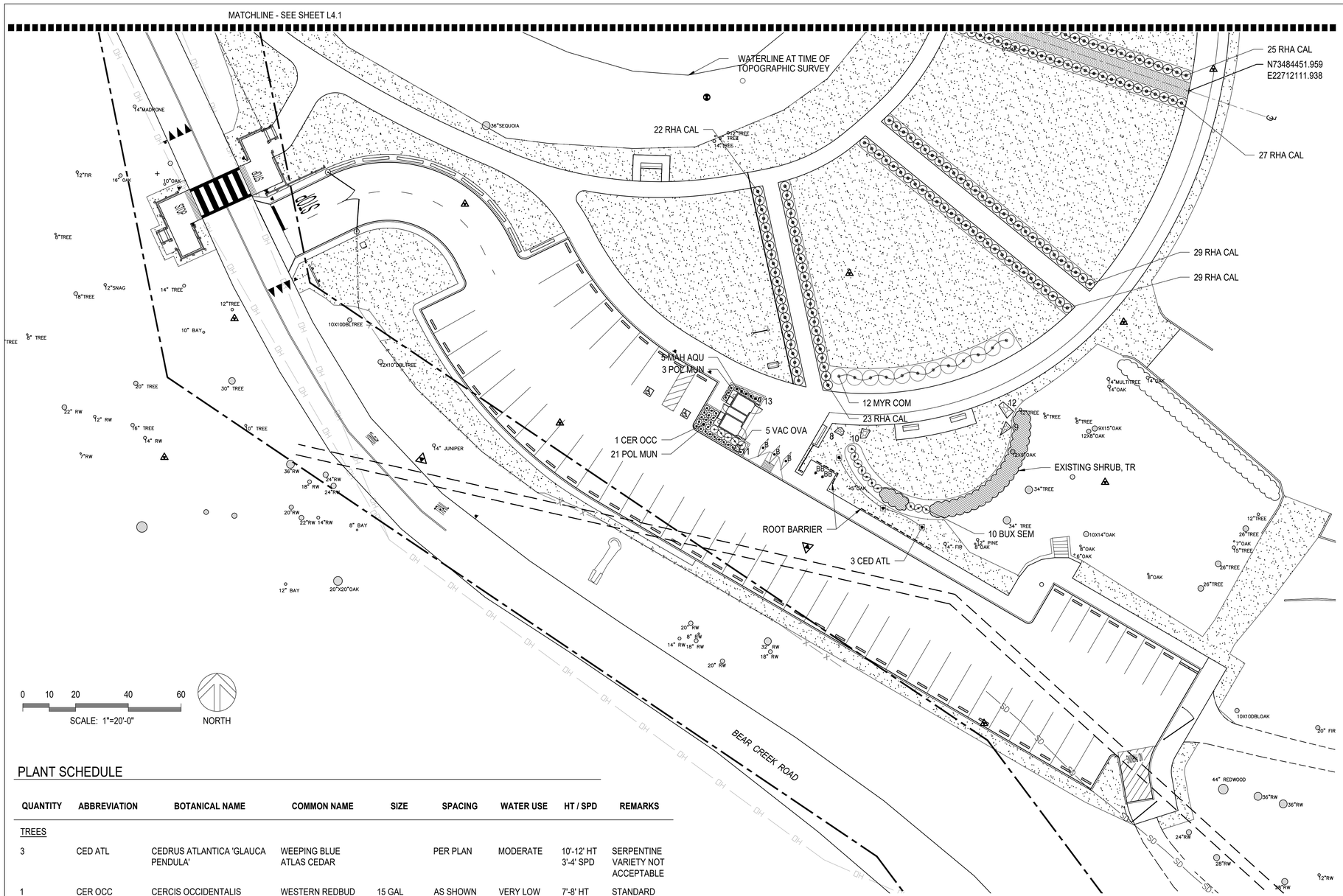
PLANTING PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04
Sheet Number : L4.1



0 10 20 40 60

SCALE: 1"=20'-0"

NORTH

PLANTING PLAN LEGEND

	TREE, 15 GAL	4 / L5.2
	COAST LIVE OAK TREE, FROM ACORN	
	TREE, 24 INCH BOX	4 / L5.2
	EXISTING TREE TO REMAIN	
	GRASSLAND TYPE A - FROM SEED SEE SCHEDULE	
	GRASSLAND TYPE B - NATIVE MOW FREE BY PACIFIC COAST SEED COMPANY	
	SHRUBS	5 / L5.2
	ROOT BARRIER	3 / L5.2
TYP	TYPICAL	
SF	SQUARE FOOT	

PLANTING NOTES

1. SPECIFICATIONS: SEE PLANTING SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. TOPSOIL: ALL PLANTING AREAS SHALL RECEIVE A SIX INCH LAYER OF NATIVE TOPSOIL AMENDED PER SPECIFICATION, INCLUDING ALL AREAS TO BE SEEDED.
3. TREES: ALL TREES SHALL HAVE STRAIGHT TRUNKS OF UNIFORM TAPER, LARGER AT THE BOTTOM. TRUNKS SHALL BE FREE OF DAMAGED BARK, WITH ALL MINOR ABRASIONS AND CUTS SHOWING HEALING TISSUE. SUCKER BASAL GROWTH AND SUCKER LATERAL GROWTH SHALL BE REMOVED AND TREATED TO ELIMINATE RESPROUTING. NORMAL LOWER SIDE BRANCHING SHALL REMAIN. TREES UNABLE TO SUPPORT THEMSELVES WITHOUT STAKING SHALL BE REJECTED.
4. PROTECTION OF PLANTS: CONTRACTOR SHALL MAINTAIN ALL PLANT MATERIAL IN A HEALTHY GROWING CONDITION PRIOR TO AND DURING PLANTING OPERATIONS.
5. ROOT BARRIER: INSTALL TO DIMENSIONS SHOWN. WHERE NO DIMENSION IS SHOWN, PROVIDE 10' MIN. LENGTH CENTERED ON TREE.
6. BASINS: CONSTRUCT BASINS AS NECESSARY TO WATER PLANTS. BASINS FOR PLANTS TO BE HAND WATERED SHALL REMAIN IN PLACE. BASIN BOTTOMS SHALL DRAIN TO BERM AWAY FROM PLANT STEM.
7. MULCH: INSTALL A 3 INCH DEEP LAYER OF MULCH PER SPECIFICATIONS THROUGHOUT ALL SHRUB PLANTING AREAS; TAPER TO ADJACENT GRADE AT EDGES. SEE DETAIL 7, SHEET 5.2.
8. QUALITY: MINIMUM QUALITY OF ALL PLANT MATERIAL SHALL CONFORM TO PREVAILING PUBLISHED SPECIFICATIONS OF THE CALIFORNIA ASSOCIATION OF NURSERYMEN AND THE AMERICAN ASSOCIATION OF NURSERYMEN UNLESS OTHERWISE INDICATED. ADDITIONAL SPECIFICATIONS SHALL BE AS INDICATED ON THE DRAWINGS. ALL CONTAINER-GROWN STOCK SHALL BE GROWN IN ITS CONTAINER FOR AT LEAST SIX MONTHS PRIOR TO ITS PLANTING. CONTRACTOR SHALL ALLOW 1% OF THE QUANTITY OF PLANTS FOR REMOVAL AND INSPECTION. FOLIAGE, ROOTS, AND STEMS OF ALL PLANTS SHALL BE OF VIGOROUS HEALTH AND NORMAL HABIT OF GROWTH FOR ITS SPECIES. ALL PLANTS SHALL BE FREE OF DISEASES, INSECT STAGES, BURNS OR DISFIGURING CHARACTERISTICS.
9. QUANTITIES: THE QUANTITIES SHOWN ON THE PLANT LIST AND IN LABELS ARE FOR THE LANDSCAPE ARCHITECT'S USE AND ARE NOT TO BE CONSTRUED AS THE COMPLETE AND ACCURATE LIMITS OF THE CONTRACT. CONTRACTOR SHALL FURNISH AND INSTALL ALL PLANTS SHOWN SCHEMATICALLY ON THE DRAWINGS.
10. SOILS TESTING: SEE SPECIFICATIONS FOR REQUIRED TESTING OF TOPSOIL AND AMENDMENTS.
11. DO NOT APPLY SEEDING TO AREAS BENEATH SHRUBS.

PLANT SCHEDULE

QUANTITY	ABBREVIATION	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	WATER USE	HT / SPD	REMARKS
TREES								
3	CED ATL	CEDRUS ATLANTICA 'GLAUCA PENDULA'	WEEPING BLUE ATLAS CEDAR		PER PLAN	MODERATE	10'-12' HT 3'-4' SPD	SERPENTINE VARIETY NOT ACCEPTABLE
1	CER OCC	CERCIS OCCIDENTALIS	WESTERN REDBUD	15 GAL	AS SHOWN	VERY LOW	7'-8' HT 2'-3' SPD	STANDARD
5	QUE AGR	QUERCUS AGRIFOLIA	COAST LIVE OAK	ACORN	PER PLAN	VERY LOW	-	
7	SEQ SOQ	SEQUOIA SEMPERVIRENS 'SOQUEL'	COAST REDWOOD	15 GAL	PER PLAN	LOW / MODERATE	6'-7' HT 2'-3' SPD	

QUANTITY	ABBREVIATION	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	WATER USE
SHRUBS						
10	BUX SEM	BUXUS SEMPERVIRENS 'SUFFRUTICOSA'	TRUE DWARF BOXWOOD	5 GAL	3'-0" OC	MODERATE
5	MAH AQU	MAHONIA AQUIFOLIUM 'COMPACTA'	OREGON GRAPE	1 GAL	2'-0" OC	MODERATE
12	MYR COM	MYRTUS COMMUNIS	TRUE MYRTLE	15 GAL	6'-0" OC	MODERATE
24	POL MUN	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	1 GAL	2'-0" OC	MODERATE
189	RHA CAL	RHAMNUS CALIFORNICA 'EVE CASE'	COFFEE BERRY	5 GAL	3'-6" OC	LOW
5	VAC OVA	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	1 GAL	2'-0" OC	MODERATE

GRASSLAND TYPE A - SEED MIX

BOTANICAL NAME	COMMON NAME	APPLICATION RATE BROADCAST SEED PLS SEED (LBS/ACRE)
BROMUS CARINATUS	CALIFORNIA BROME	16
ELYMUS GLAUCUS	BLUE WILD RYE	16
STIPA PULCHRA	PURPLE NEEDLE GRASS	8
TOTAL LBS PER ACRE		40

NOTE: SEED TO BE PROVIDED BY DISTRICT AND INSTALLED BY CONTRACTOR

1

LANDSCAPE AREA

TYPE	TOTAL (SF)
GRASSLAND TYPE A	56,205
GRASSLAND TYPE B	931
SHRUBS	3,553
TOTAL SF OF LANDSCAPE AREA	60,689

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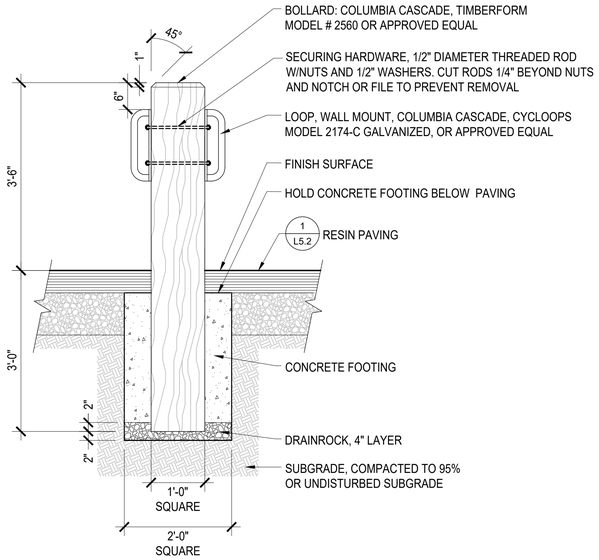
WILLIAM S. HARRIS 2408
08-31-18
STATE OF CALIFORNIA

Drawn by : ZD
Checked by : BH
Drawing Title :

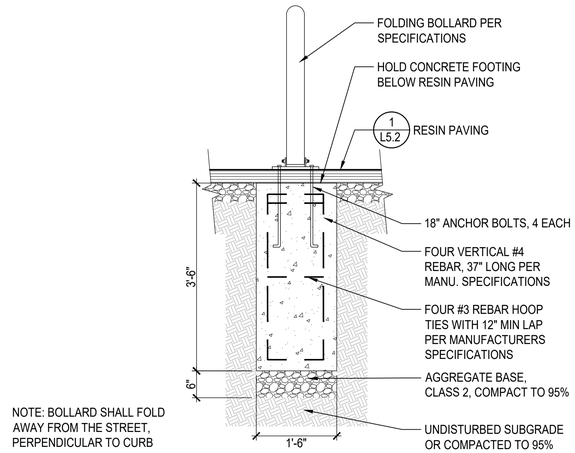
PLANTING PLAN

Date : 02/02/18
Scale : 1" = 20'-0"
Project Number : 16.04
Sheet Number : L4.2



1 BICYCLE PARKING BOLLARD

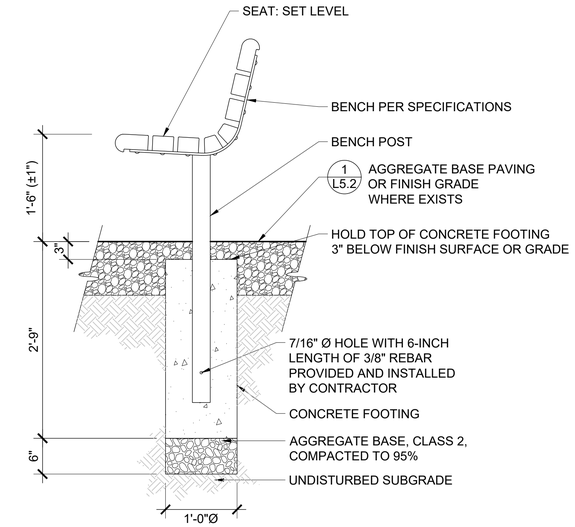
SCALE: 3/4"=1'-0"



NOTE: BOLLARD SHALL FOLD
AWAY FROM THE STREET,
PERPENDICULAR TO CURB

2 FOLDING BOLLARD

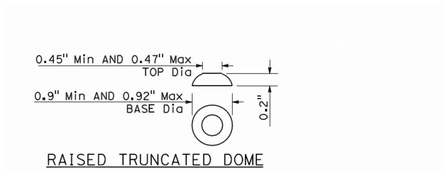
SCALE: 3/4"=1'-0"



3 BENCH

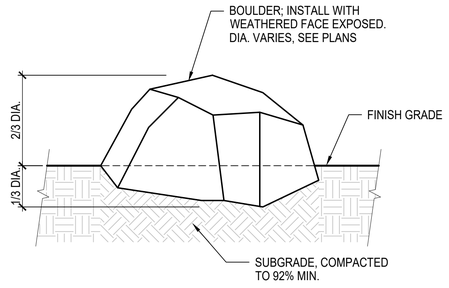
SCALE: 1"=1'-0"

1



4 TRUNCATED DOME PER STANDARD PLAN A88A

SCALE: N.T.S.



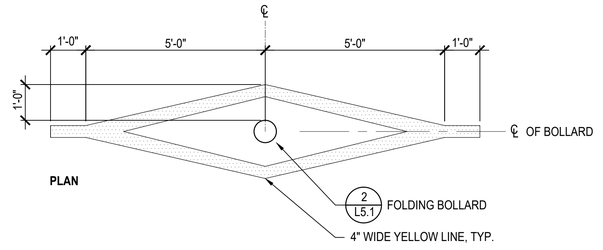
SECTION

NOTE:

INSTALL EXISTING BOULDERS TO BE RELOCATED IN SAME POSITION & TO SAME DEPTH AS EXISTING.

5 BOULDER PLACEMENT

SCALE: 1"=1'-0"



6 BOLLARD STRIPING

SCALE: 1/2"=1'-0"

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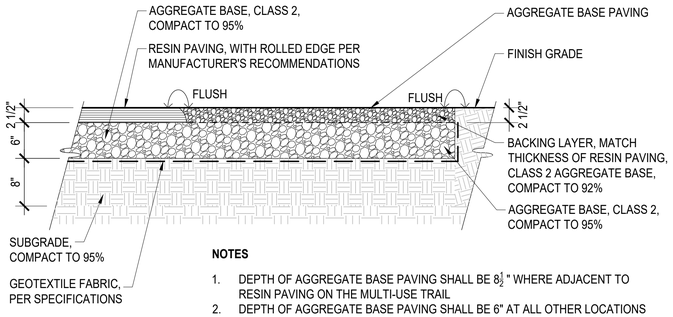
LICENSED LANDSCAPE ARCHITECT
WILLIAM S. HARRIS 2978
08-31-18
STATE OF CALIFORNIA

Drawn by : ZD
Checked by : BH
Drawing Title :

LANDSCAPE CONSTRUCTION DETAILS

Date : 02/02/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : L5.1



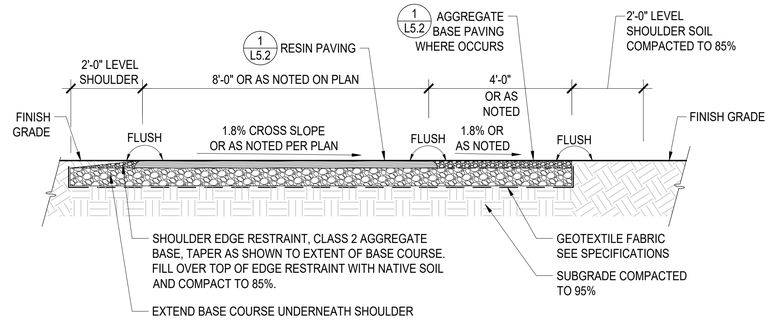
SECTION

NOTES

1. DEPTH OF AGGREGATE BASE PAVING SHALL BE 8½ " WHERE ADJACENT TO RESIN PAVING ON THE MULTI-USE TRAIL
2. DEPTH OF AGGREGATE BASE PAVING SHALL BE 6" AT ALL OTHER LOCATIONS
3. PROVIDE GEOTEXTILE FABRIC BENEATH ALL AGGREGATE BASE PAVING
4. EXCAVATE FULL PAVEMENT SECTION INCLUDING SHOULDERS INTO SUBGRADE AFTER 95% COMPACTION HAS BEEN APPROVED.
5. ALL RESIN PAVING AND AGGREGATE BASE PAVING SHALL HAVE NEAT, STRAIGHT EDGES WHERE IT MEETS ADJACENT GRADE.
6. RESIN PAVEMENT ABUTTING BICYCLE BOLLARDS, FOLDING BOLLARDS AND OTHER SITE IMPROVEMENTS ALONG EDGES OF PATH SHALL BE HAND COMPACTED TO ACHIEVE SPECIFIED COMPACTION AND CONSISTENT SURFACE, TYP.

1 RESIN PAVING / AGGREGATE BASE PAVING

SCALE: 1'=1'-0"



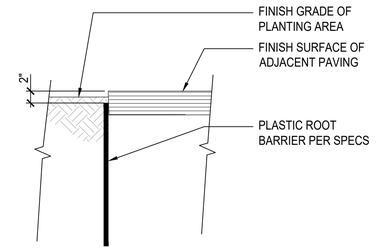
SECTION

NOTE:

1. SEE DETAIL 1 SHEET L5.2 FOR NOTES AND ADDITIONAL INFORMATION.

2 MULTI-USE TRAIL

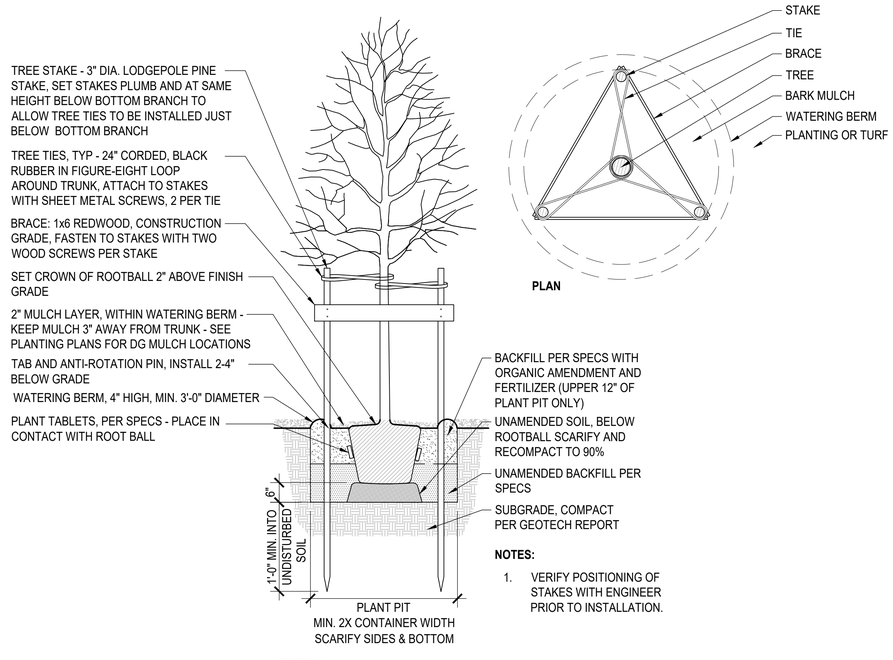
SCALE: 1/2" = 1'-0"



SECTION

3 ROOT BARRIER

SCALE: 1" = 1'-0"



PLAN

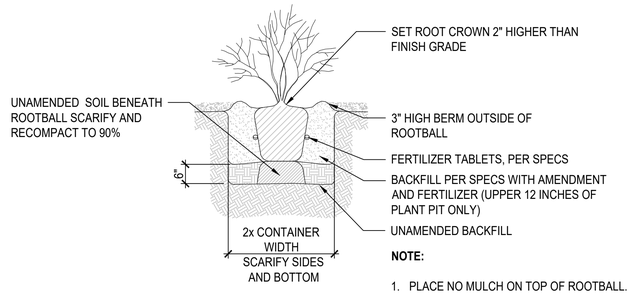
SECTION

NOTES:

1. VERIFY POSITIONING OF STAKES WITH ENGINEER PRIOR TO INSTALLATION.

4 TREE PLANTING

SCALE: N.T.S.

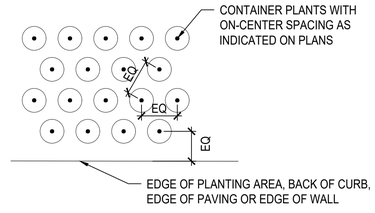


NOTE:

1. PLACE NO MULCH ON TOP OF ROOTBALL.

5 SHRUB PLANTING

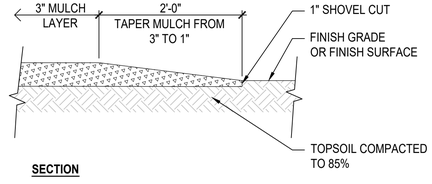
SCALE: N.T.S.



TRIANGULAR SPACING DIAGRAM

6 SHRUB & GROUNDCOVER SPACING

SCALE: N.T.S.



SECTION

7 MULCH

SCALE: 1" = 1'-0"

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WILLIAM S. HARRIS #2978
STATE OF CALIFORNIA
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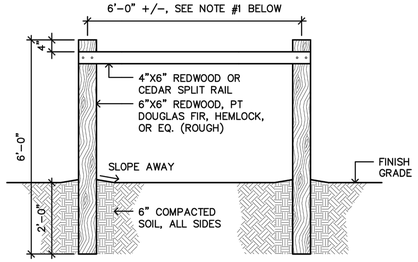
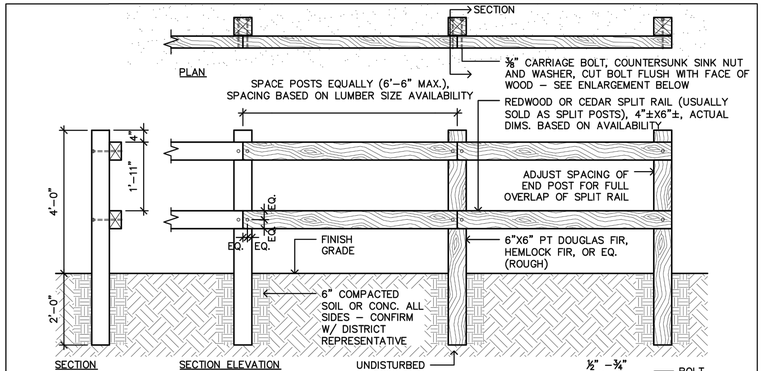


NOTES:
1. IN AREAS OF HIGH USE, E.G. SURROUNDING PARKING AREAS, ETC., SPLIT RAIL SHALL BE USED.

HORSE HITCHING POST

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT	SCALE: 1" = 1'-0"	DATE: 11/17/2011

1 HORSE HITCHING POST
SCALE: 1/2"=1'-0"

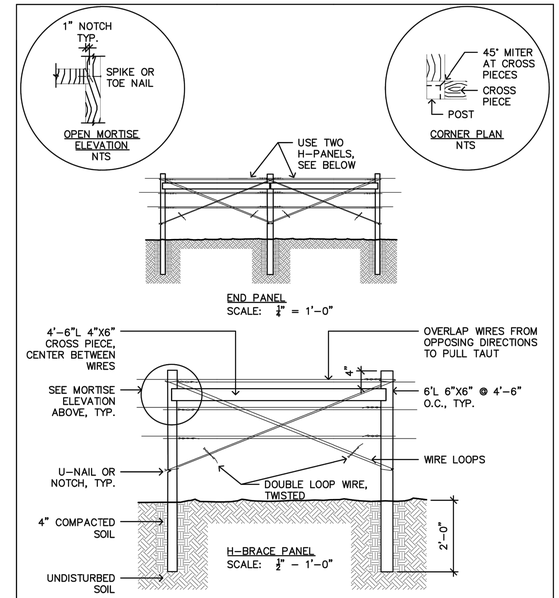


NOTES:
1. LUMBER AVAILABLE FROM BIG CREEK LUMBER (831-457-5042) OR EQ.
2. INSTALL ALL POSTS PLUMB. LOCATE ANY ADJACENT UNDERGROUND UTILITIES PRIOR TO EXCAVATING POST HOLES TO AVOID DAMAGE.
3. SPLICE RAILS ON CENTERLINE OF POST ONLY. FACE RAILS OUTWARDS (TOWARDS ROAD OR TRAIL).
4. POST MATERIAL TO BE CONSISTENT THROUGHOUT PROJECT.
5. IF W/IN 50' OF ORDINARY HIGH WATER LEVEL (AS DETERMINED BY DISTRICT REPRESENTATIVE), POSTS SHALL BE REDWOOD OR EQUIVALENT NON-PT MATERIAL.
6. PT LEVEL AS APPROPRIATE FOR UNDERGROUND APPLICATION.

FENCE - DOUBLE SPLIT RAIL FENCE

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT	SCALE: 1/2" = 1'-0"	DATE: 11/17/2011

2 FENCE - DOUBLE SPLIT RAIL FENCE
SCALE: 1/2" = 1'-0"

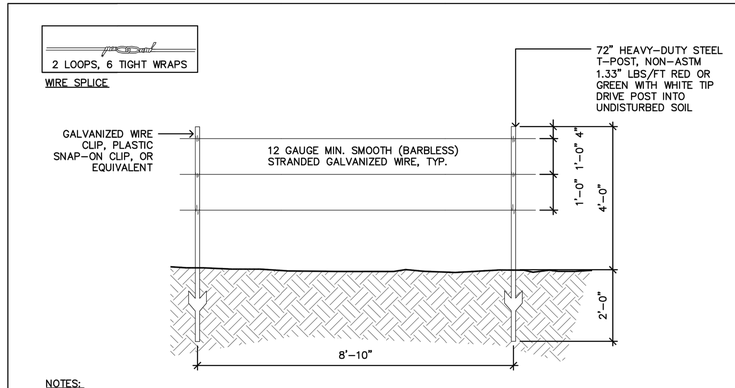


NOTES:
1. SEE WIRE BARRIER DETAIL FOR POST TYPE, WIRE TYPE AND SPACING, AND SPLICE DETAIL..
2. ALL LUMBER TO BE PT DOUGLAS FIR, HEMLOCK FIR, OR EQ. (ROUGH).
3. AT CORNERS 135° OR LESS, INSTALL TWO (2) H-BRACE PANELS, SIMILAR TO END PANEL SHOWN ABOVE. MITER CROSS PIECE AS SHOWN IN PLAN, ABOVE.

WIRE BARRIER FENCE BRACING, END, AND CORNER

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT	SCALE: 1" = 1'-0"	DATE: 12/06/2011

3 WIRE BARRIER FENCE BRACING, END, AND CORNER
SCALE: 1/2"=1'-0"

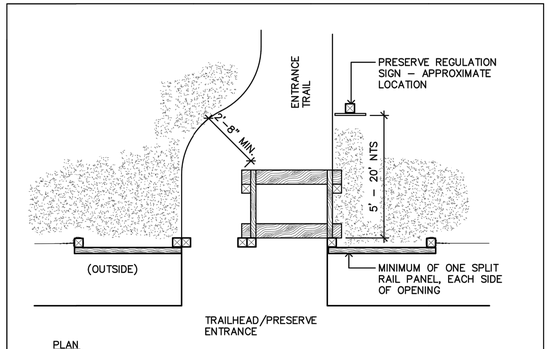


NOTES:
1. SET ALL POSTS PLUMB.
2. STRING WIRE TAUT. STRING WIRE FROM BOTTOM.
3. FOR AREAS WHERE SLOPE IS >45%, USE 84" STEEL T-POST AND DRIVE 6" INTO SOIL.
4. USE 72"L 6"X6" PT DOUGLAS FIR, HEMLOCK FIR, OR EQ. (ROUGH) INSTEAD OF T-POST WHERE MINOR GRADE CHANGES ARE CLOSE TOGETHER, WHERE MORE SUPPORT IS NEEDED TO STRING WIRE TAUT, OR AT LONG STRAIGHT RUNS. LOOP WIRE AT POST OR STAPLE.
5. USE H-BRACE PANEL AT SIGNIFICANT GRADE CHANGES, OR CHANGES OF 135° OR LESS. SEE H-BRACE, END, AND CORNER DETAIL.

WIRE BARRIER FENCE

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT	SCALE: 1/2" = 1'-0"	DATE: 11/17/11

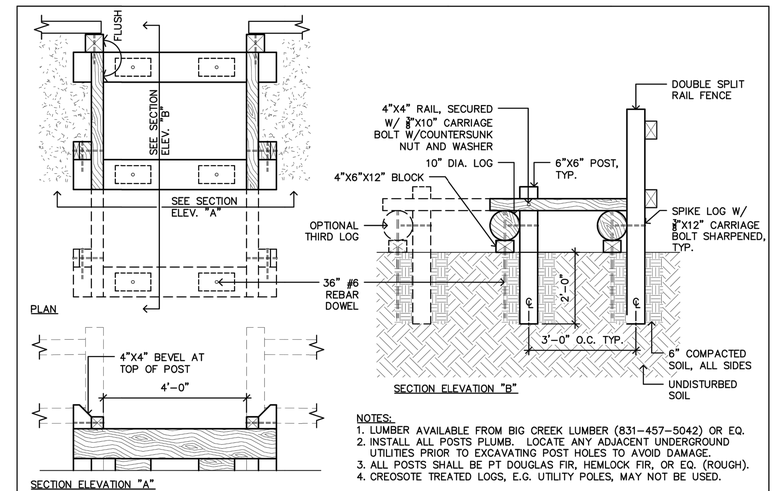
4 WIRE BARRIER FENCE
SCALE: 1/2"=1'-0"



TRAILHEAD/PRESERVE ENTRANCE TYPE 3

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT	SCALE: 1/4" = 1'-0"	DATE: 11/17/2011

5 TRAILHEAD/PRESERVE ENTRANCE TYPE 3
SCALE: 1/4"=1'-0"



NOTES:
1. LUMBER AVAILABLE FROM BIG CREEK LUMBER (831-457-5042) OR EQ.
2. INSTALL ALL POSTS PLUMB. LOCATE ANY ADJACENT UNDERGROUND UTILITIES PRIOR TO EXCAVATING POST HOLES TO AVOID DAMAGE.
3. ALL POSTS SHALL BE PT DOUGLAS FIR, HEMLOCK FIR, OR EQ. (ROUGH).
4. CREOSOTE TREATED LOGS, E.G. UTILITY POLES, MAY NOT BE USED.

LOG BARRIER STILE

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT	SCALE: 1/2" = 1'-0"	DATE: 05/15/2012

6 LOG BARRIER STILE
SCALE: 1/2"=1'-0"

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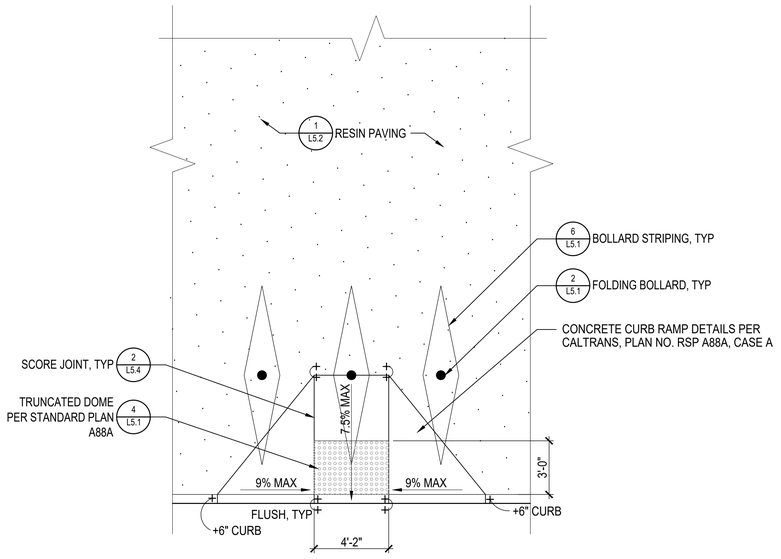
Issued for	Rev Date	Appr
50% CD	6/16/17	BH
90% CD	10/10/17	BH
100% CD	02/02/18	BH

Seals and Signatures

Drawn by : ZD
Checked by : BH
Drawing Title :

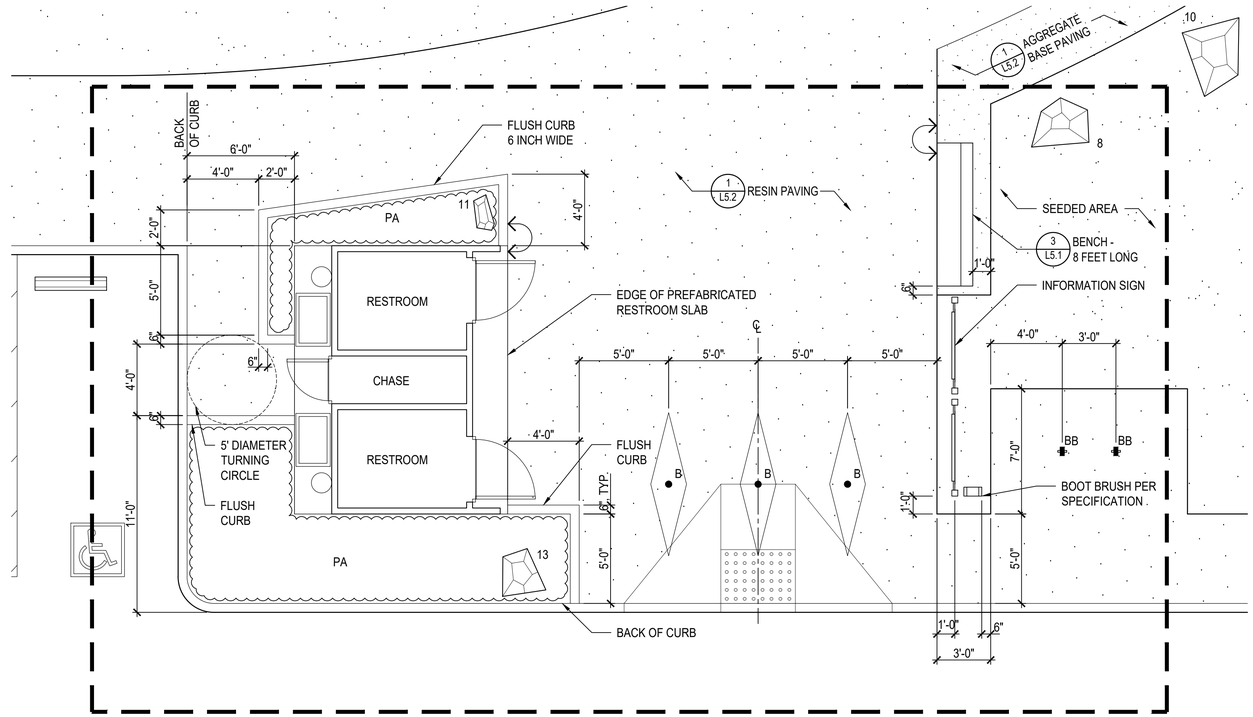
LANDSCAPE CONSTRUCTION DETAILS

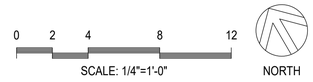
Date : 02/02/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : L5.3



1 CURB RAMP

SCALE: 1/4"=1'-0"





LAYOUT LEGEND

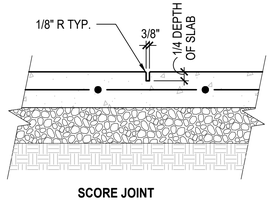
	ALIGN	EQ	EQUAL
BB	BICYCLE BOLLARD PER SPECIFICATIONS	PA	PLANTING AREA
B	FOLDING BOLLARD — 2 L5.1	TYP	TYPICAL

LAYOUT NOTES

1. SEE SHEET L3, LAYOUT PLAN FOR LAYOUT NOTES.

3 TRAILHEAD LAYOUT PLAN

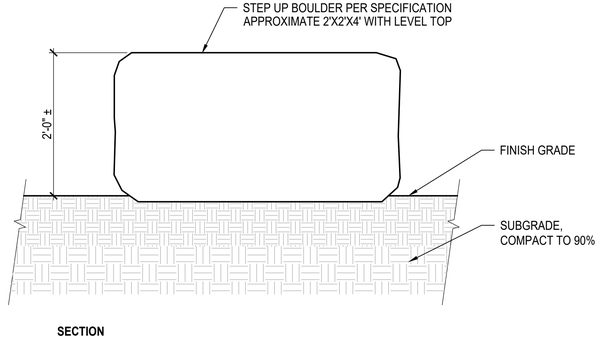
SCALE: 1/4"=1'-0"



SCORE JOINT

2 SCORE JOINT

SCALE: 1-1/2"=1'-0"



SECTION

4 STEP UP BOULDER

SCALE: 1"=1'-0"

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100% CD		02/02/18	BH

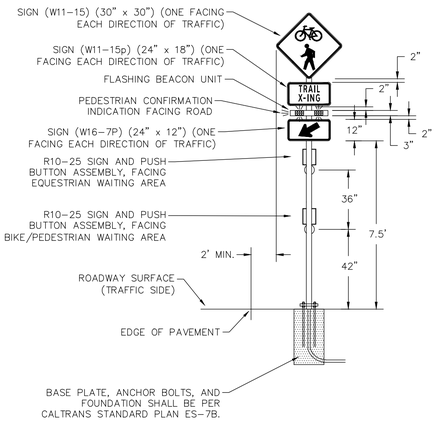
Seals and Signatures

LICENSED LANDSCAPE ARCHITECT
WILLIAM S. HARRIS #428
STATE OF CALIFORNIA
08-31-18

Drawn by : ZD
Checked by : BH
Drawing Title :

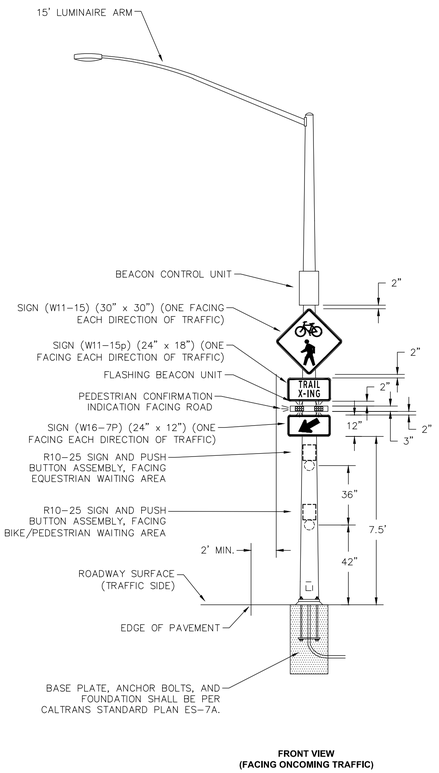
LANDSCAPE CONSTRUCTION DETAILS

Date : 02/02/18
Scale : AS SHOWN
Project Number : 16.04
Sheet Number : L5.4



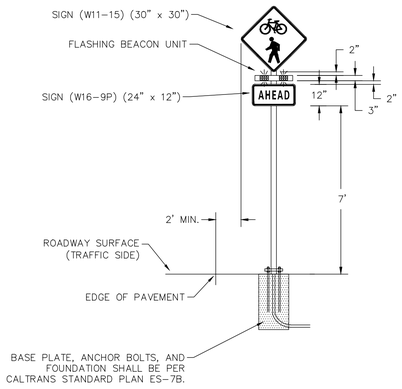
FRONT VIEW
(FACING ONCOMING TRAFFIC)

DETAIL 1:
RECTANGULAR RAPID FLASHING BEACON (RRFB) SYSTEM INSTALLATION AND RRFB ARRANGEMENT – TYPE 1B POLE
NOT TO SCALE



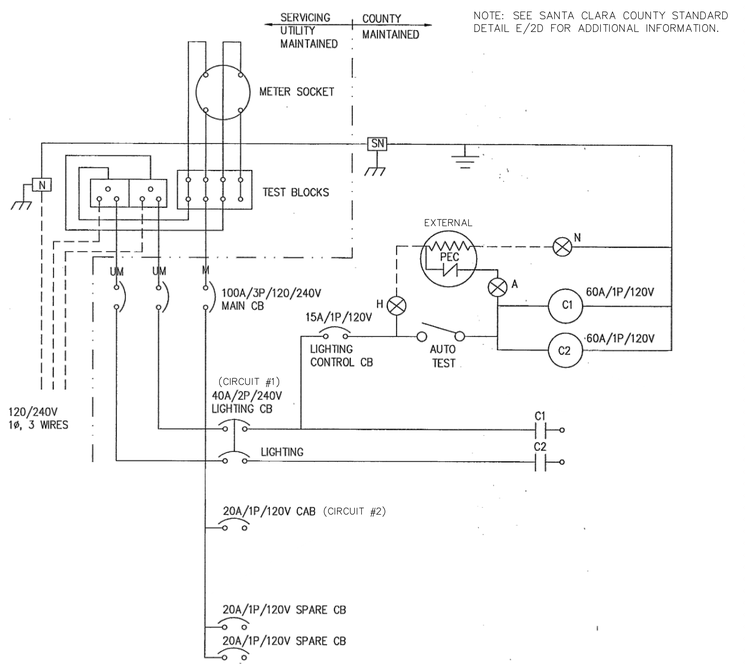
FRONT VIEW
(FACING ONCOMING TRAFFIC)

DETAIL 2:
RECTANGULAR RAPID FLASHING BEACON (RRFB) SYSTEM INSTALLATION AND RRFB ARRANGEMENT – TYPE 15TS POLE
NOT TO SCALE



FRONT VIEW
(FACING ONCOMING TRAFFIC)

DETAIL 3:
RECTANGULAR RAPID FLASHING BEACON (RRFB) SYSTEM INSTALLATION AND RRFB ARRANGEMENT – ADVANCE WARNING ASSEMBLY
NOT TO SCALE



DETAIL 4:
SERVICE WIRING DIAGRAM: 100A, 120/240V, 3-WIRE, SINGLE-PHASE PANEL
NO SCALE

GENERAL ELECTRICAL NOTES:

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE 2015 STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) STANDARD PLANS AND STANDARD SPECIFICATIONS, ANY SUBSEQUENT STANDARD PLANS AND STANDARD SPECIFICATIONS REVISIONS ADOPTED BY CALTRANS, AND APPLICABLE SANTA CLARA COUNTY STANDARD DRAWINGS.
2. REFER TO CALTRANS STANDARD PLAN RSP ES-1A, RSP ES-1B, RSP ES-1C, AND THE LEGEND ON SHEET E-2 FOR SIGNAL, LIGHTING, AND ELECTRICAL SYMBOLS AND ABBREVIATIONS.
3. LOCATIONS OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS AND VERIFY ALL CONDITIONS ON THE JOB SITE AND PROTECT UTILITIES TO REMAIN. HAND DIG TO DETERMINE EXACT UTILITY LOCATIONS AS REQUIRED FOR FOUNDATIONS UNTIL CLEAR OF OBSTRUCTIONS. CALL UNDERGROUND SERVICE ALERT AT (800) 227-2600 PRIOR TO ANY EXCAVATION.
4. ALL EQUIPMENT IS SHOWN IN APPROXIMATE LOCATIONS ONLY. OBTAIN COUNTY ENGINEER APPROVAL FOR EXACT EQUIPMENT LOCATIONS PRIOR TO FINAL PLACEMENT. COORDINATE WITH ENGINEER ON EXACT PLACEMENT OF SIGNAL STANDARDS. PLACEMENT SHALL OCCUR AFTER CONTRACTOR HAS DETERMINED EXACT LOCATION OF ALL UTILITIES. THE CONTRACTOR SHALL GIVE 48 HOURS NOTICE TO THE ENGINEER FOR VERIFICATION OF EQUIPMENT LOCATIONS.
5. ALL PEDESTRIAN PUSH BUTTONS (PPB's) SHALL BE POLARA BULLDOG, OR APPROVED EQUAL. PPBs SHALL BE INSTALLED SUCH THAT THE CENTER OF THE PPB IS 42 INCHES ABOVE THE SURFACE WHERE A PERSON WOULD BE LOCATED TO ACTUATE THE SIGNAL. THE SECONDARY PUSH BUTTON FOR EQUESTRIANS SHALL BE MOUNTED 36" ABOVE THE LOWER BUTTON. ALL PPB DEVICES SHALL BE APPROVED BY THE COUNTY PRIOR TO PURCHASE AND INSTALLATION.
6. A LIST OF MATERIALS PROPOSED BY THE CONTRACTOR TO BE USED ON THIS WORK FOR ELECTRICAL EQUIPMENT SHALL BE SUBMITTED TO THE COUNTY ENGINEER FOR APPROVAL PRIOR TO THE START OF WORK. THE LIST SHALL INCLUDE MANUFACTURER'S SPECIFICATIONS FOR ALL APPLICABLE PRODUCTS.
7. EXISTING PAVEMENT STRIPING, MARKINGS, AND MARKERS THAT ARE NOT TO BE REMOVED SHALL BE PROTECTED BY THE CONTRACTOR. ANY STRIPING, MARKINGS, OR MARKERS THAT ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THE ORIGINAL CONDITION AT THE CONTRACTOR'S SOLE EXPENSE.
8. COUNTY ENGINEER OR REPRESENTATIVE SHALL BE PRESENT DURING INITIAL SYSTEM ACTIVATION.

BID SET
FEBRUARY 2018
NOT FOR CONSTRUCTION

Midpeninsula Regional Open Space District

Alma College Parking Area and Trailhead

Bear Creek Redwoods Open Space Preserve
Santa Clara County, CA

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100% CD		2-2-18	

Seals and Signatures

REGISTERED PROFESSIONAL ENGINEER — JEFFREY A. ELIA — C 68719 — EXP. 9/30/19 — CIVIL — STATE OF CALIFORNIA — 2/2/18

Drawn by : T. CHANG
Checked by : J. ELIA

Drawing Title :
RRFB Crosswalk System Installation Notes and Details

Date : 2/2/18
Scale : 1" = 20'
Project Number : 15GB14

Sheet Number : 1 OF 3

E-1

PROJECT NOTES (THIS SHEET ONLY):

1. FURNISH AND INSTALL A TYPE III–AF SERVICE EQUIPMENT ENCLOSURE PER SCC STANDARD DETAIL E/2D. PHOTOELECTRIC CONTROL UNIT SHALL BE EXTERNAL TO ENCLOSURE. SEE DETAIL 4, SHEET E–1, FOR SERVICE WIRING DIAGRAM.

   MAXIMUM LOAD:
   CIRCUIT #1 – 165 WATTS – LED SAFETY LIGHTING LUMINAIRE (UNMETERED)
   CIRCUIT #2 – 50 WATTS – FLASHING BEACON SYSTEM (METERED)

2. FURNISH AND INSTALL 14.5' MINIMUM CALTRANS TYPE 1–B SIGNAL POLE WITH TWO (2) RRFB UNITS, TWO (2) 30"X30" W11–15 WARNING SIGNS, TWO (2) 24"X18" W11–15p PLAQUES, TWO (2) 24"x12" W16–7P (DIAGONAL DOWNWARD ARROW) PLAQUES, AND TWO (2) PUSH BUTTONS. FLASHING BEACONS SHALL BE INSTALLED FOLLOWING THE RECOMMENDATIONS FROM THE SYSTEM MANUFACTURER. COLOR OF FLASHING BEACON UNIT HOUSING SHALL BE YELLOW. SEE DETAIL 1, SHEET E–1.

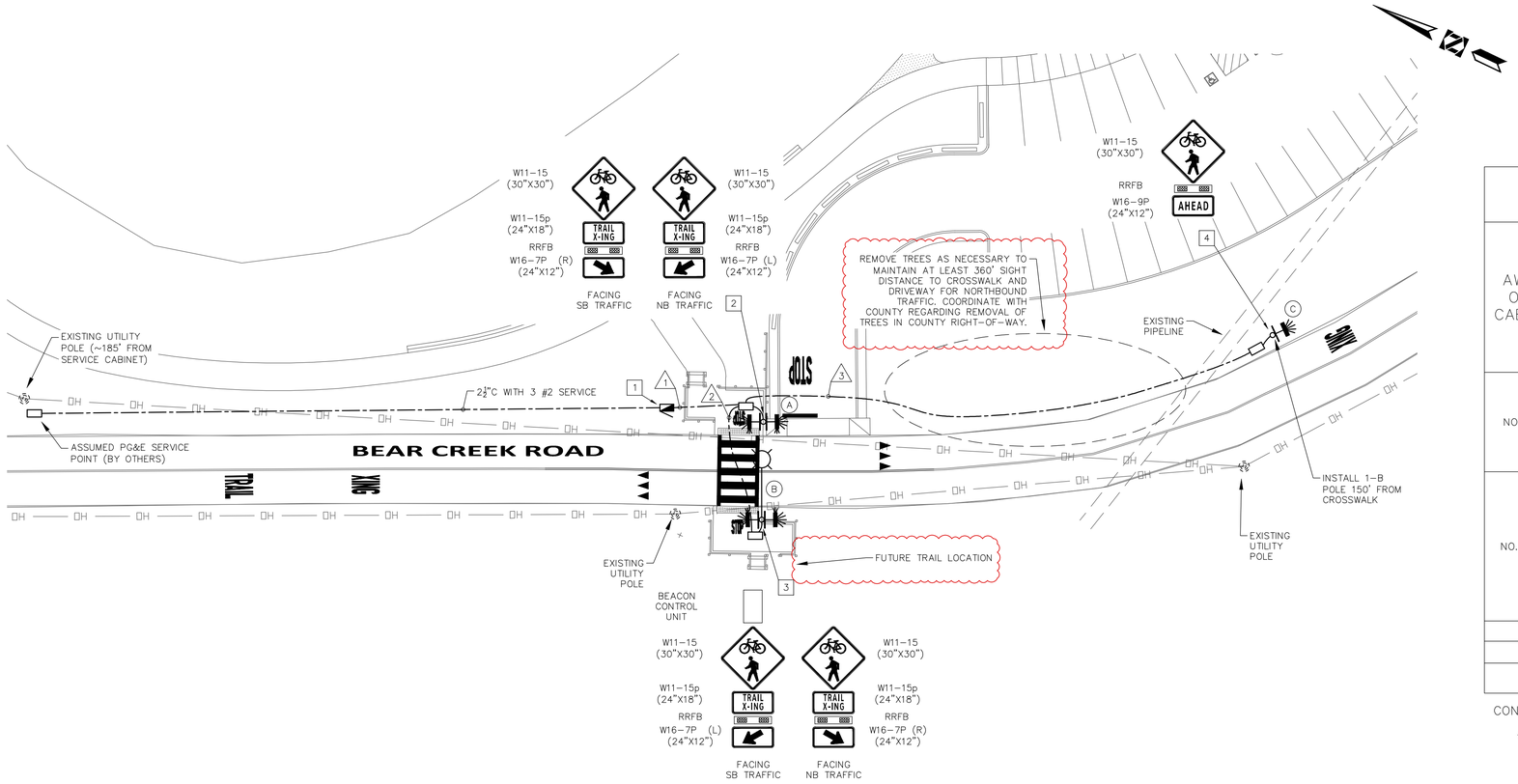
3. FURNISH AND INSTALL TYPE 15TS SIGNAL POLE WITH POLE–TOP PEU UNIT, TWO (2) RRFB UNITS, BEACON CONTROL UNIT, TWO (2) 30"X30" W11–15 WARNING SIGNS, TWO (2) 24"x18" W11–15p PLAQUES, TWO (2) 24"x12" W16–7P (DIAGONAL DOWNWARD ARROW) PLAQUES, AND TWO (2) PUSH BUTTONS. FLASHING BEACONS SHALL BE INSTALLED FOLLOWING THE RECOMMENDATIONS FROM THE SYSTEM MANUFACTURER. COLOR OF FLASHING BEACON UNIT HOUSING SHALL BE YELLOW. SEE DETAIL 2, SHEET E–1. VERIFY HEIGHT OF OVERHEAD LINES BEFORE ORDERING SIGNAL POLE.

4. FURNISH AND INSTALL 12.5' MINIMUM CALTRANS TYPE 1–B SIGNAL POLE WITH RRFB UNIT, 30"X30" W11–15 WARNING SIGN, AND 24"x12" W16–9P ("AHEAD") PLAQUE. FLASHING BEACON SHALL BE INSTALLED FOLLOWING THE RECOMMENDATIONS FROM THE SYSTEM MANUFACTURER. COLOR OF FLASHING BEACON UNIT HOUSING SHALL BE YELLOW. SEE DETAIL 3, SHEET E–1.

POLE AND EQUIPMENT SCHEDULE*

LOCATION	STANDARD TYPE	STANDARD SIGNAL MAST ARM	STANDARD LUMINAIRE MAST ARM	VEHICLE SIGNAL MOUNTING MAST ARM	VEHICLE SIGNAL MOUNTING POLE	PED SIGNAL MOUNTING	PPB Ø	PPB ARROW	LUMINAIRE (WATTS)	SPECIAL REQUIREMENTS**
A	1–B (14.5')						N/A	→		INSTALL BI–DIRECTIONAL AC POWERED RRFBs*** ON POLE. INSTALL TWO PUSH BUTTON UNITS ON POLE WITH R10–25. INSTALL BEACON CONTROL UNIT.
B	15TS		15'				N/A	←	LED (165)	INSTALL BI–DIRECTIONAL AC POWERED RRFBs*** ON POLE. INSTALL TWO PUSH BUTTON UNITS ON POLE WITH R10–25. INSTALL POLE–TOP PEU.
C	1–B (12.5')									INSTALL ONE–DIRECTIONAL AC POWERED RRFB*** ON POLE. RRFB SHALL FACE SOUTH.

*OTHER REQUIREMENTS ARE COVERED BY NOTES, LEGENDS, SPECIAL PROVISIONS, AND STANDARD SPECIFICATION. FOR TYPE OF STANDARD, VEHICLE AND PEDESTRIAN MOUNTINGS, SEE CALTRANS STANDARD PLANS, 2015.
**ALL EQUIPMENT IS NEW, UNLESS OTHERWISE NOTED.
***RECTANGULAR RAPID FLASHING BEACON (RRFB) SYSTEM SHALL BE CARMANAH SC315, TAPCO RRFB–XL2, OR APPROVED EQUAL. INSTALL BEACONS AND PUSH BUTTONS PER MANUFACTURER'S RECOMMENDATIONS.



CONDUCTOR SCHEDULE

AWG OR CABLE	CIRCUIT	NUMBER OF CONDUCTORS/CABLES RUN NUMBER 1	2	3
NO. 8	CONTROLLER SERVICE (120V)	2	2	
	SAFETY LIGHTING (240V)	2	2	
	EQUIPMENT GROUND (BARE CU)	1	1	1
	TOTAL NO. 14	5	5	1
NO. 14	RRFB		2	2
	NEUTRAL		1	1
	PPB		1	
	PPB COMMON		1	
	PEU	3	3	
	TOTAL NO. 14	3	8	3
CONDUIT SIZE		2"	3"	2"
NEW (N) OR EXISTING (E)		N	N	N
FOOTNOTE REFERENCE		Ⓐ	Ⓐ	Ⓐ

CONDUCTOR SCHEDULE FOOTNOTES:

Ⓐ FURNISH AND INSTALL NEW CONDUIT AND CABLES/CONDUCTORS.

GRAPHIC SCALE

20 0 10 20 40 80

1 INCH = 20 FEET

LEGEND

- BI–DIRECTIONAL RECTANGULAR RAPID FLASHING BEACONS (RRFB), AND PEDESTRIAN CROSSING SIGNS ON TYPE 1–B POLE.
- BI–DIRECTIONAL RECTANGULAR RAPID FLASHING BEACONS (RRFB), AND PEDESTRIAN CROSSING SIGNS ON TYPE 15TS POLE WITH LUMINAIRE.
- NO. 5 PULL BOX WITH GROUND ROD
- NEW CONDUIT, SIZE AS SHOWN.

BID SET
FEBRUARY 2018
NOT FOR CONSTRUCTION

CA: 1–800–227–2600
CALL BEFORE YOU DIG
USA
UNDERGROUND SERVICE ALERT
CA: 1–800–227–2600
CALL TWO WORKING DAYS BEFORE YOU DIG

- THIS PLAN IS ACCURATE FOR ELECTRICAL WORK ONLY.
- SEE SHEET E–1 FOR GENERAL ELECTRICAL NOTES AND DETAILS.

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Seals and Signatures

Drawn by : T. CHANG
Checked by : J. ELIA

Drawing Title :
RRFB Crosswalk System Installation

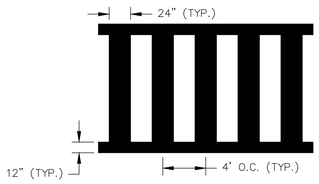
Date : 2/2/18
Scale : 1" = 20'
Project Number : 15GB14

Sheet Number : 2 OF 3

E-2

PROJECT NOTES (THIS SHEET ONLY):

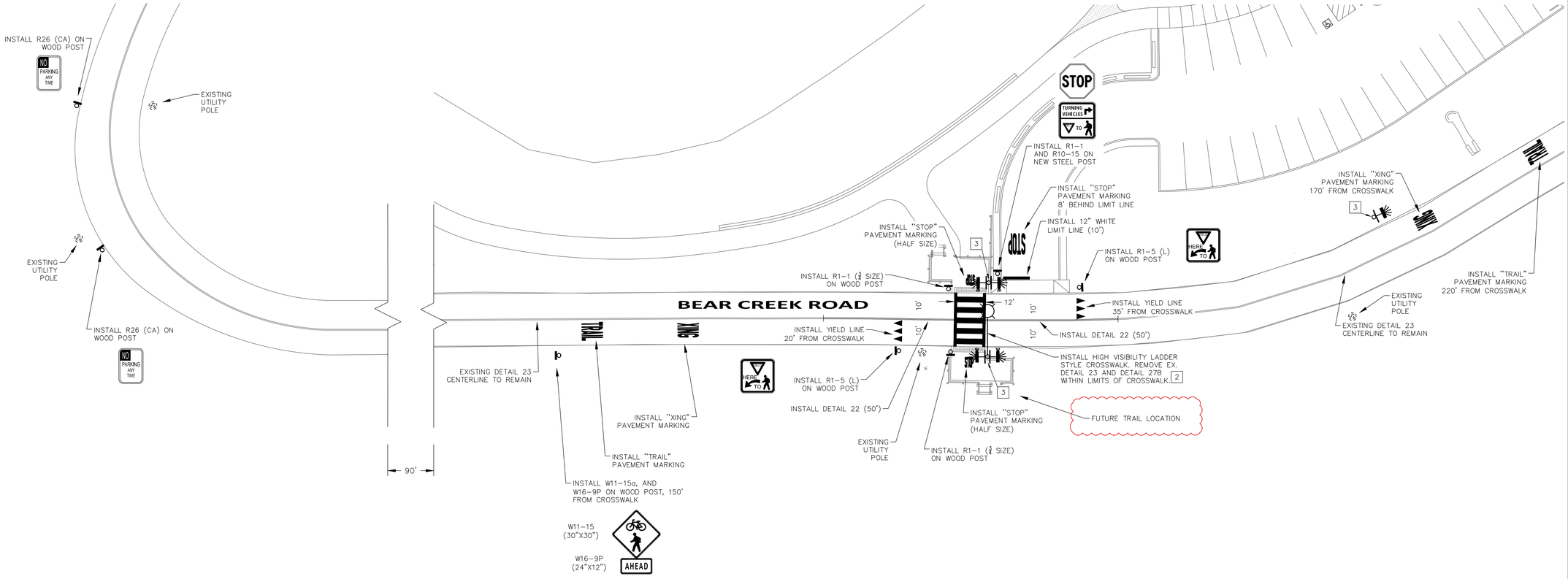
1. ALL EXISTING SIGNAGE AND STRIPING SHALL REMAIN, UNLESS OTHERWISE NOTED.
2. SEE DETAIL 1, THIS SHEET, FOR LADDER STYLE CROSSWALK STRIPING DIMENSIONS. STRIPING SHALL BE WHITE THERMOPLASTIC.
3. SEE SHEET E-2 FOR RRFB INSTALLATION AND SIGNS ON SIGNAL POLES.



DETAIL 1:
LADDER STYLE CROSSWALK
NOT TO SCALE

GENERAL SIGNING AND STRIPING NOTES:

1. ALL WORK SHALL CONFORM WITH THE LATEST REVISIONS OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA MUTCD) AND CALTRANS STANDARD PLANS AND SPECIFICATIONS.
2. ALL EXISTING SIGNS AND POSTS SHALL REMAIN, UNLESS OTHERWISE NOTED.
3. CONTRACTOR SHALL REMOVE STRIPING AND SIGNAGE THAT CONFLICTS WITH THIS PLAN.
4. ALL UTILITIES AND IMPROVEMENTS THAT BECOME DAMAGED DURING CONSTRUCTION SHALL BE COMPLETELY RESTORED BY THE CONTRACTOR TO THE SATISFACTION OF THE COUNTY.
5. LAYOUT AND CONTROL MARKS SHALL BE PLACED BY THE CONTRACTOR AND APPROVED BY THE COUNTY PRIOR TO PLACEMENT OF ANY PERMANENT STRIPING, MARKERS, OR PAVEMENT MARKINGS. 48 HOURS NOTICE MUST BE GIVEN TO THE COUNTY FOR INSPECTION OF LAYOUT AND CONTROL MARKS.
6. ALL PERMANENT STRIPING AND PAVEMENT MARKINGS TO BE THERMOPLASTIC PER CALTRANS STANDARDS AND SPECIFICATIONS.



LEGEND

- BI-DIRECTIONAL RECTANGULAR RAPID FLASHING BEACONS (RRFB), AND PEDESTRIAN CROSSING SIGNS ON TYPE 1-B POLE.
- BI-DIRECTIONAL RECTANGULAR RAPID FLASHING BEACONS (RRFB), AND PEDESTRIAN CROSSING SIGNS ON TYPE 15TS POLE WITH LUMINAIRE.
- NEW SIGN WITH POST.

- THIS PLAN IS ACCURATE FOR SIGNAGE/STRIPING WORK ONLY.
- EXISTING SIGNAGE/STRIPING IS NOT FULLY DOCUMENTED ON THIS PLAN.

CA: 1-800-227-2600 — CALL BEFORE YOU DIG — USA — UNDERGROUND SERVICE ALERT — CA: 1-800-227-2600
CALL TWO WORKING DAYS BEFORE YOU DIG

BID SET
FEBRUARY 2018
NOT FOR CONSTRUCTION

GRAPHIC SCALE
20 0 10 20 40 80
1 INCH = 20 FEET

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Seals and Signatures

REGISTERED PROFESSIONAL ENGINEER — C 68719 EXP. 9/30/19 — CIVIL — STATE OF CALIFORNIA — 2/2/18

Drawn by : T. CHANG
Checked by : J. ELIA

Drawing Title :
Crosswalk Installation Signing and Striping

Date : 2/2/18
Scale : 1" = 20'
Project Number : 15GB14

Sheet Number : 3 OF 3

SS-1

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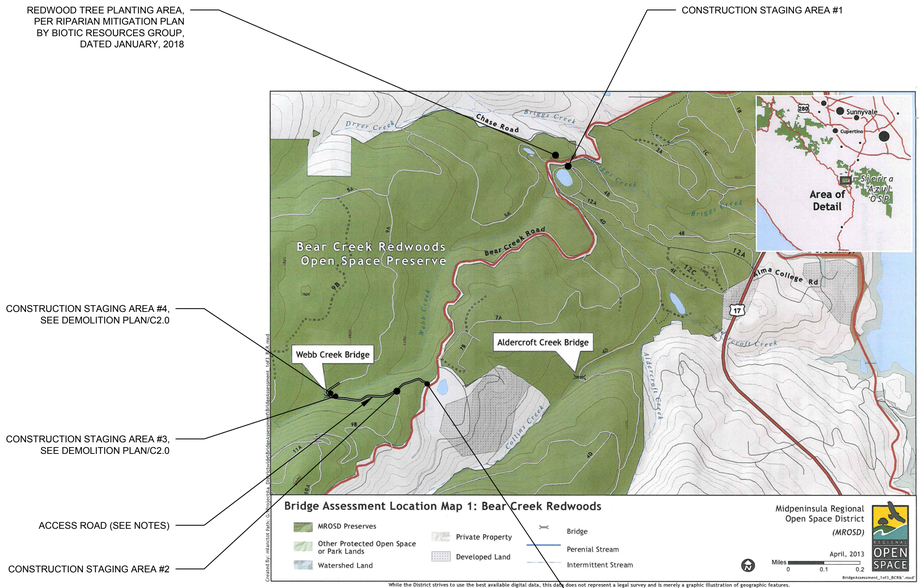
WEBB CREEK BRIDGE REPLACEMENT PROJECT

BID PLANS

Project Plans C: Webb Creek Bridge

ABBREVIATIONS

AB	Anchor Bolt	LGT	Lighting
AC	Asphalt Concrete	LL	Live load
ACI	American Concrete Institute	LS	Lag screw
AGG BASE	Aggregate Base	LT	Left
AISC	American Institute of Steel Construction	LTWT	Light weight
AITC	American Institute of Timber Construction	MANUF	Manufacturer's
APA	American Plywood Association	MAX	Maximum
APPROX	Approximately	MB	Machine Bolt
ARCH	Architect	MECH	Mechanical
ASTM	American Society for Testing & Materials	MISC	Miscellaneous
ATC	Acoustic tile ceiling	MH	Manhole
AVG	Average	MIN	Minimum
BC	Begin curve	MP	Midpoint
BG	Below grade	MTL	Metal
BLDG	Building	NG	Natural Grade
BLKG	Block(ing)	NTS	Not to Scale
BM	Bench Mark	OC	On center
BN	Boundary nailling	OCBW	On center both ways
BOT	Bottom	OD	Outside Diameter
BRC	Brace	OH	Other hand
BRG	Bearing	OPP	Opposite
BSMT	Basement	PART	Partition
BTWN	Between	PC	Point of curvature
BVC	Begin vertical curve	PCC	Portland Cement Conc
BVL	Bevel	PCR	Point of curb return
C	Channel	PI	Point of intersection
CANT	Cantilever	PIP	Poured in place
CB	Catch Basin, Carraige Bolt	PL	Property Line, Plate
CC	Center to Center	PLY	Plywood
CF	Cubic feet	PMP	Perforated metal pipe
CFM	Cubic feet per minute	PNL	Panel
CG&S	Curb, Gutter, & Sidewalk	PPVC	Perforated Polyvinyl Chloride Pipe
CI(P)	Cast Iron (Pipe)	PRCST	Precast
CJ	Construction joint or Contraction joint	PREFAB	Prefabricated
CL	Center Line	PSF	Pounds per Square Foot
CLG	Ceiling	PSI	Pounds per Square Inch
CLR	Clear, Clearance	PT	Point of tangency or Point
CMP	Corrugated metal pipe	PTDF	Pressure Treated Douglas Fir
CMU	Concrete Masonry Unit	PVC	Polyvinyl Chloride Pipe
CNTRL	Control	PVMT	Pavement
CO	Cleanout	R	Radius, Riser
COL	Column	RC	Relative Compaction
COLL	Collector	RCP	Reinforced concrete pipe
COMP PEN	Complete penetration	REINF	Reinforcement
CONC	Concrete	REM	Removal
CONN	Connection	REPL	Replace
CONT	Continuous	REQD	Required
CSK	Countersink	RET	Retaining
CTR	Center	RF(G)	Roof(ing)
CVR	Cover	RGH or RS	Rough or Rough sawn
CY	Cubic yard	RM	Room
DBL	Double	RT	Right
DEG	Degree	R/W or ROW	Right of way
DET	Detail	RWALL	Retaining Wall
DF	Douglas Fir	RWD	Redwood
DI	Drop inlet or Drainage inlet	S	Slope
DIA	Diameter	SAD	See Architectural Drawings
DIAG	Diagonal	SB	Solid backing
DIM	Dimension	SCH	Schedule
DL	Dead load	SD	Storm drain
DN	Down	SDMH	Storm Drain Manhole
DW	Driveway	SECT	Section
DWG	Drawing	SEL	Select
E	Electric	SF	Square foot
EA	Each	SHRWL	Shear wall
EB	Expansion bolt	SHT	Sheet
EC	End curve	SHTG	Sheathing
EF	Each face	SIM	Similar
EJ	Expansion joint	SK	Sack
ELECT	Electric, Electrical	SLV	Sleeve
ELEV or EL	Elevation	SM	Sheet metal
EN	Edge nailing	SP	Sheet pile
ENGR	Engineer	SPEC	Specifications
EP	Edge of pavement	SQR	Square
ES	Each side	SS	Sanitary or Sanitary Sewer
ESMT	Easement	SSMH	Sanitary Sewer Manhole
EVC	End vertical curve	SSP	Stainless steel pipe
EW	Each way	STA	Station
EX	Existing	STD	Standard
EXP	Expansion	STL	Steel
EXT	Exterior	STRUCT	Structural
FB	Flat bar	SWK	Sidewalk
FG	Finish grade	SWR	Sewer
FIN	Finish	SY	Square yard
FLD	Field	T	Ton, Tee Section
FLR	Floor	T&B	Top and Bottom
FN	Field nailing	TBM	Temporary bench mark
FND	Foundation	TC	Top of curb
FOC	Face of concrete or curb	TEL	Telephone
FOS	Face of steel or stud	TEN	Typical edge nailing
FRMG	Framing	TG	Top grate
FT	Foot or Feet	T&G	Tongue and groove
FTG	Footing	TOC	Top of concrete
G	Gas	TOS	Top of steel
GA	Gauge	TOW	Top of wall
GALV	Galvanized	TP	Top of pavement
GLB	Glulam beam	TR	Tread
GR	Grade Elevation	TS	Top slab, structural steel tube
H/C	Handicapped	TV	Television cable
HD	Holdown	TYP	Typical, UNO
HDR	Header	UG	Underground
HORIZ	Horizontal	UBC	Uniform Building Code
HP	High point	UNO	Unless noted otherwise
HT	Height	VC	Vertical curve
ID	Inside Diameter	VERT	Vertical
INT	Interior	VIF	Verify in field
INV	Invert elevation	W	Water
IP	Iron pipe	W/	With
IR	Inside radius	WC	Wheelchair
JB	Junction box	W/O	Without
JP	Joint pole	WP	Weatherproof, work point
JST(S)	Joist(s)	WWF	Welded Wire Fabric
JT	Joint	XFMR	Transformer
L	Angle	XS	Extra Strong
LA	Landscape Architect(ure)	XXS	Double Extra Strong
LB or #	Pound	YD	Yard
LD	Load		



VICINITY MAP

SCALE: NTS

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C2.0	DEMOLITION PLAN
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LEGEND

- EXISTING MAJOR CONTOUR (100)
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR (100)
- PROPOSED MINOR CONTOUR
- PROPERTY LINE
- GRADE BREAK
- FLOW LINE
- FENCE
- VEGETATION DRIPLINE
- SURVEY CONTROL LINE W/ STATIONING (1+50)
- SURVEY CONTROL POINT
- BORING HOLE/BENCHMARK
- TREE

REV:	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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STATE OF CALIFORNIA

WEBB CREEK BRIDGE REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE RESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

COVER SHEET

DRAWN BY: DM
CHECKED BY: RC
JOB NUMBER: 17109
SHEET
C0.0

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GENERAL NOTES

1. QUALIFICATIONS
The Contractor shall possess a Class "A" General Engineering Contractor license under the provisions of the Business and Professions Code of the State of California to do the type of work contemplated and shall be skilled and regularly engaged in the general class or type of work called for under this contract.

2. CODES
Construction and materials shall be in accordance with Title 24 California Code of Regulations California Building Code (CBC), the California Plumbing Code (CPC), the Caltrans Standard Plans and Specifications, Santa Clara County Fire Department Standard Details and Specifications, all other State and Federal laws, all locally enforced codes and authorities, and the County of Santa Clara Design Criteria. Should the Contractor discover work within the Plans not in conformance with these requirements, Contractor shall immediately submit a written Request for Information (RFI) to the Owner's Representative.

3. STANDARD SPECIFICATIONS
Construction and materials shall be as specified and as required by the latest editions of the Caltrans Standard Plans and Caltrans Standard Specifications. Should the Contractor discover work within the Plans not in conformance with these requirements, Contractor shall immediately submit a written Request for Information (RFI) to the Owner's Representative.

4. PERMITS
Contractor shall inform themselves of, and fully adhere to the rules regulations and requirements of all governmental agencies having jurisdiction over the work, and all federal, state and local laws, codes or regulations regarding construction activity. In addition to the permits provided by the Owner, Contractor shall investigate and procure any and all permits that may be required on the project.

5. SITE SAFETY
The Contractor agrees that in accordance with generally accepted construction practices, Contractor will be required to assume sole and complete responsibility for job site conditions, construction means, methods or techniques, or for safety measures, precautions or programs at the project site during the course of the project, including safety of all persons and property; that this requirement shall be made to apply continuously and not be limited to normal work hours. It shall be the Contractor's sole responsibility to design and provide adequate shoring, bracing, formwork, scaffolding, temporary structures, etc., as required for the protection of life and property during construction. Contractor to take necessary precautions against sewage, gases, solvents, compounds, acids, preservatives, fuels, and other hazardous materials. All construction shall be performed in conformance with CalOSHA requirements. The Contractor agrees to defend, indemnify, and hold the Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this project, excepting liability rising from the sole negligence of the Design Engineer of Record.

6. PUBLIC SAFETY
The Contractor shall provide for the safety of traffic and the public in accordance with the provisions of Section 7-1.09 of the Standard Specifications whenever the Contractor's operations create a hazardous condition including, but not limited to, fencing, railing, barricades, lights, signs and other devices to prevent accidents or damage or injury to the public.

7. SCOPE
The Contractor shall examine carefully the site of work contemplated and thoroughly review the Plans and Specifications. The submission of a bid shall be conclusive evidence that the contractor has investigated the site and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of work to be performed, the quantities of materials to be furnished and as to the requirements of the Plans and Specifications. The Contractor shall make a detailed and thorough study of these Plans and Specifications in their entirety prior to any work on the jobsite. The Contractor is to coordinate these drawings with all other trade disciplines for the completed work.

8. INTENT
It is the intent of these Plans and General Notes/Specifications that the work shall result in complete, finished, operating, satisfactory, and functional systems and no extra compensation will be allowed for anything omitted but fairly implied for systems' function. Where detail references in the Plans have been omitted, the Contractor is deemed to have estimated the best quality detail. In the event certain features of the construction are not fully shown or detailed on the plans, their construction shall be as shown on the plans or details for similar best quality features and as directed by the Manufacturer's latest written Specifications. All typical details shall apply unless noted otherwise. The Owner's Representative best quality interpretation is deemed to control.

9. PRECEDENCE
All figured dimensions shall take precedence over scaled measurements. Should a conflict or inconsistency occur in or between the Plans and the Specifications, the Plans shall control over the Specifications.

10. ADDENDA
If discrepancies or apparent errors or omissions are found in the Plans or Specifications or any differences between the Plans and conditions in the field the Contractor shall submit a written Request For Information (RFI). If the Contractor proceeds with the work affected without instructions from the Owner's Representative, the Contractor shall make good any resulting damage or defect to the satisfaction of the Owner's Representative. Any request for alterations or substitutions must be presented directly to the Owner's Representative in writing, accompanied by a detailed sketch and/or photograph, as required for review, before any approval will be given and before proceeding with the work.

11. VERIFICATION
The Contractor shall be responsible for field-verifying all existing conditions, dimensions, levels, and materials for all layout and construction work and shall submit a Request for Information (RFI) to the Owner's Representative to resolve any discrepancies before proceeding with the work. The Contractor shall adjust, correct, and coordinate the work so that no discrepancies result.

12. NOTICE TO PROCEED
No work shall commence without an official notice to proceed from the Owner.

13. EXISTING FACILITIES
Contractor shall protect all existing facilities and shall repair all damaged areas to original or better condition. Contractor shall do all cutting, fitting, or patching of his work that may be required to make its several parts fit together properly and shall not endanger any other work by cutting or otherwise altering the total work or any part of it. Contractor shall exercise care to protect any existing construction so that integrity and finish are not impaired. All patching, repairing, and replacing of materials and surfaces, cut or damaged in execution of work, shall be done with appropriate materials so the surfaces replaced will, upon completion, match surrounding similar surfaces.

14. HOUSEKEEPING
The job site shall be maintained daily in a neat, clean, orderly condition free of debris and litter, shall not be unreasonably encumbered with any materials or equipment. Materials stored on the site shall be properly stacked and protected to prevent damage and deterioration until use. Failure to protect materials may be cause for rejection of work. Dust shall be controlled and mud and debris shall be cleaned off public right of ways. Coordinate materials and equipment storage locations with the Owner.

15. WORKING HOURS
Normal working hours shall be between 7:00 am and 5:00 pm and no work shall be done on Sundays or legal holidays unless written permission is given. All work involving heavy equipment or traffic control shall be done between 8:30 am and 4:30 pm.

16. SUBMITTALS
No work shall commence with unapproved materials. Submittals and shop drawings shall be supplied to the Owner's Representative for review for the following:
a. All material and equipment items
b. Water Pollution Control Plan
c. Schedule indicating detailed sequence, with starting and ending dates for each activity, including selective demolition and removal work and interruption of vehicular and pedestrian access.
The Contractor shall supply submittals sufficiently detailed to demonstrate compliance with the Plans and Specifications. Each submittal shall be sequentially numbered, dated, titled, and checked by the Contractor. The Owner's Representative will require 10 days for review. The Contractor's responsibility for errors, omissions, and deviations is not relieved by the submittal review.

OBSERVATIONS BY CIVIL ENGINEER

Observation is required at the following construction milestones:

1. All observations in accordance with the requirements of the streambed alteration agreement by the California Department of Fish and Wildlife except for biological observations by Biologist
2. Initial Inspection of temporary erosion control in place prior to demolition
3. Inspection of grading
4. Inspection of Rock Slope Protection
5. Final Inspection of permanent erosion control in place at final site stabilization
6. Final construction prior to project closeout

The engineer shall be notified two days in advance of above milestones.

EXISTING ACCESS ROAD

1. Contractor shall be responsible for implementing road improvements as needed to construct bridge.
2. Contractor shall repair road to existing conditions after construction of new bridge is complete.
3. Contractor shall provide photo documentation of access road prior to starting work and after completion of road repairs.
4. Contractor shall be responsible for protecting all existing utilities during construction.

CONSTRUCTION SITE BEST MANAGEMENT PRACTICES NOTES

IN ACCORDANCE WITH THE CALIFORNIA STORM WATER BEST MANAGEMENT PRACTICES HANDBOOK (CURRENT EDITION), BEST MANAGEMENT PRACTICES SHALL BE IMPLEMENTED DURING CONSTRUCTION TO PREVENT EROSION, SEDIMENTATION, AND THE DISCHARGE OF POLLUTANTS DURING CONSTRUCTION AND SHALL INCLUDE:

1. PROVIDE A BARRIER THAT WILL INTERCEPT AND FILTER SEDIMENT AND DEBRIS FROM ENTERING THE STREAM.

2. USE ATTACHMENTS ON CONSTRUCTION EQUIPMENT, SUCH AS BACKHOES, TO CATCH DEBRIS FROM SMALL DEMOLITION OPERATIONS.

3. USE TEMPORARY COVERS OR PLATFORMS TO COLLECT DEBRIS AND PREVENT DEBRIS FROM ENTERING STREAMS. PLATFORMS AND COVERS ARE TO APPROVED BY THE DISTRICT. PLATFORMS AND COVERS SHALL NOT BE PLACED IN THE WETTED CHANNEL BUT SHALL BE SUSPENDED ABOVE.

4. PREVENT EROSION AT ROADWAYS ADJACENT TO CONSTRUCTION. DIVERT RUNOFF FROM ADJACENT ROAD SURFACES AWAY FROM THE CONSTRUCTION SITE.

5. DISCHARGES TO WATERWAYS OR MUDDYING OF STREAMS SHALL BE REPORTED TO THE COUNTY OF SANTA CLARA IMMEDIATELY AND A WRITTEN NOTIFICATION PROVIDED WITHIN 7 DAYS.

6. MAINTAIN ANY DEBRIS CATCHING DEVICE REGULARLY AS NEEDED

7. VEGETATION DISTURBANCE SHOULD BE MINIMIZED. WHEN APPROVED, TRIM CUTS SHOULD BE CLEAN TO PROMOTE GROWTH.

8. IF MATERIAL FALLS INTO THE RIVER, IT SHALL BE REMOVED IMMEDIATELY. THE MATERIAL SHALL NOT BE ALLOWED TO IMPEDE THE FLOW OF THE RIVER, NOR IMPOUND OR DAM ANY WATER. THE RIVER SHALL BE RESTORED TO ORIGINAL CONDITION.

9. USE MATERIALS FREE OF OIL, GREASE, SILT, PAINT, PLASTIC, SOLVENTS, OR TOXIC SUBSTANCES.

CREEK PROTECTION NOTES

DEBRIS CATCHMENT:
1. PRIOR TO DEMOLITION OF EXISTING BRIDGE, INSTALL TEMPORARY UNTREATED PLYWOOD COVERS TO PREVENT ANY AND ALL DEBRIS FROM ENTERING THE CREEK. COVERS SHALL NOT BE PLACED IN THE WETTED CHANNEL BUT SHALL SPAN ACROSS THE WETTED CHANNEL. ALL DEBRIS SHALL BE REMOVED FROM COVERS.

GRAVEL BAG BERM CONSTRUCTION:
1. BAGS SHALL BE POROUS WOVEN GEOTEXTILE, WEIGHT 4 oz/yd2 MIN, MULLEN BURST 300 lb/in2 MIN, IN CONFORMANCE WITH ASTM D3786 AND WITH UV STABILITY EXCEEDING 70% PER ASTM D4355.
2. BAGS SHALL BE HALF FILLED WITH GRAVEL. FILLED SIZE SHALL BE 18" X 12" X 4", WITH MASS OF 33 LBS APPROX.
3. GRAVEL SHALL BE 1/2", 3/4", OR 1" WASHED, OPEN GRADED DRAIN ROCK.
4. SIDES ARE TURNED UPSLOPE TO PREVENT RUNOFF FROM GOING AROUND THE SIDES.

INSPECTION & MAINTENANCE:
1. INSPECT DURING AND AFTER EACH SIGNIFICANT STORM (1/2 INCH IN 48 HOURS)
2. REMOVE SEDIMENT WHEN SEDIMENT DEPTH EXCEEDS SIX INCHES. THE REMOVED SEDIMENT SHALL BE PLACED WHERE IT CANNOT ENTER A STORM DRAIN, WATERWAY, OR BE TRANSPORTED OFF SITE.
3. IF THE COVERS ARE DAMAGED OR THE GRAVEL BAGS ARE CLOGGED WITH SEDIMENT, THEY SHALL BE REPLACED.
4. REMOVE DEBRIS, COVERS, AND BERMS AFTER FINAL STABILIZATION OF DISTURBED AREAS.

EROSION CONTROL NOTES

APPROPRIATE BEST MANAGEMENT PRACTICES SHALL BE IMPLEMENTED DURING CONSTRUCTION TO PREVENT EROSION, SEDIMENTATION, AND THE DISCHARGE OF POLLUTANTS DURING CONSTRUCTION. IN ACCORDANCE WITH THE CALIFORNIA STORM WATER BEST MANAGEMENT PRACTICES HANDBOOK, THESE MEASURES SHALL INCLUDE:

1. LIMITING THE EXTENT OF LAND DISTURBANCE TO THE MINIMUM AMOUNT NECESSARY TO CONSTRUCT THE PROJECT;

2. DESIGNATING AREAS FOR THE STAGING OF CONSTRUCTION EQUIPMENT AND MATERIALS, INCLUDING RECEPTACLES AND TEMPORARY STOCKPILES OF GRADED MATERIALS, WHICH SHALL BE COVERED ON A DAILY BASIS.

3. PROVIDING FOR THE INSTALLATION OF SILT FENCES, TEMPORARY DETENTION BASINS, AND/OR OTHER CONTROLS TO INTERCEPT, FILTER, AND REMOVE SEDIMENTS CONTAINED TO ANY RUNOFF FROM CONSTRUCTION, STAGING, AND STORAGE/STOCKPILE AREAS.

4. INCORPORATING GOOD CONSTRUCTION HOUSEKEEPING MEASURES, INCLUDING THE USE OF DRY CLEANUP MEASURES WHENEVER POSSIBLE.

5. COLLECTING AND FILTERING CLEANUP WATER WHEN DRY CLEANUP METHODS ARE NOT FEASIBLE.

6. CLEANING AND REFUELING CONSTRUCTION EQUIPMENT AT DESIGNATED OFFSITE MAINTENANCE AREAS.

7. IMMEDIATE CLEAN-UP OF ANY LEAKS OR SPILLS.

8. CONSTRUCTION AREAS SHALL BE DELINEATED WITH FENCING AND MARKERS TO PREVENT LAND-DISTURBING ACTIVITES FROM TAKING PLACE OUTSIDE THOSE AREAS.

9. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REGULARLY INSPECTED, MAINTAINED AND REPAIRED.

10. TEMPORARY MULCH:
REDWOOD BARK MULCH (CLEAN AND CERTIFIED WEED FREE) @ 4,000 LBS/ACRE (92 LBS/1,000 SF)

11. EROSION CONTROL BLANKET:
HEAVY JUTE NETTING (NO POLYPROPYLENE). 14.4 oz/sq yd MINIMUM WEIGHT OF FABRIC.

BIOLOGICAL OBSERVATION

A QUALIFIED WILDLIFE BIOLOGIST PROVIDED BY THE DISTRICT SHALL PERFORM OBSERVATIONS DURING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE STREAMBED ALTERATION AGREEMENT BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.

LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLANS ARE ONLY APPROXIMATE. THE EXISTING UTILITIES SHOWN WERE PLOTTED USING INCOMPLETE AND IMPRECISE RECORDS. IT SHOULD BE EXPRESSLY UNDERSTOOD THIS INFORMATION DOES NOT NECESSARILY REPRESENT ACTUAL OR COMPLETE SITE CONDITIONS OR SHOW DETAILS OF EXACT LOCATION, DEPTH OR OTHER CONSTRUCTION FEATURES OF THESE UTILITIES. NO WARRANTY, EITHER EXPRESSED OR IMPLIED, AS TO THE COMPLETENESS OR ACCURACY OF THIS INFORMATION IS SET FORTH HEREIN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THIS INFORMATION WITH THE AFFECTED UTILITIES PRIOR TO EXCAVATION. THE CONTRACTOR SHALL CALL "UNDERGROUND SERVICE ALERT" AT 1-800-642-2444 OR 8-1-1 FOR THE MARKING OF UNDERGROUND FACILITIES AT LEAST 2 DAYS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL HAND DIG AND LOCATE ALL UTILITIES THAT MAY BE AFFECTED BY THE NEW FACILITIES IN THIS CONTRACT TO VERIFY ACTUAL DEPTH AND LOCATION OF UTILITIES AND REPORT POTENTIAL CONFLICTS TO THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES WHETHER SHOWN OR NOT AND IS RESPONSIBLE FOR ALL DAMAGES TO EXISTING UTILITIES.

811 Know what's below. Call before you dig.

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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No.67728
CIVIL
STATE OF CALIFORNIA

WEBB CREEK BRIDGE REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
REGIONAL OPEN SPACE RESERVE
BEAR CREEK REDWOODS, SARATOGA
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

GENERAL NOTES

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET
C0.1

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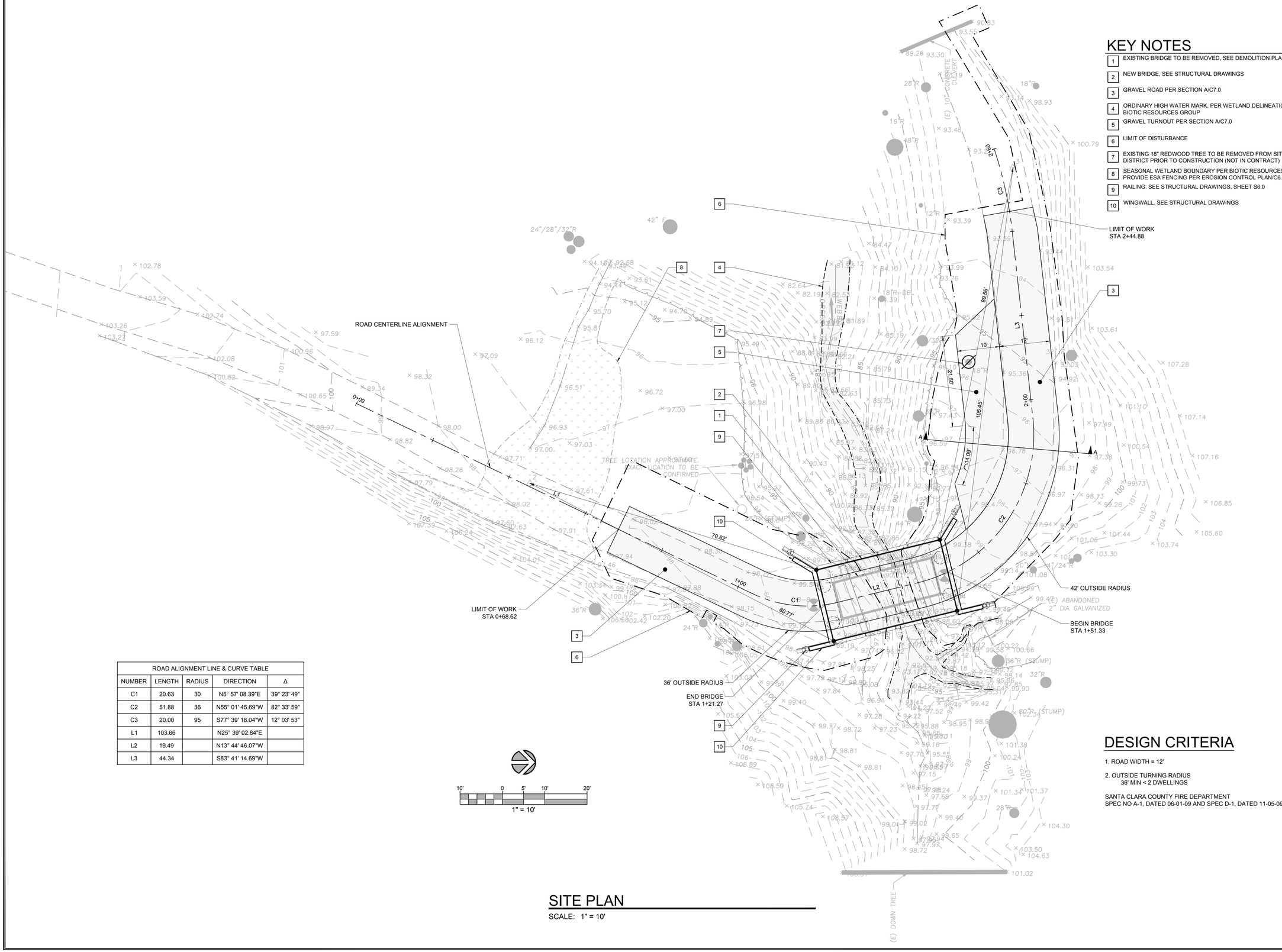

KEY NOTES

1. EXISTING BRIDGE TO BE REMOVED, SEE DEMOLITION PLAN
2. NEW BRIDGE, SEE STRUCTURAL DRAWINGS
3. GRAVEL ROAD PER SECTION A/C7.0
4. ORDINARY HIGH WATER MARK, PER WETLAND DELINEATION BY BIOTIC RESOURCES GROUP
5. GRAVEL TURNOUT PER SECTION A/C7.0
6. LIMIT OF DISTURBANCE
7. EXISTING 18" REDWOOD TREE TO BE REMOVED FROM SITE BY DISTRICT PRIOR TO CONSTRUCTION (NOT IN CONTRACT)
8. SEASONAL WETLAND BOUNDARY PER BIOTIC RESOURCES GROUP. PROVIDE ESA FENCING PER EROSION CONTROL PLAN/C6.0
9. RAILING. SEE STRUCTURAL DRAWINGS, SHEET S6.0
10. WINGWALL. SEE STRUCTURAL DRAWINGS

ROAD ALIGNMENT LINE & CURVE TABLE				
NUMBER	LENGTH	RADIUS	DIRECTION	Δ
C1	20.63	30	N5° 57' 08.39"E	39° 23' 49"
C2	51.88	36	N55° 01' 45.69"W	82° 33' 59"
C3	20.00	95	S77° 39' 18.04"W	12° 03' 53"
L1	103.66		N25° 39' 02.84"E	
L2	19.49		N13° 44' 46.07"W	
L3	44.34		S83° 41' 14.69"W	

10' 0 5' 10' 20'
1" = 10'

SITE PLAN
SCALE: 1" = 10'

DESIGN CRITERIA

1. ROAD WIDTH = 12'
2. OUTSIDE TURNING RADIUS
   36' MIN < 2 DWELLINGS

SANTA CLARA COUNTY FIRE DEPARTMENT
SPEC NO A-1, DATED 06-01-09 AND SPEC D-1, DATED 11-05-09

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

SITE PLAN

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET
C1.0

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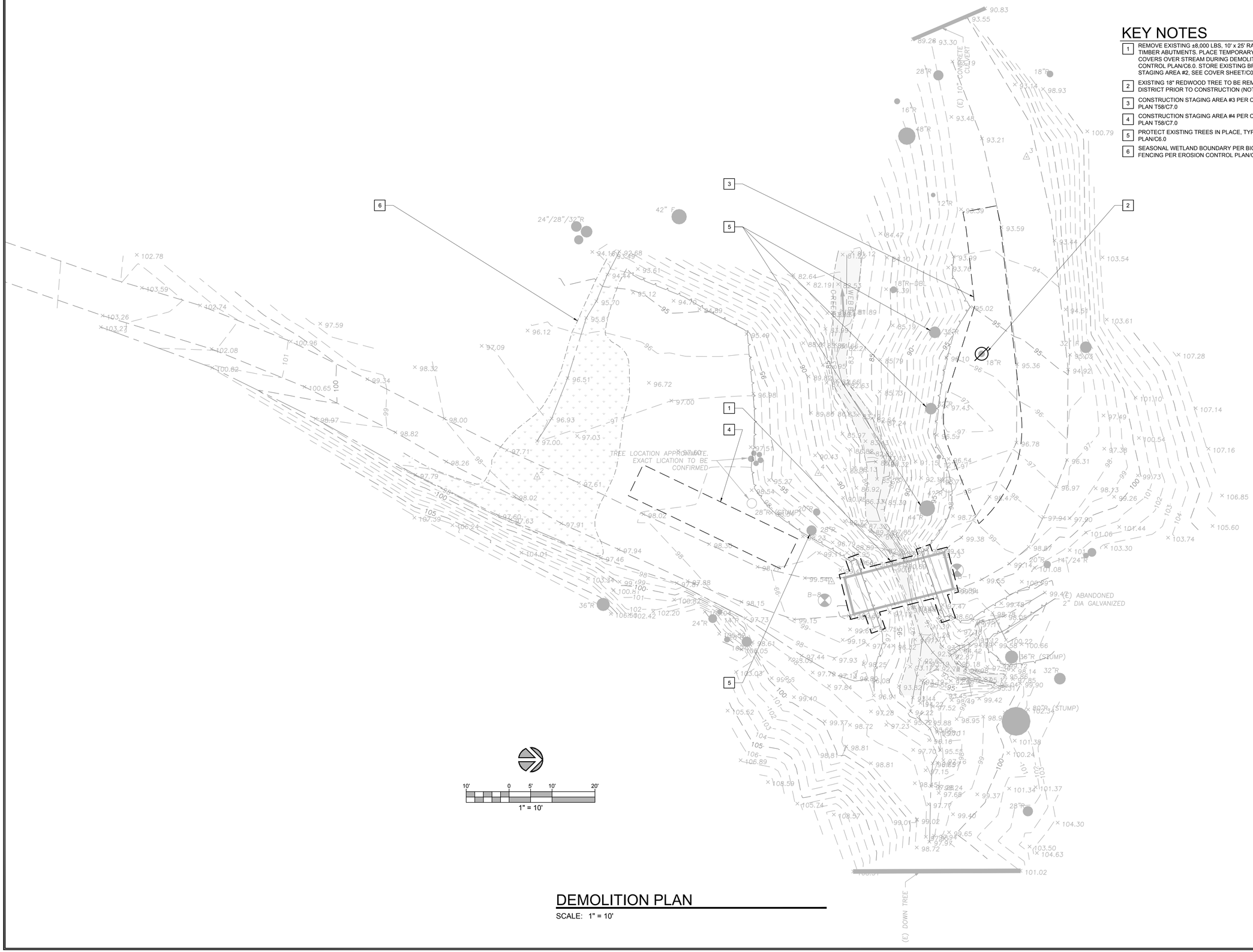

KEY NOTES

1. REMOVE EXISTING ±8,000 LBS, 10' x 25' RAILCAR BRIDGE AND TIMBER ABUTMENTS. PLACE TEMPORARY UNTREATED PLYWOOD COVERS OVER STREAM DURING DEMOLITION PER EROSION CONTROL PLAN/C6.0. STORE EXISTING BRIDGE AT CONSTRUCTION STAGING AREA #2. SEE COVER SHEET/C0.0
2. EXISTING 18" REDWOOD TREE TO BE REMOVED FROM SITE BY DISTRICT PRIOR TO CONSTRUCTION (NOT IN CONTRACT)
3. CONSTRUCTION STAGING AREA #3 PER CALTRANS STANDARD PLAN T58/C7.0
4. CONSTRUCTION STAGING AREA #4 PER CALTRANS STANDARD PLAN T58/C7.0
5. PROTECT EXISTING TREES IN PLACE, TYP. SEE EROSION CONTROL PLAN/C6.0
6. SEASONAL WETLAND BOUNDARY PER BIOLOGIST. PROVIDE ESA FENCING PER EROSION CONTROL PLAN/C6.0

DEMOLITION PLAN

SCALE: 1" = 10'

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DEMOLITION PLAN

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET

C2.0

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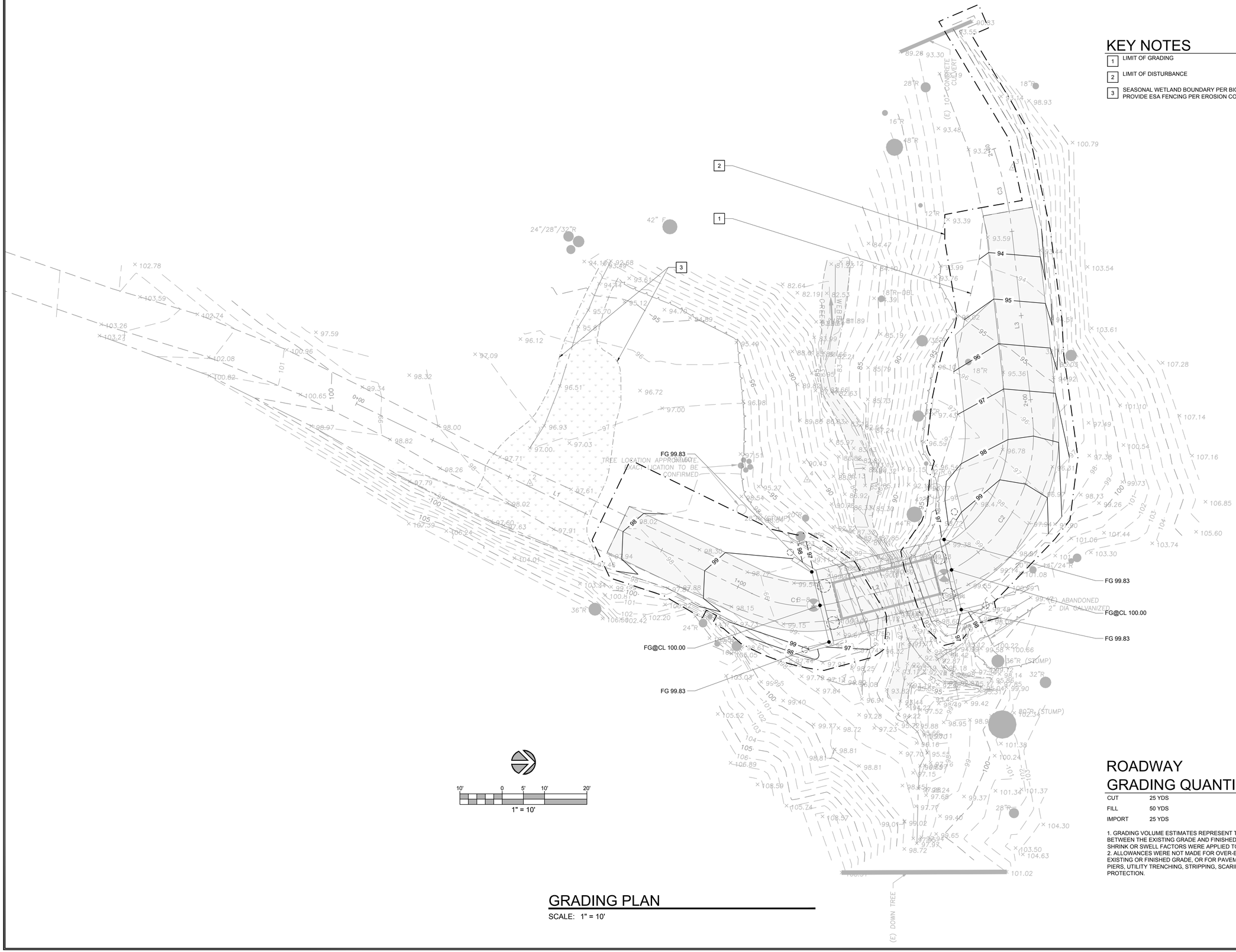

KEY NOTES

1. LIMIT OF GRADING
2. LIMIT OF DISTURBANCE
3. SEASONAL WETLAND BOUNDARY PER BIOTIC RESOURCES GROUP. PROVIDE ESA FENCING PER EROSION CONTROL PLAN/C6.0

ROADWAY GRADING QUANTITIES

CUT	25 YDS
FILL	50 YDS
IMPORT	25 YDS

1. GRADING VOLUME ESTIMATES REPRESENT THE NEAT DIFFERENCE BETWEEN THE EXISTING GRADE AND FINISHED GRADE SURFACE. NO SHRINK OR SWELL FACTORS WERE APPLIED TO THESE VALUES.
2. ALLOWANCES WERE NOT MADE FOR OVER-EXCAVATION OF THE EXISTING OR FINISHED GRADE, OR FOR PAVEMENTS, FOUNDATIONS, PIERS, UTILITY TRENCHING, STRIPPING, SCARIFICATION, OR SLOPE PROTECTION.

GRADING PLAN

SCALE: 1" = 10'

REV:	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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STATE OF CALIFORNIA

WEBB CREEK BRIDGE
REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE PRESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

GRADING PLAN

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET
C3.0

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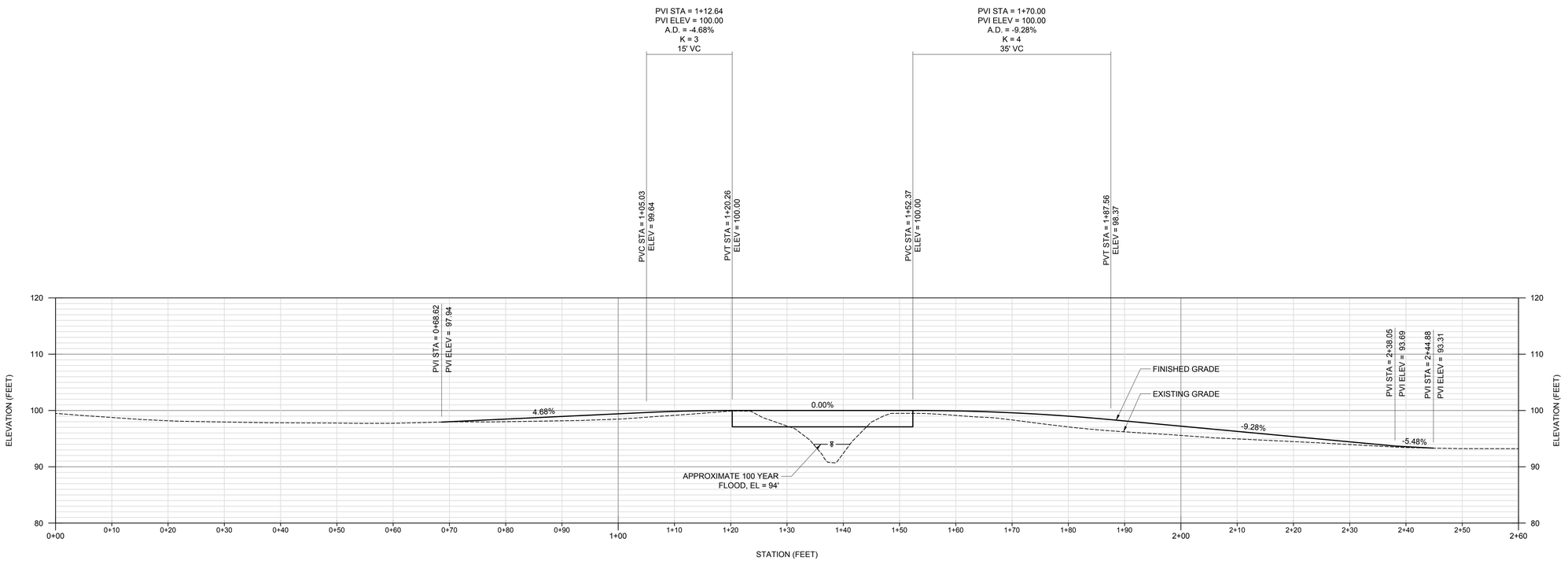
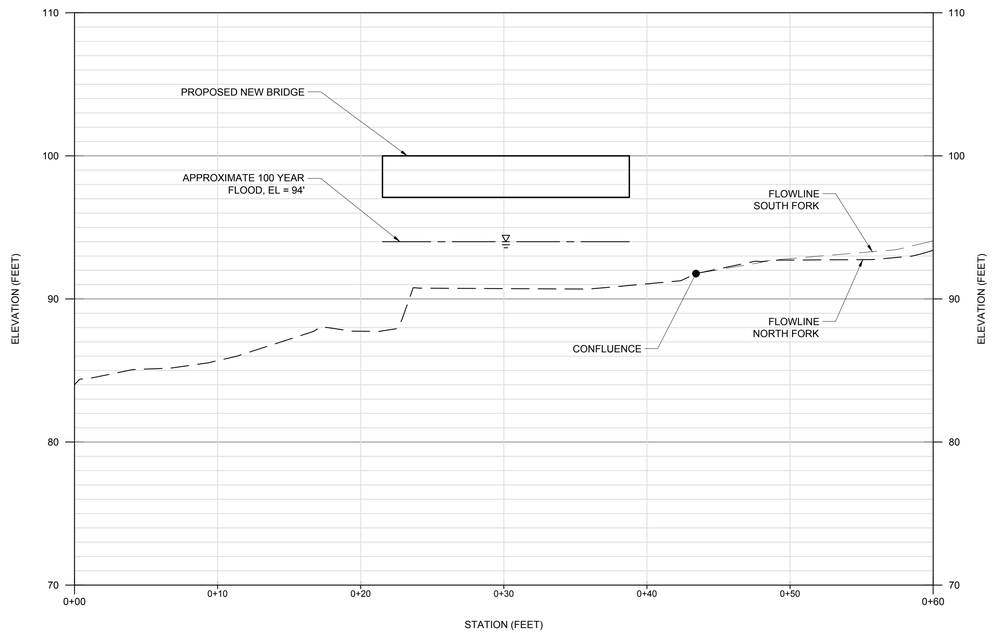


ROAD PROFILE

SCALE: H: 1" = 10'; V: 1" = 10'



CREEK PROFILE

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

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE PRESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

PROFILES

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET

C4.0

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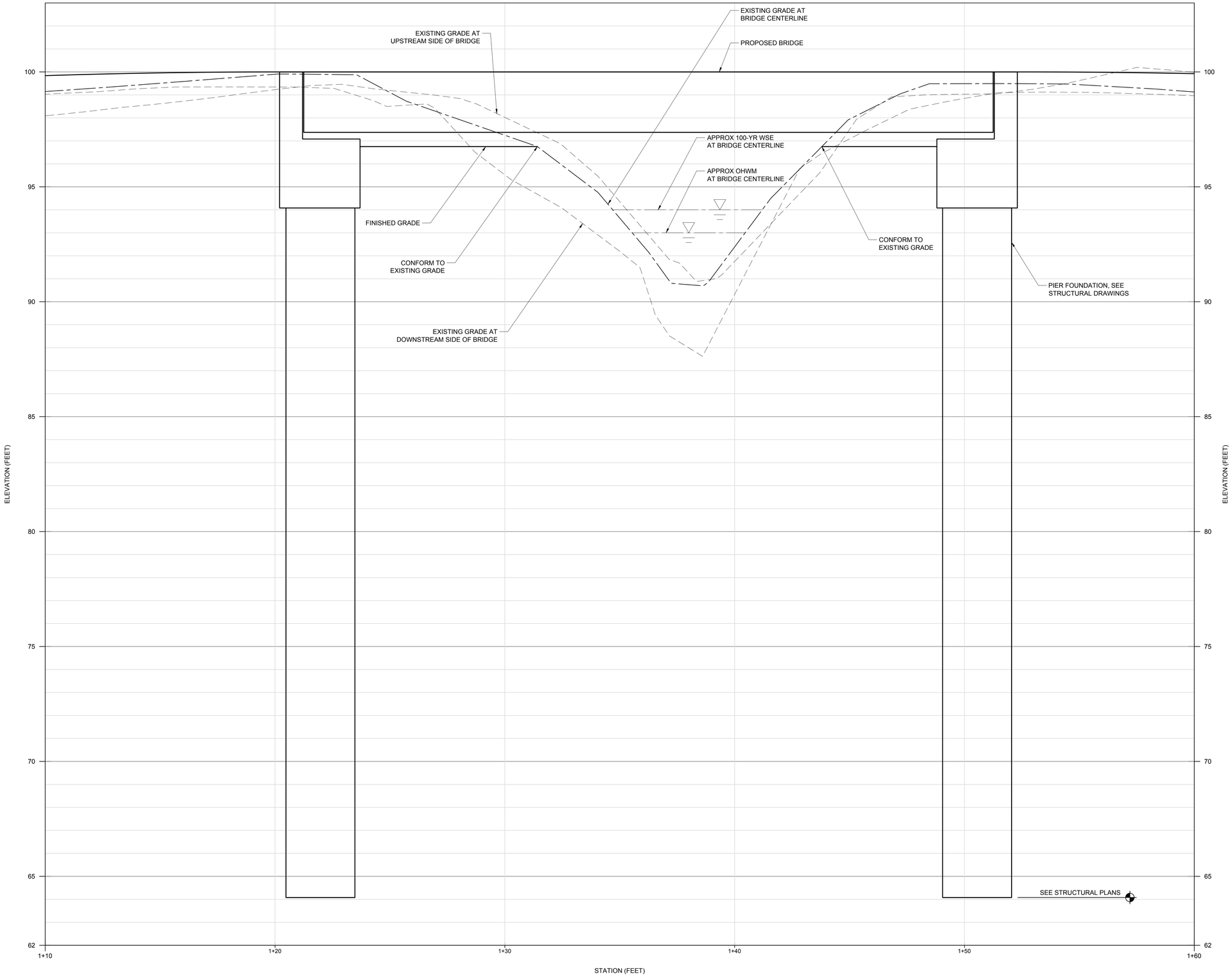

BRIDGE PROFILE DETAIL

SCALE: H: 1" = 2'; V: 1" = 2'

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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WEBB CREEK BRIDGE
REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE PRESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

BRIDGE PROFILE DETAIL

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET
C5.0

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KEY NOTES

- T51 TEMPORARY SILT FENCE PER CALTRANS STANDARD PLAN T51/C7.0
- T56 TEMPORARY FIBER ROLL PER CALTRANS STANDARD PLAN T56/C7.0, TYPE 2, TYP
- T65 TEMPORARY ESA FENCE PER CALTRANS STANDARD PLAN T65/C7.0
- RM REDWOOD BARK MULCH ON ALL DISTURBED SOILS
- TC PRIOR TO DEMOLITION OF EXISTING BRIDGE, INSTALL TEMPORARY PLYWOOD COVERS TO PREVENT ANY AND ALL DEBRIS FROM ENTERING THE CREEK. COVERS SHALL NOT BE PLACED IN THE WETTED CHANNEL BUT SHALL SPAN ACROSS THE WETTED CHANNEL. ALL DEBRIS SHALL BE REMOVED FROM COVERS.
- TP STRAW BALE TREE PROTECTION. PLACE STRAW BALES AROUND TREE TRUNKS

LEGEND

- TSF TSF TSF — TEMPORARY SILT FENCE
- TEMPORARY FIBER ROLL
- LIMIT OF DISTURBANCE
- REDWOOD BARK MULCH ON DISTURBED SOILS

10' 0 5' 10' 20'
1" = 10'

TEMPORARY EROSION CONTROL PLAN

SCALE: 1" = 10'

REV:	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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PREPARED AT THE REQUEST OF
REBECCA FLORES, PROJECT MANAGER
BEAR CREEK REDWOODS OPEN SPACE PRESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

TEMPORARY EROSION CONTROL PLAN

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109

SHEET
C6.0

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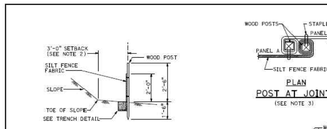
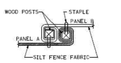
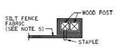
259



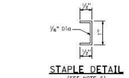
SECTION A-A
TEMPORARY SILT FENCE



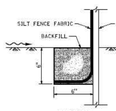
PLAN
POST AT JOINTS
(SEE NOTE 3)



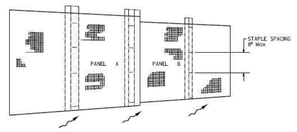
PLAN
END POST DETAIL



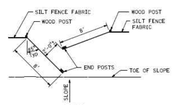
STAPLE DETAIL
(SEE NOTE 6)



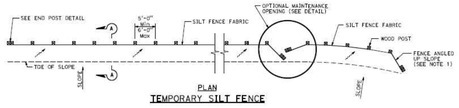
SECTION
TRENCH DETAIL



PERSPECTIVE
SILT FENCE PANELS AT JOINTS



PLAN
OPTIONAL MAINTENANCE OPENING DETAIL



PLAN
TEMPORARY SILT FENCE

LEGEND
- TAMPED BACKFILL
- SLOPE DIRECTION
- DIRECTION OF FLOW

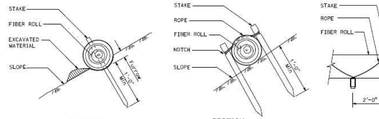
NOTES:
1. The down stream end of the temporary silt fence shall have the last 8' angled up slope.
2. Setback dimensions may vary to fit field conditions.
3. Posts to overlap and fence fabric to fold around each post one full turn, secure fabric with 4 staples for each post.
4. Posts shall be driven tightly together to prevent potential flow-through of sediment at the joint. The tops of the posts shall be secured to each other with wire.
5. For each end post, fence fabric shall be folded around two posts one full turn and secured with 4 staples.
6. Minimum of 4 staples shall be installed per post. Dimensions shown are typical.
7. Maintenance openings shall be constructed in a manner to ensure that sediment is retained by the temporary silt fence.
8. Joint sections shall not be placed at sump locations.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY SILT FENCE)
NO SCALE

T51

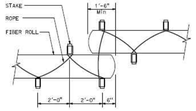
2015 STANDARD PLAN T51

264



SECTION
TEMPORARY FIBER ROLL (TYPE 1)

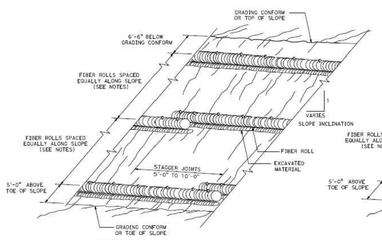
SECTION
TEMPORARY FIBER ROLL (TYPE 2)



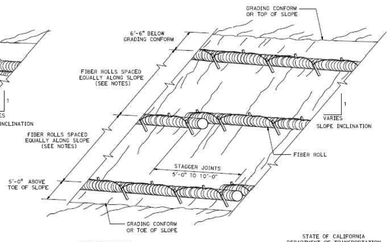
PLAN

ELEVATION
STAKE NOTCH DETAIL

NOTES:
1. Temporary fiber roll spacing varies depending upon slope inclination.
2. Installations shown in the perspectives are for slope inclination of 1:1 and steeper.



PERSPECTIVE
TEMPORARY FIBER ROLL (TYPE 1)



PERSPECTIVE
TEMPORARY FIBER ROLL (TYPE 2)

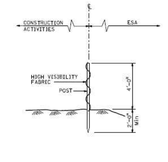
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY FIBER ROLL)
NO SCALE

T56

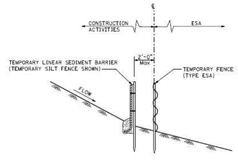
2015 STANDARD PLAN T56

273

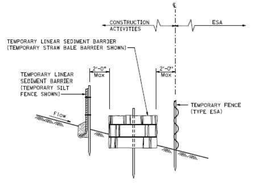
SIGN DETAIL



SECTION
TEMPORARY FENCE (TYPE ESA)



SECTION
PLACEMENT DETAIL
FOR TEMPORARY LINEAR SEDIMENT BARRIER USED WITH TEMPORARY FENCE (TYPE ESA)



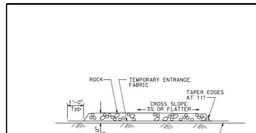
SECTION
PLACEMENT DETAIL
FOR TEMPORARY SILT FENCE AND TEMPORARY STRAW BALE BARRIER USED WITH TEMPORARY FENCE (TYPE ESA)

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
TEMPORARY WATER POLLUTION CONTROL DETAILS [TEMPORARY FENCE (TYPE ESA)]
NO SCALE

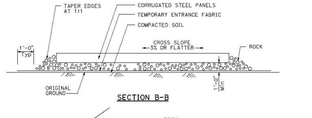
T65

2015 STANDARD PLAN T65

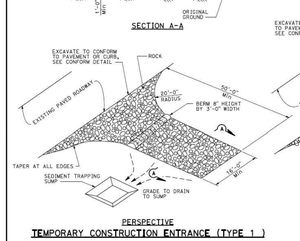
266



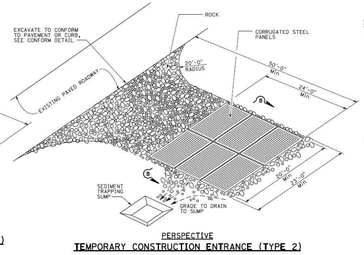
SECTION A-A



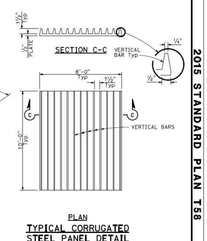
SECTION B-B



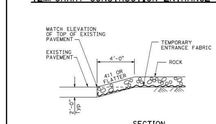
PERSPECTIVE
TEMPORARY CONSTRUCTION ENTRANCE (TYPE 1)



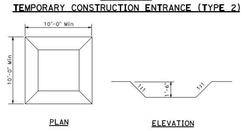
PERSPECTIVE
TEMPORARY CONSTRUCTION ENTRANCE (TYPE 2)



PLAN
TYPICAL CORRUGATED STEEL PANEL DETAIL



SECTION
CONFORM DETAIL

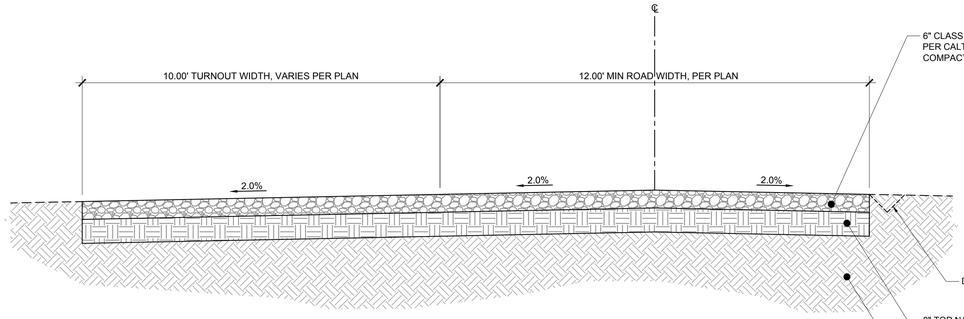


PLAN ELEVATION
SEDIMENT TRAPPING SUMP

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CONSTRUCTION ENTRANCE)
NO SCALE

T58

2015 STANDARD PLAN T58



TYPICAL ROAD SECTION
SCALE: 1/2" = 1'-0"
A-A

REV:	DESCRIPTION	BY	DATE
1	BID PLANS	RC	2/20/2018

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STATE OF CALIFORNIA

WEBB CREEK BRIDGE REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE PRESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

DETAILS

DRAWN BY:	DM
CHECKED BY:	RC
JOB NUMBER:	17109
SHEET	C7.0

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STRUCTURAL SPECIFICATIONS

EARTHWORK

Earthwork shall be in strict accordance with the recommendations of the Geotechnical Investigation for :

Bear Creek Redwoods Roads and Trails - MP222
CMAG Engineering, Inc. Project No 16-120-SCL
Dated: August 1, 2016

Drilled, Cast-In-Place Concrete Shaft Construction
Bear Creek Redwoods Roads and Trails
Proposed Bridge, Webb Creek Crossing - MP222
CMAG Engineering, Inc. Project No 16-120-SCL
Dated: June 12, 2017

Contractor shall carefully excavate all materials necessary, of whatever nature, for construction of the work. Any material of an unsuitable or deleterious nature discovered below the bottoms of the foundations shall be brought to the attention of the geotechnical engineer before proceeding with the work.

The abutments have been designed for the following loads:

Active Earth Pressure = 40.5 psf/ft (level backfill)
Vehicular Live Load Surcharge = 90 psf
Seismic Pressure due to Lateral Spreading (Abutment) = 355 psf/ft equivalent fluid pressure (Ultimate)
Seismic Pressure due to Lateral Spreading (Piers) = 210 psf/ft x 1.0 Pier Diameter to 6 feet below bottom of abutment (Ultimate)
Seismic Pressure due to Earthquake Motion = 44H² acting at ⅓ Height Abutment (Ultimate)

Backfill shall not be placed behind wingwalls and abutments until 14 days after placing concrete or grout or until the concrete or grout has developed a compressive strength of not less than 2,500 psi, whichever occurs first. Permeable materials placed behind retaining walls shall be of the type specified on the plans. Backfill placed under paved areas shall be compacted to a relative density of 95%.

All other earthwork shall conform to the requirements of the current CBC Chapter 33, "Safegaurds During Construction" and Appendix J, "Grading", and the recommendations contained within the aforementioned report by the Geotechnical Engineer.

The Geotechnical Investigation Report shall be part of the construction documents and shall be kept at the job site at all times.

CAST-IN-PLACE CONCRETE PIERS

Concrete for cast-in-place concrete piers shall be as specified in section titled "CONCRETE". The concrete shall be dense and homogeneous. Concrete placed in drilled holes shall be placed against undisturbed material. Concrete shall be placed through a tremie and the end of the tube shall be embedded 4 feet below the concrete surface during placement. Concrete shall be vibrated in the upper 15 feet of the pier.

The contractor is to notify the project geotechnical engineer four working days prior to commencement of drilling operations.

Drilled holes for cast-in-place concrete piers shall be drilled to the diameters and depths shown on the plans or to depths as determined by the project geotechnical engineer.

Drilled holes shall be examined for straightness and any hole showing an out of plumb tolerance in excess of 1% (per Geotechnical Investigation) of the total hole depth shall be rejected. If the tolerances noted herein are exceeded, the contractor shall furnish and pay for any corrective design and construction that may be required. Suitable casings shall be furnished and placed when necessary to control water or to prevent caving of the hole.

Loose material existing at the bottom of the hole after drilling operations have been completed shall be removed before placing reinforcing steel or concrete in the hole. Surface water shall not be permitted to enter the hole and all water which may have infiltrated into the hole shall be removed prior to placing concrete therein.

Casing, if used in drilling operations, shall be removed from the hole as concrete is placed therein. The bottom of the casing shall be maintained a minimum of four feet below top of the concrete during withdrawal and placing operations. Separation of the concrete by hammering or otherwise vibrating the casing during withdrawal operations shall be avoided.

WOOD

All wood construction shall receive waterproofing wood sealant of the type selected by the District. Submit for approval color samples and product data.

Wood species for all framing members shall be of Redwood and shall be Clear Heart unless noted otherwise in the plans. Solid sawn lumber shall have a maximum of 19% moisture content at time of installation.

Bolt holes shall be 1/16 inch larger than the nominal size of the bolt. Cut flat washers shall be provided at all heads and nuts which would otherwise bear directly on wood. Bolts shall be tightened to a snug condition and retightened upon job completion or immediately before constructing work which will make them inaccessible.

Use common type nails where nails are indicated on details or plans. Nails shall be hot dipped galvanized where exposed to the weather.

REINFORCEMENT

Use Grade 40 deformed reinforcing for #3 and smaller bars and Grade 60 for #4 and larger bars conforming to the requirements of ASTM A615. Stagger all reinforcing bar contact splices. Support horizontal steel at bottom on mortar blocks.

All reinforcing, and other embedments shall be secured in place and inspected prior to placing any concrete or grout.

Work done under this section shall conform with the applicable portions of ACI 318, latest edition, particularly Chapter 7, "Details of Reinforcement".

CONCRETE

Work done under this section shall conform with the applicable portions of ACI 318, latest edition.

Poured in place concrete work shall be constructed of normal weight, Portland Cement Concrete, having a minimum 28-day compressive strength of 4,000 psi and maximum water-cement ratio of 0.50.

Portland cement concrete shall conform to the requirements of ACI 318, "Building Code Requirements for Reinforced Concrete", latest edition. The use of any admixture in the concrete must be approved by the Engineer.

Aggregates: Coarse aggregates shall conform to ASTM C33 Size 57, 67 or 7. Pea gravel aggregates shall not be used.

Newly placed concrete shall be cured in accordance with the provisions in ACI 308, "Standard Practice for Curing Concrete," latest edition. Method of curing shall be at the option of the Contractor with approval of the Owner and Engineer.

Metal anchorage devices, anchor bolts, etc. shall be secured in place and inspected prior to placing concrete. Wet setting embeded devices is not acceptable.

CONCRETE FINISHES

Deck: Coordinate with District.

Abutments: Smooth Form Finish.

NON-SHRINK GROUT

Non-Shrink Grout shall be composed of portland cement, sand, and water. The proportion of cement to sand, measured by volume shall be one to 3. The non-shrink grout shall contain only enough water to permit placing and packing. Use SIKAGROUT 212 by SIKA Corp. or SFT Grout by Master Builders or approved equal.

Concrete areas to be in contact with the non-shrink grout shall be cleaned of all loose or foreign material that would in any way prevent bond between the non-shrink grout and the concrete and steel surfaces and shall be flushed with water and allowed to dry to a surface dry condition immediately prior to placing the non-shrink grout.

The non-shrink grout shall completely fill and shall be placed within 15 minutes of mixing and tightly packed into recesses and holes, on surfaces, under structural members, and at other locations specified.

All non-shrink grout placed shall be immediately cured by keeping all exposed surfaces of the drypack continuously wet for a minimum of 72 hours.

No load shall be allowed on non-shrink grout that has been in place less than 72 hours unless otherwise permitted by the engineer.

STRUCTURAL STEEL & MISCELLANEOUS IRON

Work done under this section shall conform to the requirements of the AISC Specifications and Code of Standard Practice, latest edition. Steel shall conform to the following requirements:

Wide Flange Sections	ASTM A992, Grade 50
Hollow Steel Sections (HSS)	ASTM A500 Grade B
Other Shapes and Plates	ASTM A36
Fasteners	ASTM A307
Anchor Bolts	ASTM F1554 Grade 36
Weld Metal	FEXX=70 ksi
Expansion Anchors	Hilti Kwik Bolt TZ

All steel material and assemblies in the completed structure shall be painted as specified in section titled "PAINT". Contractor shall field prepare and repair all areas of coating damaged during installation.

Welding shall be done by welders certified for the welds to be made using E70XX electrodes in conformance with the requirements of AISC Specifications and Code of Standard Practice or AWS "Structural Welding Code." Full penetration welds are to be inspected during welding by a special inspector approved by the Building Department.

To assure the proper amperage and voltage of the welding process, the use of a hand held calibrated amp and voltmeter shall be used. The fabricator, erector and the inspectors shall use this equipment. Amperage and voltage shall be measured at the arc with this equipment. Travel speed and electrode stick out shall be verified to be in compliance with the electrode manufacturer's recommendations.

When fabricating beams, place natural camber up.

All bolted connections shall have a minimum of two bolts, unless shown otherwise.

Minimum size of bolts for structural steel connections shall be 5/8" Ø except when otherwise shown or noted.

Provide beveled washers on all connection to sloping flanges of I sections and channels.

All fasteners shall be hot-dip galvanized.

Where minimum AISC fillet weld thickness requirement exceeds welds shown on details, provide minimum AISC weld.

After fabrication, all steel shall be cleaned free of rust, loose mill, scale and oil.

The Contractor shall be responsible for the control of all erection procedures and sequences with relation to temperature differentials and weld shrinkage.

Contractor shall submit shop drawings to the Engineer for approval prior to the fabrication of any parts or assemblies.

PAINT

A. Work done under this section shall conform with Section 59, "Structural Steel Coatings" and Section 91, "Paint" of the Caltrans 2015 Standard Specifications and these Special Provisions.

B. Material Compatibility:
   1. Provide materials that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. General Paint System Description: Undercoat, Zinc rich shop primer, Finish coat, 2 topcoats exterior grade enamel (gloss finish).

D. Color Schedule: All steel components of the bridge system shall be painted and color selected by the District. Submit paint color samples (paint chips) to district for initial selection.

E. Submit for approval color samples and product data.

F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

SUBMITTALS

SUBMITTALS TO THE STRUCTURAL ENGINEER

Shop drawings shall be submitted for review in the following areas of work:

1. Concrete mix designs, stamped by an engineer licensed in the State of California
2. Concrete pumping/tremie system
3. Concrete curing method
4. Structural Steel
5. For all substitutions

Shop drawings for fabrication of components shall not utilize copies of the Engineer's drawings.

All submittals shall be reviewed and checked by the Contractor prior to submittal to Engineer for review. Contractor shall stamp and sign each submittal indicating they have reviewed, checked and approved the submittal for compliance with all the requirements of the plans and specifications.

SUBMITTALS TO THE GEOTECHNICAL ENGINEER

Shop drawings shall be submitted for review in the following areas of work:

1. Aggregate base materiel
2. Permeable drain rock
3. Engineered and imported fill

All submittals shall be reviewed and checked by the Contractor prior to submittal to the Geotechnical Engineer for review. Contractor shall stamp and sign each submittal indicating they have reviewed, checked and approved the submittal for compliance with all the requirements of the plans and specifications.

SPECIAL INSPECTIONS

Special inspection per Section 1705 of the California Building Code will be performed by an independent testing laboratory approved by the local jurisdiction and paid by the owner for the following areas of work:

1. See Special Inspection and Testing Agreement for complete listing of tests and inspections;
2. During the placement of concrete and taking of test specimens
3. Prior to and during the placement of concrete around bolts
4. Reinforcing steel placement prior to placement of concrete
5. Structural welding
6. Welding of reinforcing steel
7. Earth excavations, grading and filling, and foundation construction
8. And for all inspections listed in the Special Inspection and Testing Schedule/Agreement

Approval by the inspector does not mean approval of failure to comply with the plans or specifications. Any detail that fails to be clear or is ambiguous must be referred to the Engineer for interpretation or clarification prior to performing the work.

OBSERVATIONS

OBSERVATION BY THE STRUCTURAL ENGINEER

Structural observation is required at the following construction milestones:

1. Reinforcing steel placement prior to placing concrete
2. Upon installation of bridge girders on new abutments
3. Upon completion of project

The structural engineer shall be notified 48 hours in advance of above milestones.

OBSERVATION BY THE GEOTECHNICAL ENGINEER

Geotechnical observation is required at the following construction milestones:

1. For select grading activities
2. For all foundation excavations and pier drilling
3. For proper placement of back drains
4. Compaction testing for engineered fill materials
5. Where required by the Geotechnical Investigation Report

The geotechnical engineer shall be notified five working days in advance of above milestones.

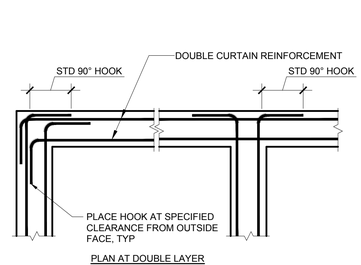
SPECIFIED CONCRETE COVER OVER REINFORCING BARS

USE CLEAR COVER SPECIFIED BELOW
UNLESS NOTED OTHERWISE ON PLANS OR DETAILS

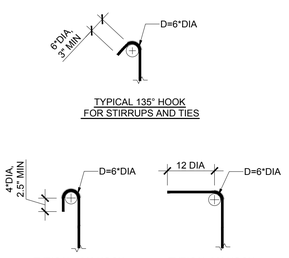
USE:	CLEAR COVER:
CAST AGAINST & PERMANENTLY EXPOSED TO EARTH	3"
FORMED, EXPOSED TO EARTH, WATER OR WEATHER	2"

SPECIFIED LAP SPLICE LENGTH (Ld)

BAR SIZE	BAR Ø	STEEL STRENGTH (fy)	f'c = 3000 psi		f'c = 4000 psi		f'c = 5000 psi	
			TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#4	0.500"	60ksi	37"	29"	32"	25"	29"	22"
#5	0.625"	60ksi	47"	36"	40"	31"	36"	28"
#6	0.750"	60ksi	56"	43"	48"	37"	43"	33"
#7	0.875"	60ksi	81"	63"	70"	54"	63"	49"
#8	1.000"	60ksi	93"	72"	80"	62"	72"	55"
#9	1.128"	60ksi	105"	81"	91"	70"	81"	63"



PLAN AT DOUBLE LAYER



TYPICAL 135° HOOK FOR STIRRUPS AND TIES

TYPICAL 180° HOOK

TYPICAL 90° HOOK

REBAR LAP SPLICE SCHEDULE AND TYPICAL REINFORCING DETAILS

1

REV	DESCRIPTION	BY	DATE
1	BID PLANS	DH	2/20/2018

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WEBB CREEK BRIDGE
REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE RESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

GENERAL NOTES
STRUCTURAL SPECIFICATIONS

DRAWN BY:	PD
CHECKED BY:	DH
JOB NUMBER:	17109

SHEET
S1

I:\17109 MROSD - Webb Creek Bridge Replacement\dwg\S1 - Specifications.dwg, 2/21/2018 4:25:16 PM, DWG To PDF.pc3

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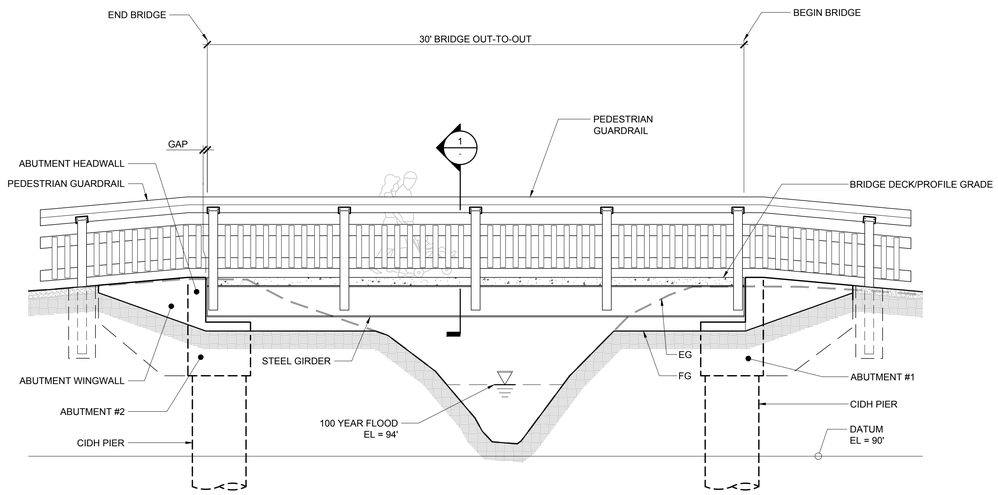
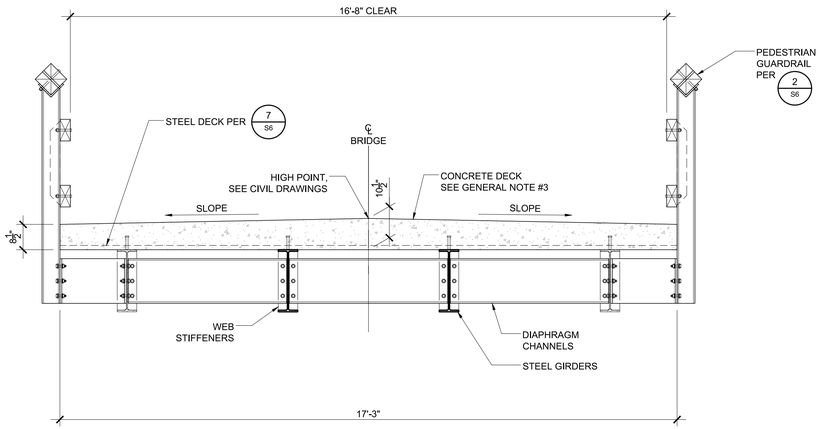


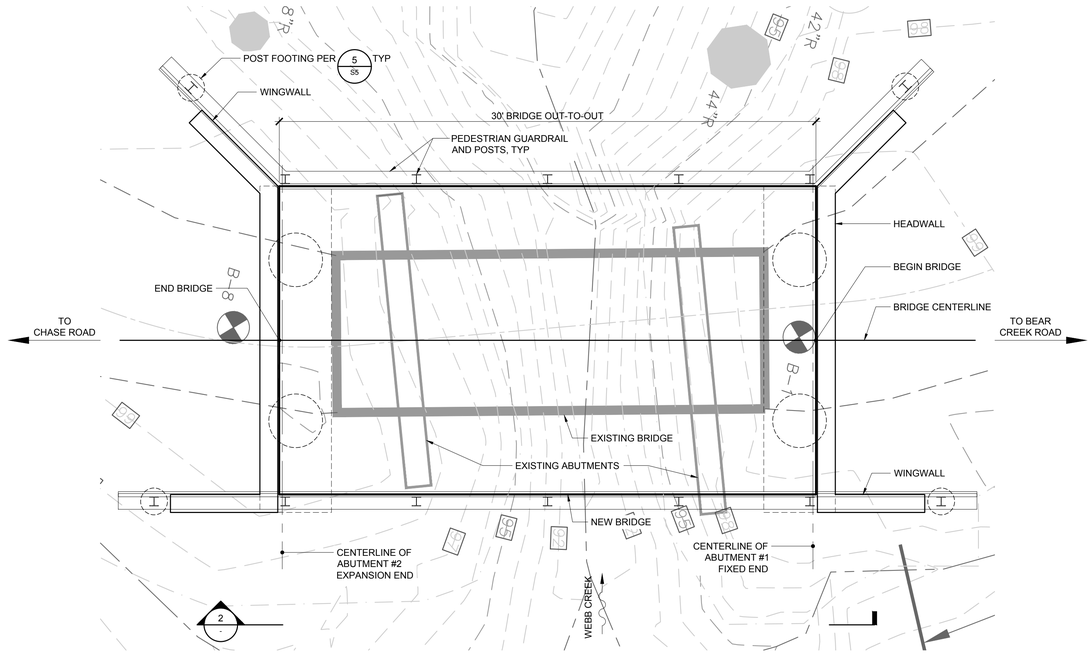
BRIDGE ELEVATION 2

SCALE: 1/4" = 1'-0"



BRIDGE SECTION 1

SCALE: 1/2" = 1'-0"



BRIDGE GENERAL PLAN

SCALE: 1/4" = 1'-0"

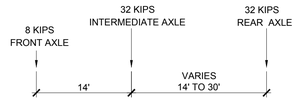
GENERAL NOTES

1. SEE CIVIL PLANS FOR FINISH GRADE ELEVATION NEAR ABUTMENTS.
2. CONCRETE DECK COLOR AND TEXTURE SHALL BE SELECTED BY DISTRICT.
3. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS, CONTROLLING FIELD DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION, ORDERING AND/OR FABRICATING ANY MATERIALS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
4. CONTRACTOR SHALL VERIFY ALL EMBEDDED ITEM LOCATIONS.
5. SEE CIVIL DRAWINGS FOR BRIDGE ALIGNMENT, LAYOUT AND SURVEY CONTROL INFORMATION.
6. ALL EXPOSED CONCRETE CORNERS SHALL HAVE A CHAMFER OF 3/4" UNO.
7. CONTRACTOR SHALL VERIFY BRIDGE LENGTHS FROM LOCATIONS OF NEW ABUTMENTS PRIOR TO FABRICATING STEEL GIRDERS.
8. TYPICAL REINFORCING DETAIL AND SPIRAL REINFORCING DETAIL ARE PROVIDED ON DETAIL 1/S1 AND 1/S6.

DESIGN VEHICLE LOAD DIAGRAM

VEHICLE LOAD HS20-44

LOAD DIAGRAM BELOW:



VEHICLE LIVE LOAD DIAGRAM

ABBREVIATIONS:

ABUT	ABUTMENT
ACI	AMERICAN CONCRETE INSTITUTE
BB	BEGIN BRIDGE
B/O	BOTTOM OF
BOT	BOTTOM
CIDH	CAST-IN-DRILLED-HOLE
CL	CENTER LINE
CLR	CLEAR
CONC	CONCRETE
EB	END BRIDGE
EG	EXISTING GRADE
ELEV	ELEVATION
FG	FINISH GRADE
HD	HEADED
HDG	HOT-DIP GALVANIZED
LOL	LAYOUT LINE
SAD	SEE ARCHITECTURAL DRAWINGS
SCD	SEE CIVIL DRAWINGS
STA	STATION
TYP	TYPICAL
T/O	TOP OF
WSE	WATER SURFACE ELEVATION
UNO	UNLESS NOTED OTHERWISE
°	DEGREES
Ø	DIAMETER
±	PLUS / MINUS

REV	DESCRIPTION	BY	DATE
1	BID PLANS	DH	2/20/2018
2			
3			
4			
5			

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PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE RESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

BRIDGE ELEVATION
BRIDGE SECTION
BRIDGE PLAN
GENERAL NOTES
BRIDGE VEHICLE LOAD

DRAWN BY:	ED
CHECKED BY:	DH
JOB NUMBER:	17109

SHEET

S2

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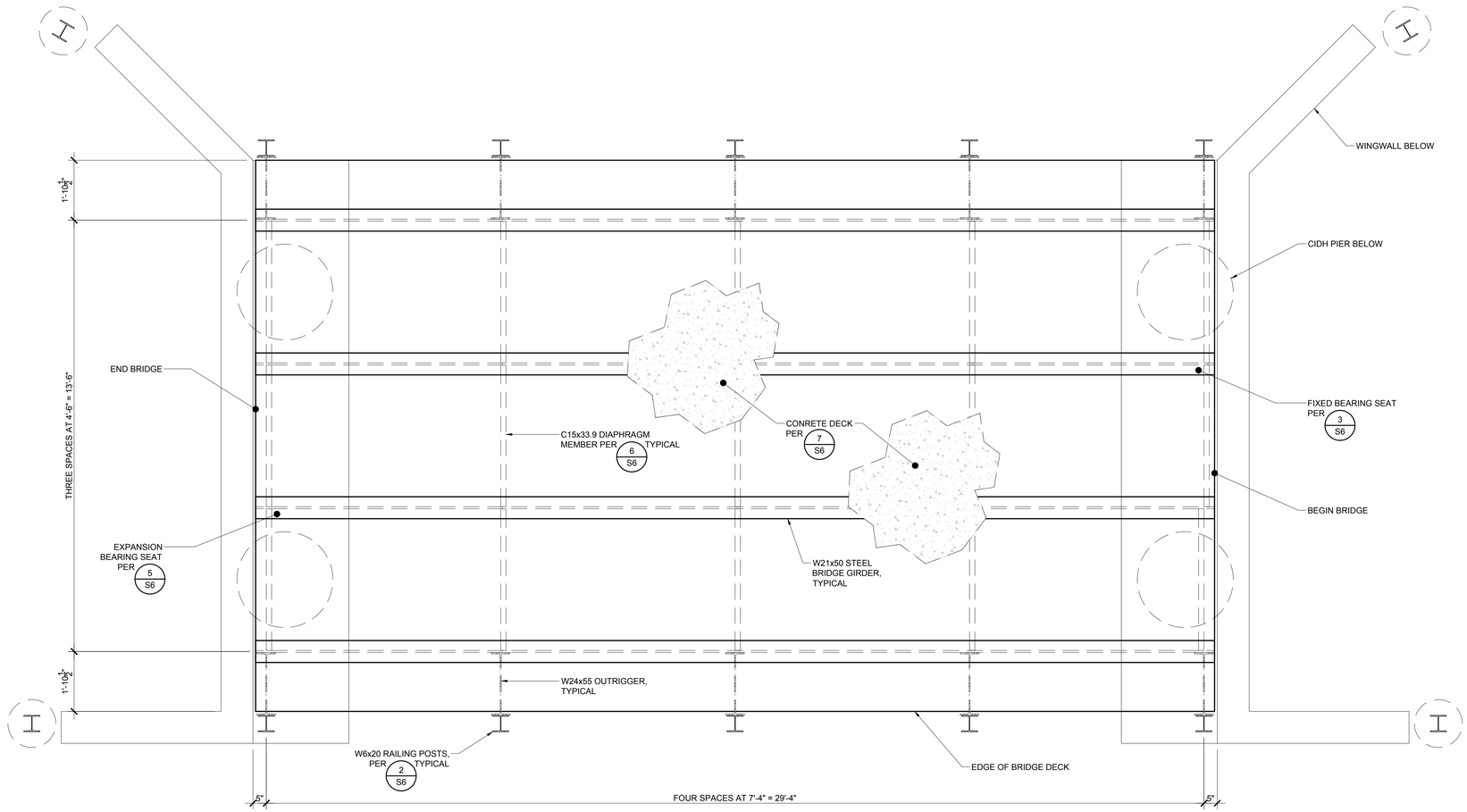
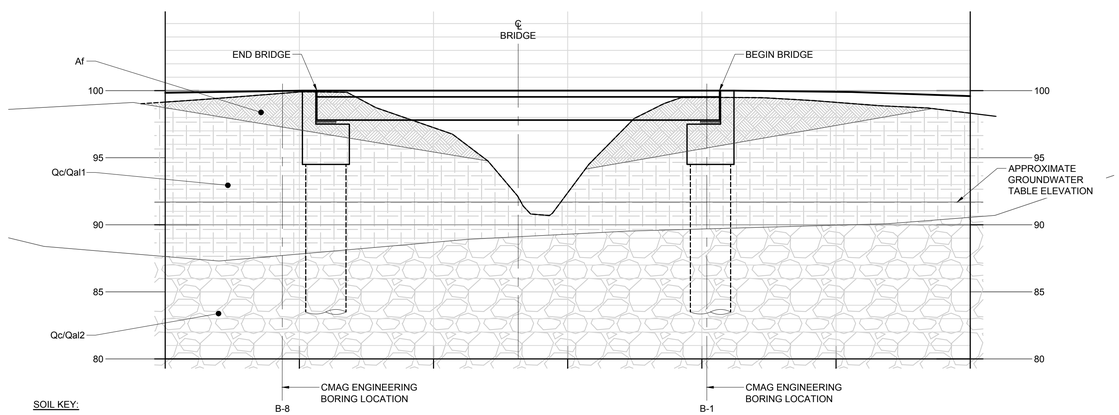


DECK PLAN

SCALE: 1/2" = 1'-0"

1



SOIL KEY:

Af: ARTIFICIAL FILL
Qc/Qal1: COLLUVIAL / ALLUVIAL DEPOSITS: VERY LOOSE TO MEDIUM DENSE SILTY SANDS, SANDY SILTS AND SANDY LEAN CLAYS (SOFT TO FIRM).
Qc/Qal2: COLLUVIAL / ALLUVIAL DEPOSITS: SANDSTONE BOULDERS IN MATRIX OF SILTY SAND, SANDY SILT AND SANDY LEAN CLAY. SANDSTONE - DENSE, MATRIX - LOOSE. CLAST AND MATRIX SUPPORTED.

SOIL SECTION (FROM SOILS REPORT)

SCALE: 3/16" = 1'-0"

2

REV.	DESCRIPTION	BY	DATE
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MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

DECK PLAN
SOIL SECTION

DRAWN BY:	EDD/PD
CHECKED BY:	DH
JOB NUMBER:	17109

SHEET

S3

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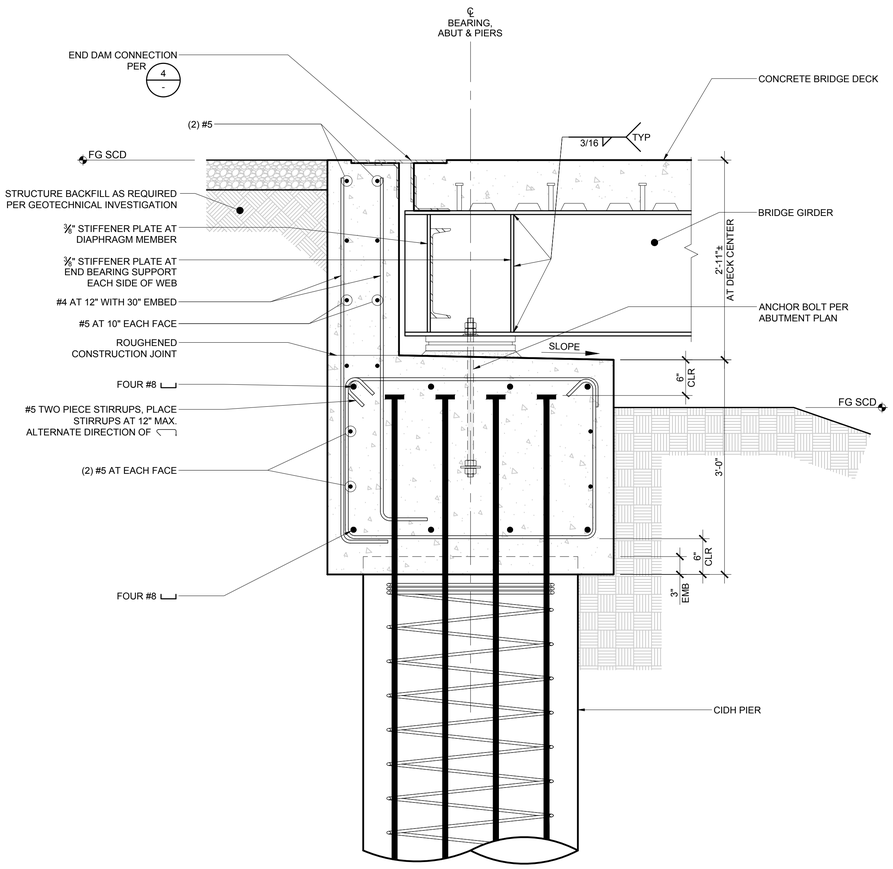
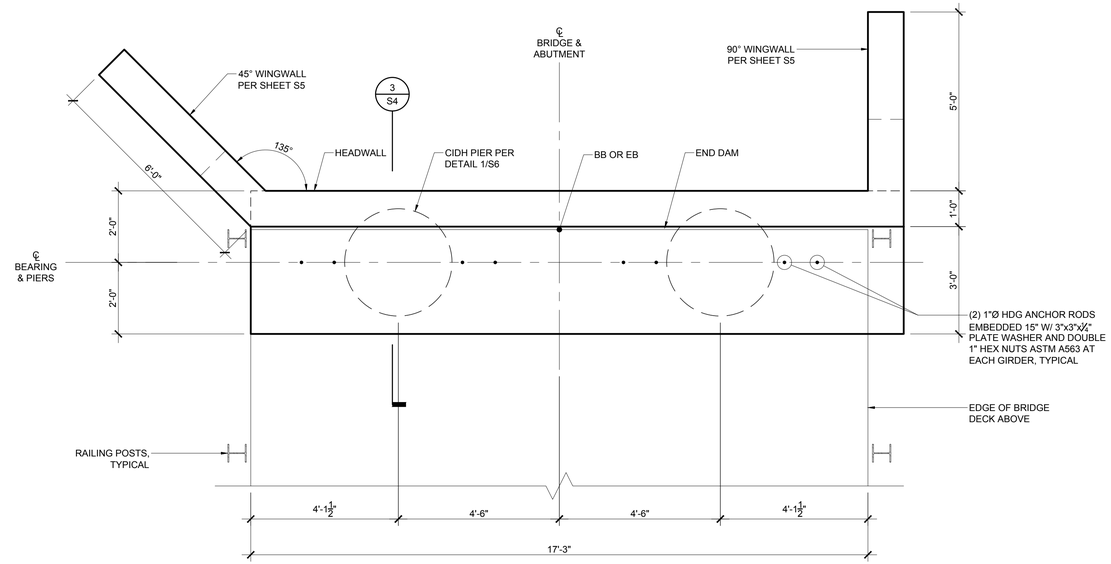


ABUTMENT SECTION

SCALE: 1" = 1'-0"

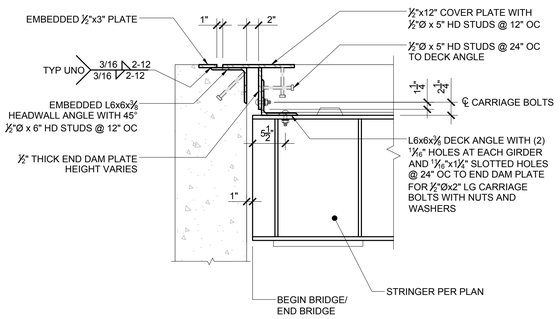
3



ABUTMENT PLAN

SCALE: 1/2" = 1'-0"

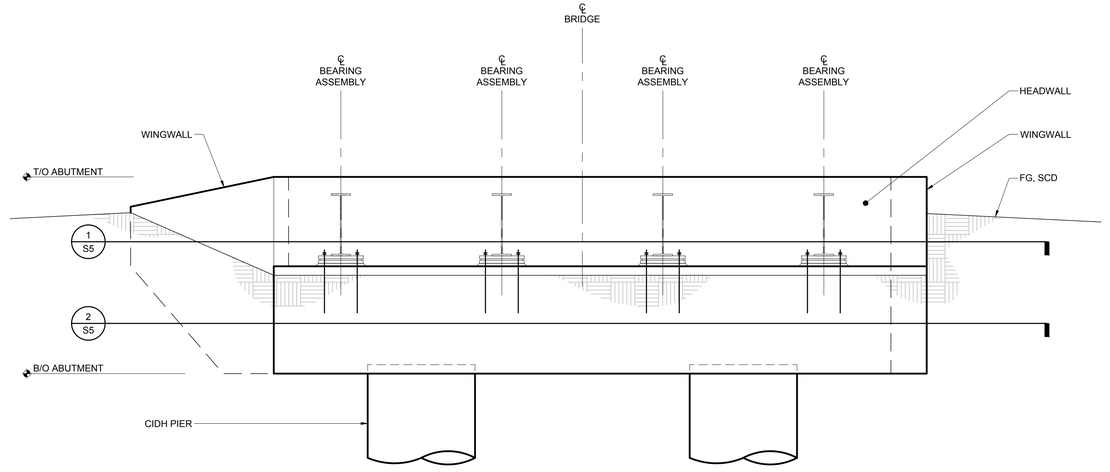
1



END DAM CONNECTION

SCALE: 1" = 1'-0"

4



ABUTMENT ELEVATION

SCALE: 1/2" = 1'-0"

2

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	DH	2/20/2018

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PREPARED AT THE REQUEST OF
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MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 ENGINEER DRIVE
LOS ALTOS, CA 94022

ABUTMENT PLAN
ABUTMENT SECTION
ABUTMENT ELEVATION

DRAWN BY:	EDD/PD
CHECKED BY:	DH
JOB NUMBER:	17109

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S4

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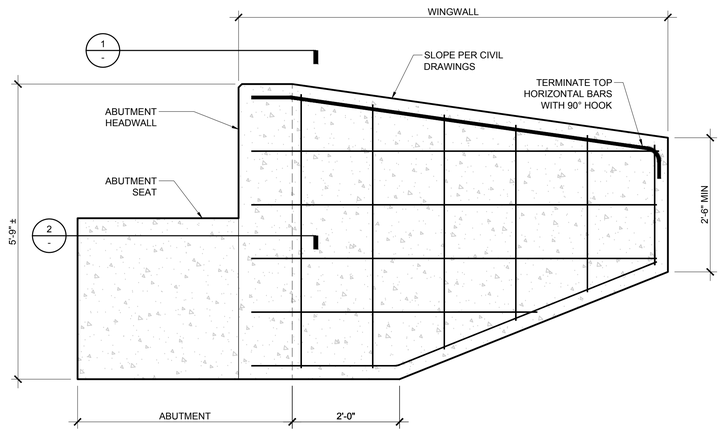
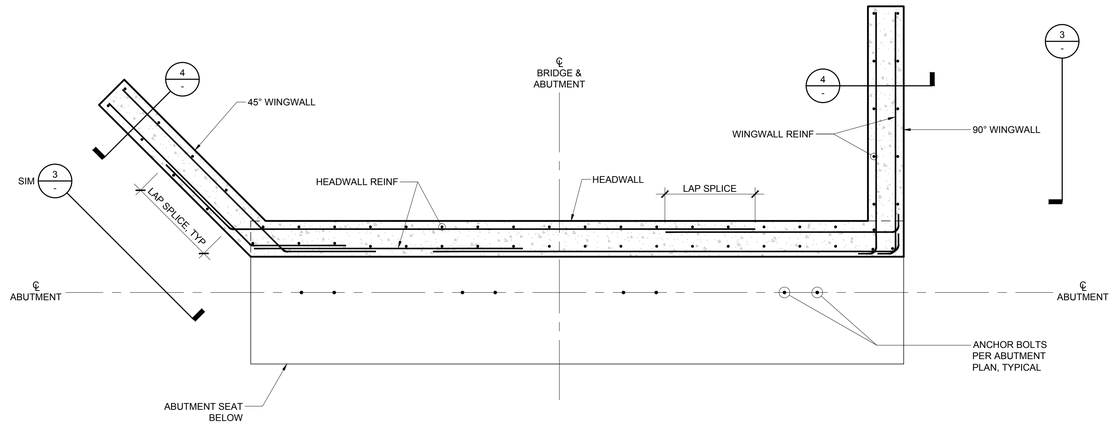


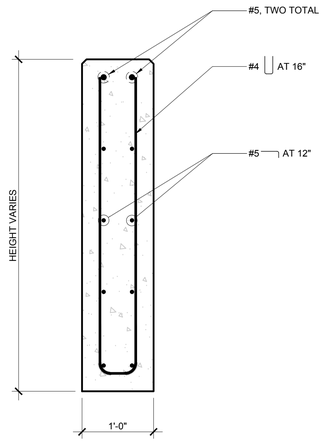
WINGWALL ELEVATION 3

SCALE: 3/4" = 1'-0"



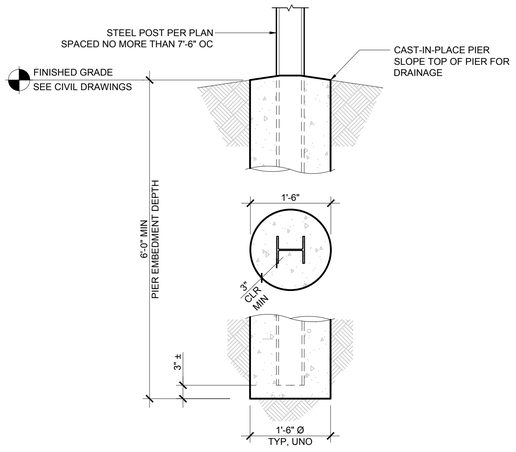
SECTION 1

SCALE: 1/2" = 1'-0"



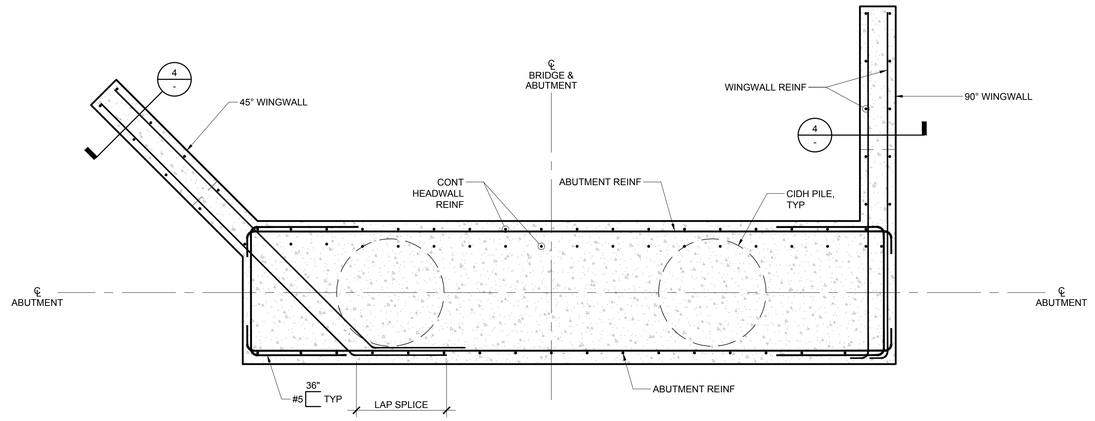
WINGWALL SECTION 4

SCALE: 1" = 1'-0"



GUARDRAIL POST FOOTING 5

SCALE: 3/4" = 1'-0"



SECTION 2

SCALE: 1/2" = 1'-0"

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	DH	2/20/2018

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PREPARED AT THE REQUEST OF
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MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

ABUTMENT & WINGWALL REINFORCING
TYPICAL GUARDRAIL FOOTING DETAIL

DRAWN BY:	EDD/PD
CHECKED BY:	DH
JOB NUMBER:	17109

SHEET

S5

I:\17109 MROSD - Webb Creek Bridge Replacement\dwg\S3,S4,S5,S6 - Bridge Abutment.dwg, 2/21/2018 4:25:21 PM, DWG To PDF.pc3

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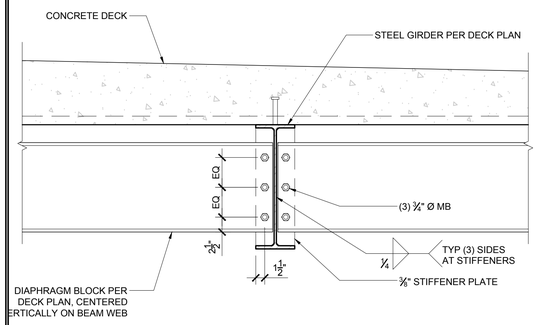
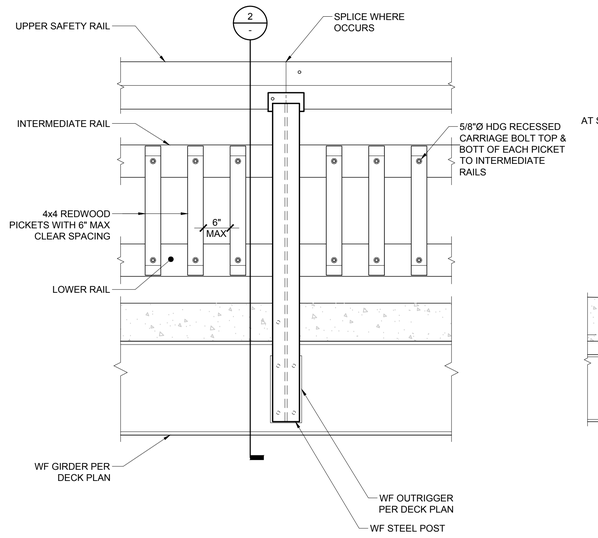


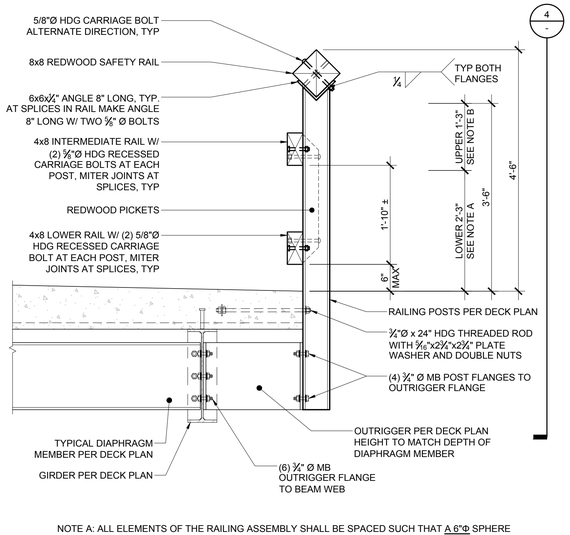
DIAPHRAGM FRAMING 6

SCALE: 1" = 1'-0"



PEDESTRIAN GUARDRAIL ELEV 4

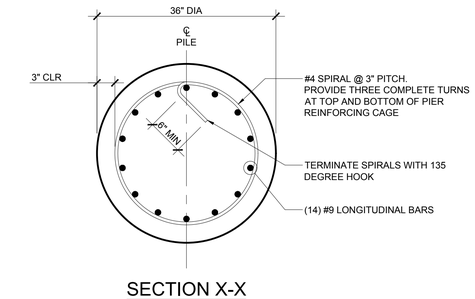
SCALE: 3/4" = 1'-0"



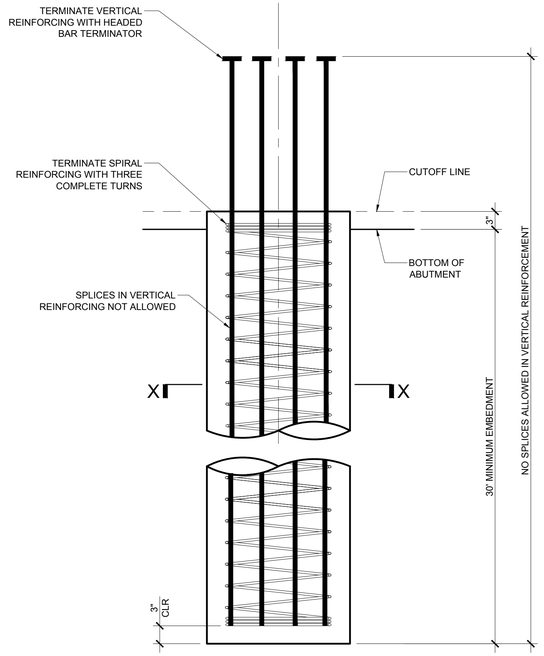
NOTE A: ALL ELEMENTS OF THE RAILING ASSEMBLY SHALL BE SPACED SUCH THAT A 6"Φ SPHERE WILL NOT PASS THROUGH ANY OPENING.
NOTE B: ALL ELEMENTS OF THE RAILING ASSEMBLY SHALL BE SPACED SUCH THAT AN 8"Φ SPHERE WILL NOT PASS THROUGH ANY OPENING.

PEDESTRIAN GUARDRAIL SECT 2

SCALE: 3/4" = 1'-0"

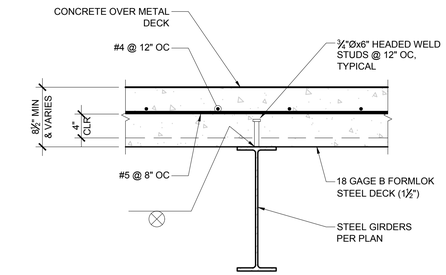


SECTION X-X



CIDH PILE DETAIL 1

SCALE: 1" = 1'-0"



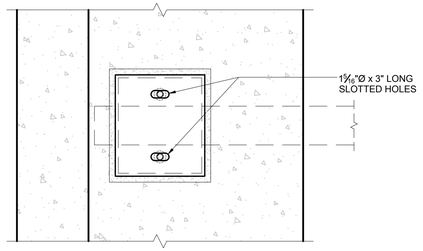
STEEL DECK NOTES:

FASTENING DECK UNITS:

1. SECURE TO SUPPORTING MEMBERS WITH ½ IN. EFFECTIVE DIAMETER ARC SPOT WELDS AT EACH FLUTE. IF STUDS ARE WELDED THROUGH DECK TO STRUCTURAL STEEL, STUD WELDS CAN REPLACE ARC SPOT WELDS.
2. CONNECT SIDELAPS WITH TOP SEAM WELDS OR VERCO PUNCHLOK TOOL TO CREATE INTERLOCKING VSC CONNECTION AT 18" ON CENTER. VSCs MAY BE MADE IN EITHER DIRECTION.

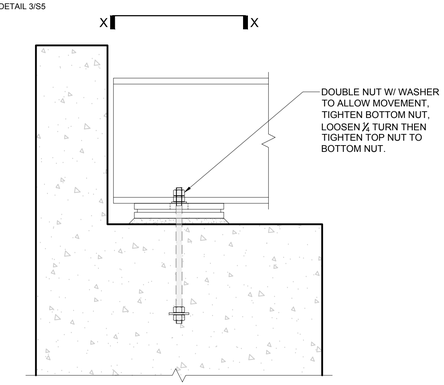
TYPICAL DECK SECTION 7

SCALE: 1" = 1'-0"



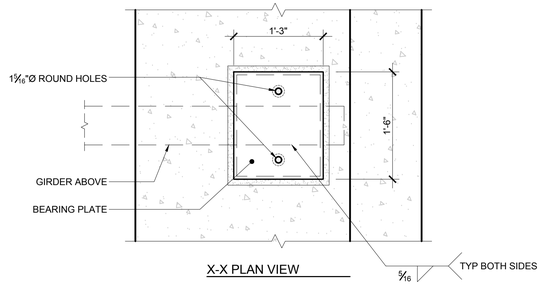
X-X PLAN VIEW

NOTE: FOR BALANCE OF INFORMATION SEE DETAIL 3/S5

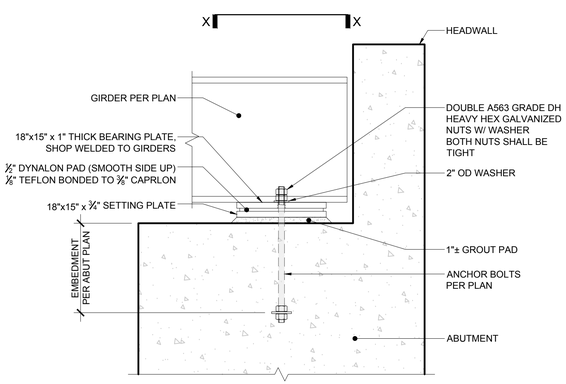


END BRIDGE EXPANSION BEARING SEAT 5

SCALE: 1" = 1'-0"



X-X PLAN VIEW



BEGIN BRIDGE FIXED BEARING SEAT 3

SCALE: 1" = 1'-0"

REV.	DESCRIPTION	BY	DATE
1	BID PLANS	DH	2/20/2018

MME
CIVIL + STRUCTURAL ENGINEERING
224 Walnut Ave, Suite B Santa Cruz, CA 95060
Phone (831) 426-3186

REGISTERED PROFESSIONAL ENGINEER — JEFFREY A. HENDERSON — No. 68549 — CIVIL STRUCTURAL — STATE OF CALIFORNIA

WEBB CREEK BRIDGE REPLACEMENT PROJECT

PREPARED AT THE REQUEST OF
BEAR CREEK REDWOODS OPEN SPACE RESERVE
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
330 DISTEL CIRCLE
LOS ALTOS, CA 94022

ABUTMENT AND PILE DETAILS
RAILING DETAILS
DECK DETAILS

DRAWN BY:	EDD
CHECKED BY:	DH
JOB NUMBER:	17109

SHEET

S6

I:\17109 MROSD - Webb Creek Bridge Replacement\dwg\S3,S4,S5,S6 - Bridge Abutment.dwg, 2/21/2018 4:25:22 PM, DWG To PDF.pc3

SURVEY NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509A SWIFT STREET
   SANTA CRUZ, CA 95060
   SURVEY DATE: MAY 25TH, 2016
2. ELEVATION DATUM: AN ASSUMED ELEVATION OF 100.00' WAS ESTABLISHED AT SURVEY CONTROL POINT #1 (½"X24", IRON ROD).
3. BASIS OF BEARINGS: BASIS OF BEARINGS BETWEEN POINTS #1 AND #2 IS N00°00'00"E, AS SHOWN.
4. CONTOUR INTERVAL IS ONE FOOT. ELEVATIONS AND DISTANCES SHOWN ARE IN DECIMAL FEET.
5. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES ARE NOT SHOWN HEREON.
6. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. THE DBH FOR TREES THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND MAY BE CONSOLIDATED INTO A SINGLE DBH BY TAKING THE SQUARE ROOT OF THE SUM OF ALL SQUARED STEM DBH'S, UNLESS OTHERWISE NOTED. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.
   12"P = 12" DBH PINE
7. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
8. TREE TRUNK DIMENSIONS MAY BE SHOWN OUT-OF-SCALE FOR PLOTTING CLARITY. CAUTION SHOULD BE USED IN DESIGNING NEAR TREE TRUNKS. THERE ARE LIMITATIONS ON FIELD ACCURACY, DRAFTING ACCURACY, MEDIUM STRETCH AS WELL AS THE "SPREAD" OR "LEANING" OF TREES. REQUEST ADDITIONAL TOPOGRAPHIC DETAIL WHERE CLOSE TOLERANCES ARE ANTICIPATED. INDIVIDUAL TREES ARE NOT TYPICALLY LOCATED WITHIN DRIPLINE CANOPY AREAS SHOWN.

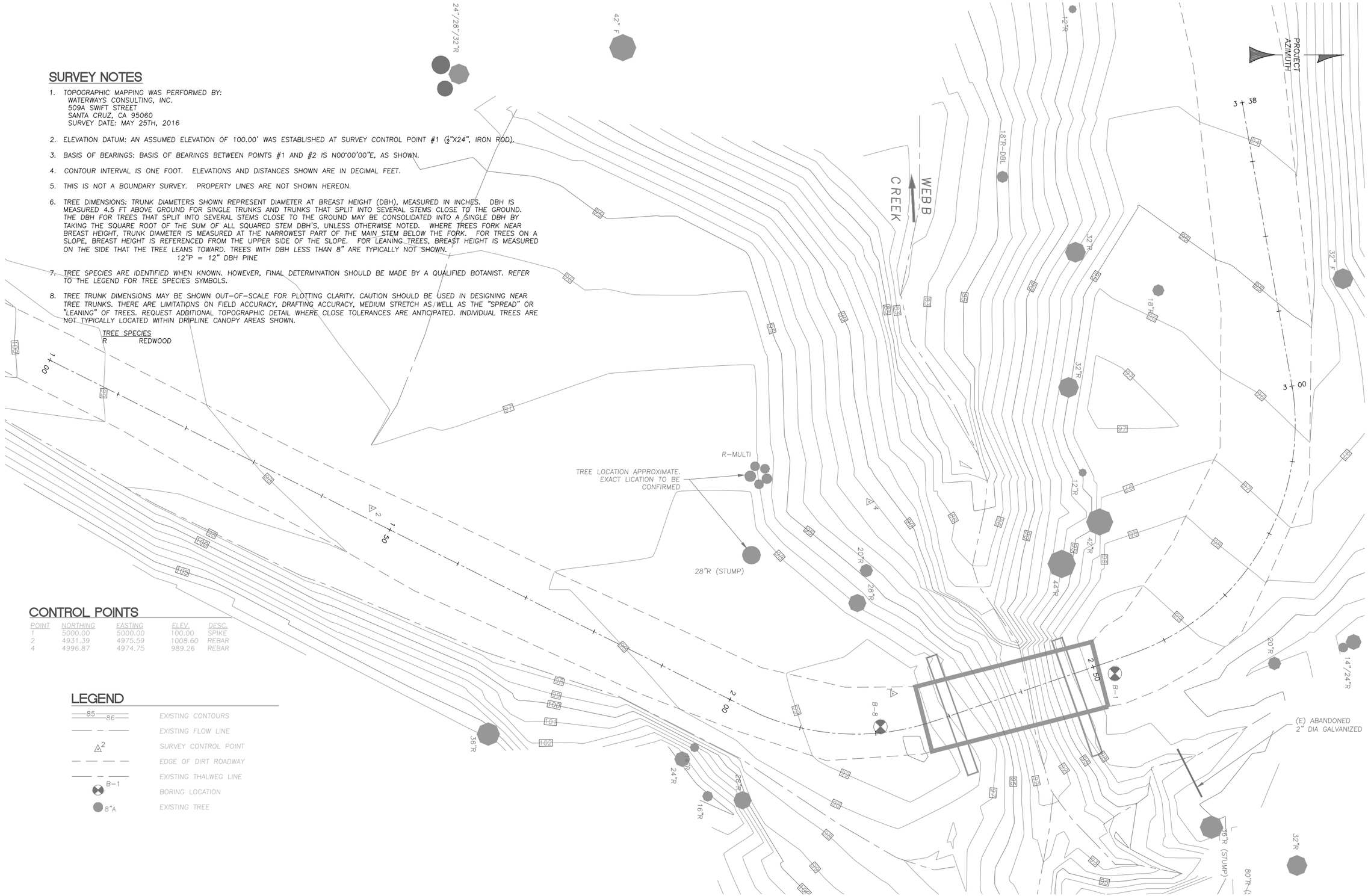
TREE SPECIES	
R	REDWOOD

CONTROL POINTS

POINT	NORTHING	EASTING	ELEV.	DESC.
1	5000.00	5000.00	100.00	SPIKE
2	4931.39	4975.59	1008.60	REBAR
4	4996.87	4974.75	989.26	REBAR

LEGEND

- 85 — 86 — EXISTING CONTOURS
- EXISTING FLOW LINE
- △2 SURVEY CONTROL POINT
- EDGE OF DIRT ROADWAY
- EXISTING THALWEG LINE
- B-1 BORING LOCATION
- 8"A EXISTING TREE



BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS

100% SUBMITTAL

VICINITY MAP
N.T.S. (GOOGLE)

REGIONAL MAP
N.T.S. (GOOGLE)

GENERAL NOTES

1. TOPOGRAPHIC MAPPING PROVIDED BY:

   A. GROUND SURVEY: WATERWAYS CONSULTING, INC.
   SURVEY DATES VARY
   (2016–2017)

   ELEVATION DATUM: BASED ON INDIVIDUAL ASSUMED LOCAL DATUM

   B. AERIAL SURVEY: SANTA CLARA COUNTY LIDAR CONTOURS
   PROVIDED BY MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

   ELEVATION DATUM: NAVD88

   BASIS OF BEARINGS: NAD83 CALIFORNIA STATE PLANES,
   ZONE III

2. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

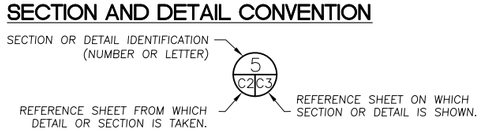
ABBREVIATIONS

AB	AGGREGATE BASE
AVG.	AVERAGE
C	CLEAN
CC	CONCRETE
CY	CUBIC YARDS
DIA.	DIAMETER
E	EXISTING
EG	EXISTING GROUND
ELEV.	ELEVATION
DI	DRAINAGE INLET
DRC	DITCH RELIEF CULVERT
FG	FINISHED GRADE
FT	FEET
HWP	HEADWALL PROTECTION
IBD	INBOARD DITCH
INV	INVERT
KN	KNICK
KO	KNOCK OUT
N	NEW
NIC	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
RC	RELATIVE COMPACTION
RED	ROCK ENERGY DISSIPATOR
RGD	REVERSE GRADE DIP
RIBD	ROCKED IBD
RIP	ROCK INLET PROTECTION
RS	ROCKED SHOULDER
RSP	ROCK SLOPE PROTECTION
SPK	SPIKE
STC	STREAM CULVERT
STD	STANDARD
SQ.FT.	SQUARE FOOT
T	TREE
T.B.D.	TO BE DETERMINED
TYP	TYPICAL
UNK	UNKNOWN
WSE	WATER SURFACE ELEVATION
YR	YEAR

TREE SPECIES

BM	BIGLEAF MAPLE
DF	DOUGLAS FIR
RC	RED CEDAR
WF	WHITE FIR

SECTION AND DETAIL CONVENTION



SHEET INDEX

C1	COVER
C2	OVERVIEW, ACCESS, & STAGING PLAN
C3	ROAD 300
C4	ROADS 321 & 322
C5	ROADS 330 & 340
C6	ROAD 320
C7	ROADS 310, 311, & 312
C8	MP–202 & MP–206
C9	MP–207
C10	MP–210
C11	MP–216 SITE PLAN
C12	MP–216 SECTION
C13	MP–221 & MP 225.1
C14	MP–240
C15	MP–242
C16	MP–252
C17	MP–265
C18	MP 330–800
C19	DETAILS (1 OF 5)
C20	DETAILS (2 OF 5)
C21	DETAILS (3 OF 5)
C22	DETAILS (4 OF 5)
C23	DETAILS (5 OF 5)
C24	NOTES

* CALL BEFORE YOU DIG *

CONTACT UNDERGROUND SERVICE ALERT (USA)
PRIOR TO ANY CONSTRUCTION WORK 1-800-227-2600

WATERWAYS CONSULTING INC.
TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY

DATE 3/06/18

REGISTERED PROFESSIONAL ENGINEER ★ MATT W. WELD ★ No. 62235 Exp. 9-30-19 CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

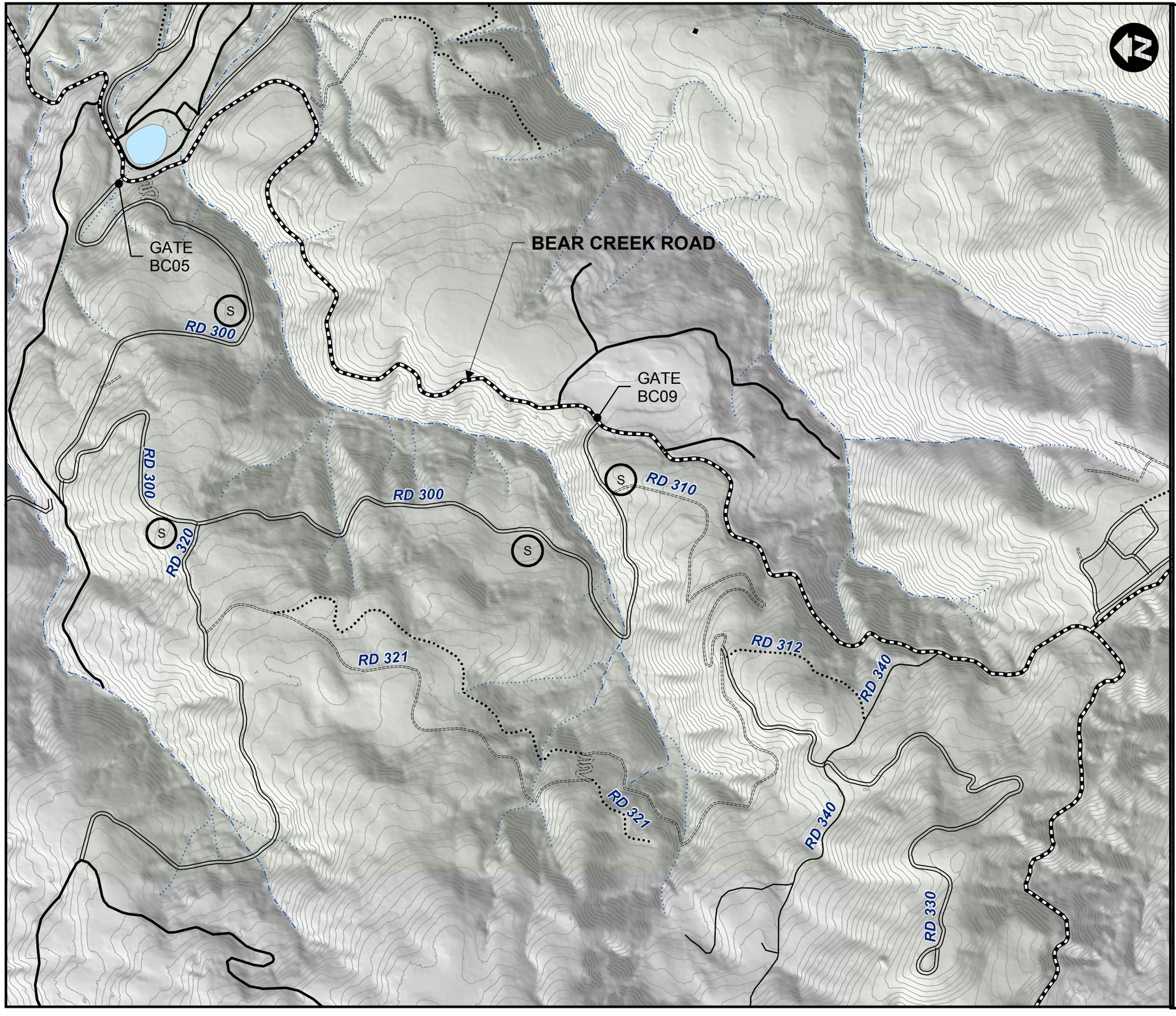
COVER

BEAR CREEK
REDWOODS - PHASE
ONE ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16–017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1



EXISTING ROADS + TRAILS

- Paved - Public
- Gravel - Private
- Primary Patrol Road
- ATV Patrol Road
- Legacy / closed

WATERCOURSES

- Perennial
- Intermittent
- Ephemerial

S Staging

GATE BC09 District Gates for Construction Access

Note: Gate BC 01 is located on Bear Creek Road just North of limit of view.

MATT W. WELD

REGISTERED PROFESSIONAL ENGINEER
MATT W. WELD
No. 62235
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

3/06/18
DATE

1:8,000

Feet
0 200 400

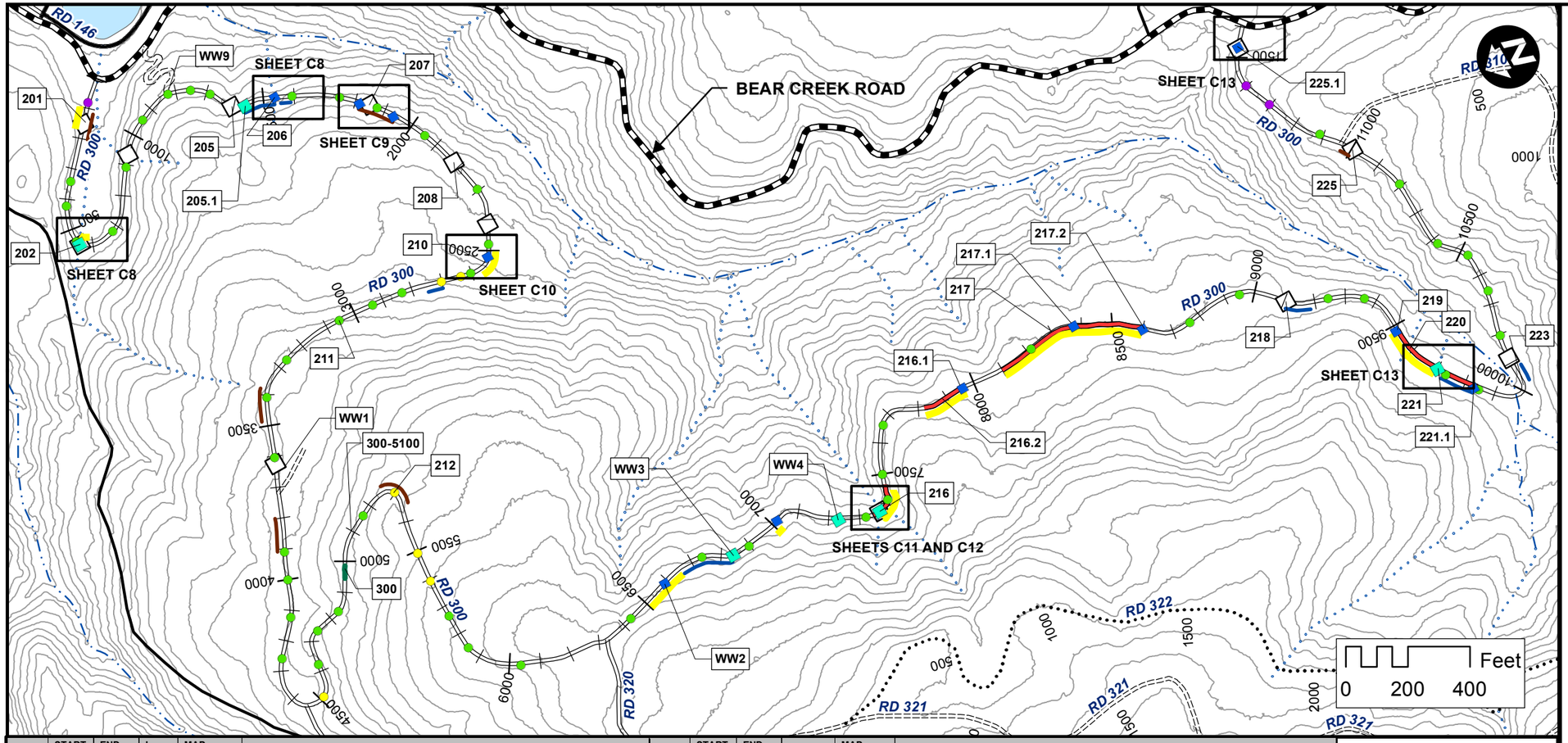
WATERWAYS CONSULTING, INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH: (831)421-9291//FAX: (888)819-6847
WWW.WATWAYS.COM

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

OVERVIEW MAP

BEAR CREEK
REDWOODS - PHASE ONE
ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

C2



ROAD	START STA	END STA	L (FT)	MAP POINT	NOTES
300	100	175	75		NIBD
	175			201	CLEAN DRC
	130	200	70		CONSTRUCT EARTHEN BERM AT OUTBOARD ROAD EDGE. HEIGHT = 18"
	550			MP202	36" DIA. X 60 LF STC, RED & CONSTRUCT ROCKSLOPE BUTTRESS (80 CY), PER DETAILED SITE PLAN
	550	585	35		NIBD
	1400			MP205	CLEAN DRC
	1440			MP205.1	18" DIA. X 40 LF DRC W/20LF DOWNSPOUT
	1440	1540	100		CIBD
	1540			MP206	24" DIA. X 40 LF STC W/40LF DOWNSPOUT AND 3 FT TALL X 4 FT LONG HEADWALL PROTECTION PER DETAILED SITE PLAN
	1550	1580	30		CIBD
	1810				INSTALL TWO (2) 18" DIA. X 30 LF DRC'S WITH 20 LF SLOPE DRAINS, PER DETAILED DESIGN SHEET
	1810	1940	130	MP207	RESHAPE ROADBED TO REMOVE HIGH POINT IN PROFILE AND INSLOPE BETWEEN DRC'S
	1810	1940	130		ROCK LINED SHOULDER
	1880				CONSTRUCT ROCKSLOPE BUTTRESS (20 CY)
	2185			MP208	CONSTRUCT 3 FT TALL X 4 FT LONG HWP
	2500	2575	75		NIBD
	2500	2700	200	MP210	REALIGN FALL-LINE ROAD REACH, PER DETAILED SITE PLAN
	2510				18" DIA X 20LF DRC
	2700	2750	50		CIBD
	3050			MP211	ADD 5 CY GABION ROCK AT OUTFALL OF RGD
	3500	3600	100		OUTSLOPE ROAD
	3620	3700	80	WW1	CIBD
	3800	3920	120		RESHAPE ROADBED
	4975			MP300	ADD 3 CY GABION ROCK AT OUTFALL OF RGD
	5100			MP300-5100	REMOVE AND DISPOSE OF TWO EXISTING FUEL TANKS, PER SPECIFICATIONS TO BE PROVIDED BY MROSD
	5250	5350	100	MP212	ENLARGE AND DEEPEN KNOCKOUT, WIDEN TURN, AND SLOPE ROAD BED TO SOUTH
	6500	6620	120		NIBD
	6600			WW2	18" X 40 LF DRC

ROAD	START STA	END STA	L (FT)	MAP POINT	NOTES
300	6620	6830	210		CIBD
	6830			WW3	INSTALL 24" X 30 LF STC W/30LF SLOPE DRAIN.
	6990	7020	30		NIBD
	7020			WW3.1	18" X 30 LF DRC. PLACE 30 CY FILL TO RAISE ROAD OVER CULVERT. FILL AVAILABLE LOCALLY
	7225			WW4	24" X 40 LF STC
	7350	7460	110		ROCK AND FABRIC PER DETAIL "I"
	7355	7450	95		NIBD
	7360			MP216	36" X 40 LF STC, PER DETAILED SITE PLAN
	7410	7440	30		CONSTRUCT ROCKSLOPE BUTTRESS (70 CY)
	7820	7990	170	MP216.2	ROCK AND FABRIC PER DETAIL "I"
	7820	7990	170		NIBD
	7960			MP216.1	18" X 40 LF DRC
	8100	8600	500	MP217	ROCK AND FABRIC AND RAISE ROAD PER DETAIL "I"
	8100	8600	500		NIBD
	8380			MP 217.1	18" X 30 LF DRC
	8600			MP217.2	REPLACE RGD WITH DRC, 18" X 30 LF
	9110	9185	75	MP218	CLEAN CULVERT AND CIBD
	9520			MP219	18" x 30 LF DRC
	9520	9700	180		NIBD.
	9520	9700	180		SUBGRADE STABILIZATION
	9700			MP221	24" X 40 LF STC, PER SKETCH
	9730	9830	100		CIBD
	9730	9830	100		SUBGRADE STABILIZATION
	9830			MP221.1	18" x 30 LF DRC
	10030	10080	50	MP223	CIBD FOR 50 LF FROM BRIDGE TO EXTG. CULVERT
	11000	11030	30	MP225	REESTABLISH OUTFALL DITCH. REGRADE ROAD TO DRAIN TO CULVERT
	11550			MP225.1	15" DIA. X 20 LF DRC, 4 FT TALL X 4 FT LONG HWP, 15" X 30 LF SLOPE DRAIN, AND CONCRETE DROP INLET PER DETAILED SECTION

PROPOSED FEATURES

- Reverse Grade Dip
- Ditch Relief Culvert
- Stream Crossing Culvert
- Knick
- Reverse Grade Dip with Knock Out
- (E) Culvert
- Construct Inboard Ditch
- Clean Inboard Ditch
- Reshape Road
- Subgrade Stabilization

NOTE: FEATURES SHOWN ON THE SIDE OF THE ROAD ARE FOR SCHEMATIC PURPOSES ONLY.

1 Map Point

EXISTING ROADS + TRAILS

- Paved - Public
- Gravel - Private
- Primary Patrol Road
- ATV Patrol Road
- Legacy / closed

WATERCOURSES

- Perennial
- Intermittent
- Ephemerial

NOTES:

1. INSTALL AGGREGATE BASE ALONG ENTIRE LENGTH OF ROAD 300 (11600 LF) PER DETAIL D ON SHEET C20.

2. WHERE SUBGRADE STABILIZATION IS SPECIFIED, OVEREXCAVATE 4 INCHES AND INSTALL ADDITIONAL 4 INCHES OF COARSE AGGREGATE BASE, PER NOTES ON DETAIL D, SHEET C20.

MATT W. WELD

REGISTERED PROFESSIONAL ENGINEER MATT W. WELD No. 62235 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

3/06/18
DATE

1:4,800

WATERWAYS CONSULTING, INC.
WWW.WATWAYS.COM

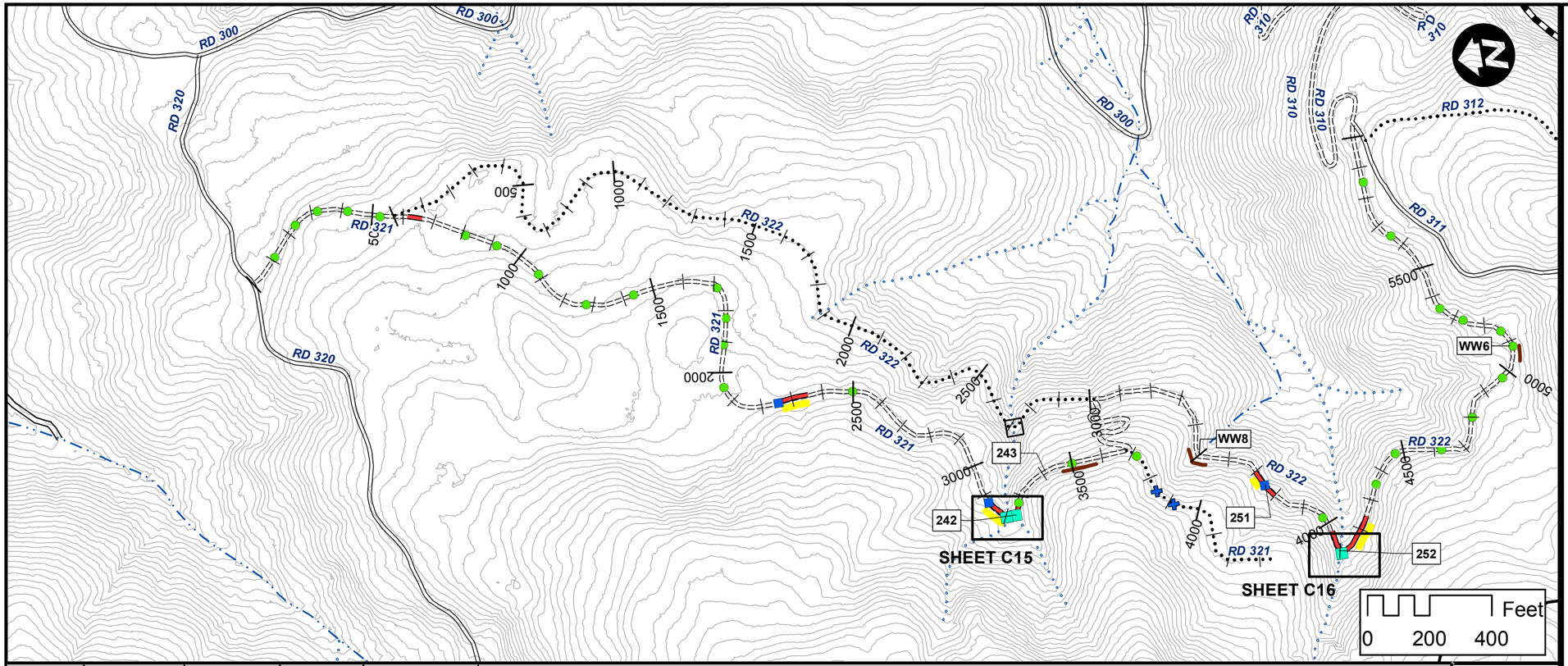
TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
1002 Columbia Street, Santa Cruz, CA 95060
(831) 425-5822 (831) 425-5820 (fax)

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

ROAD 300

BEAR CREEK
REDWOODS - PHASE ONE
ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

C3



ROAD	START STA	END STA	L (FT)	MAP POINT	Notes
321	610	660	60		SUBGRADE STABILIZATION
	2250				18" X 20 LF DRC
	2250	2350	100		NIBD
	2250	2350	100		SUBGRADE STABILIZATION
	3120	3200	80		NIBD
	3120			MP242	18" X 20 LF DRC
	3120	3350	230		SUBGRADE STABILIZATION
	3200				24" DIA X 40 LF STC
	3215				48" DIA X 40 LF STC
	3370	3470	100	MP243	REMOVE LOOSE FILL AND DEBRIS AT TOE OF CUT SLOPE TO GET 6 FT. WIDTH. OUTSLOPE
	3740				WATER BAR AND PULL FILL
	3910				WATER BAR
322	3475	3525	50	WW8	OUTSLOPE
	3710	3750	40		NIBD
	3750			MP251	18" DIA X 30 LF DRC
	3700	3800	100		SUBGRADE STABILIZATION
	4025	4250		MP252	225 LF SUBGRADE STABILIZATION
	4100				48" X 40 LF STC
	4100				RED
	4100				EXCAVATE INLET CHANNEL
	4120				18" X 30 LF DRC
	4120	4205	85		NIBD
	4205			MP252	25 LF SUBDRAIN
	4250				25 LF SUBDRAIN
	5060	5090	30	WW6	OUTSLOPE AND ROCK (4" LIME-TREATED AGGREGATE BASE) RECENTLY LEVELED TURNAROUND. APPROX. 1200 SF

PROPOSED FEATURES

- Reverse Grade Dip
- Ditch Relief Culvert
- Stream Crossing Culvert
- Knick
- Reverse Grade Dip with Knock Out
- Water Bar
- (E) Culvert
- Construct Inboard Ditch
- Clean Inboard Ditch
- Reshape Road
- Subgrade Stabilization

NOTE: FEATURES SHOWN ON THE SIDE OF THE ROAD ARE FOR SCHEMATIC PURPOSES ONLY.

1 Map Point

EXISTING ROADS + TRAILS

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- Perennial
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PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

MATT W. WELD

REGISTERED PROFESSIONAL ENGINEER
MATT W. WELD
No. 62235
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

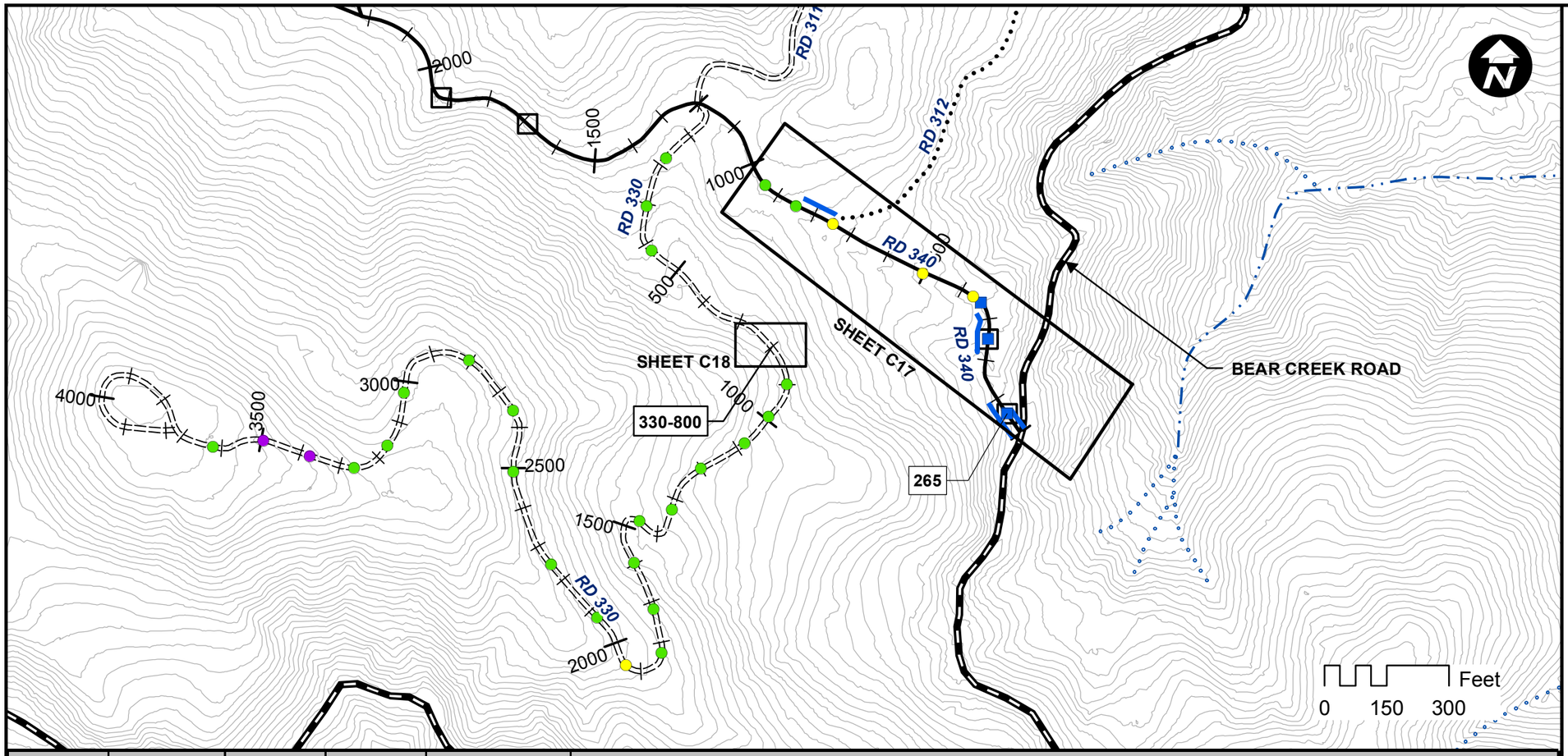
3/06/18
DATE

1:4,800

ROADS
321 & 322

BEAR CREEK
REDWOODS - PHASE ONE
ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

C4



ROAD	START STA	END STA	L (FT)	MAP POINT	NOTES
330	800			MP330-800	EXCAVATE HILLSIDE AND REMOVE TREES TO RETAIN 10 FT. ROADWAY, PER DETAILED SITE PLAN
340	0	105	105		CIBD
	0	50	50		50 LF ROCK LINED IBD
	0	220		MP265	INSTALL 3550 SF NEW AC PAVING
	30	220	146		INSTALL 146 LF AC BERM
	105	205	100		100 LF ROCK LINED IBD
	260				24" X 40LF DRC AND TIMBER HEADWALL
	240	320	80		CIBD
	350			MP265	INSTALL DRAIN ROCK BERM ACROSS FLOWLINE, 1.5 AGGREGATE, 24" MIN HEIGHT, KEYED INTO BANKS
	360				18' X 40LF DRC AND CKO
	750				CKO, PLACE AB BERM
	750	830	50		CIBD

PROPOSED FEATURES

- Reverse Grade Dip
- Ditch Relief Culvert
- Knick
- Reverse Grade Dip with Knock Out
- (E) Culvert
- Construct Inboard Ditch
- Clean Inboard Ditch

1 Map Point

NOTE: FEATURES SHOWN ON THE SIDE OF THE ROAD ARE FOR SCHEMATIC PURPOSES ONLY.

EXISTING ROADS + TRAILS

- Paved - Public
- Gravel - Private
- Primary Patrol Road
- ATV Patrol Road
- Legacy / closed

WATERCOURSES

- Perennial
- Intermittent
- Ephemerial

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No. 62235
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

3/06/18
DATE

1:3,600

WATERWAYS CONSULTING, INC.
WWW.WATWAYS.COM

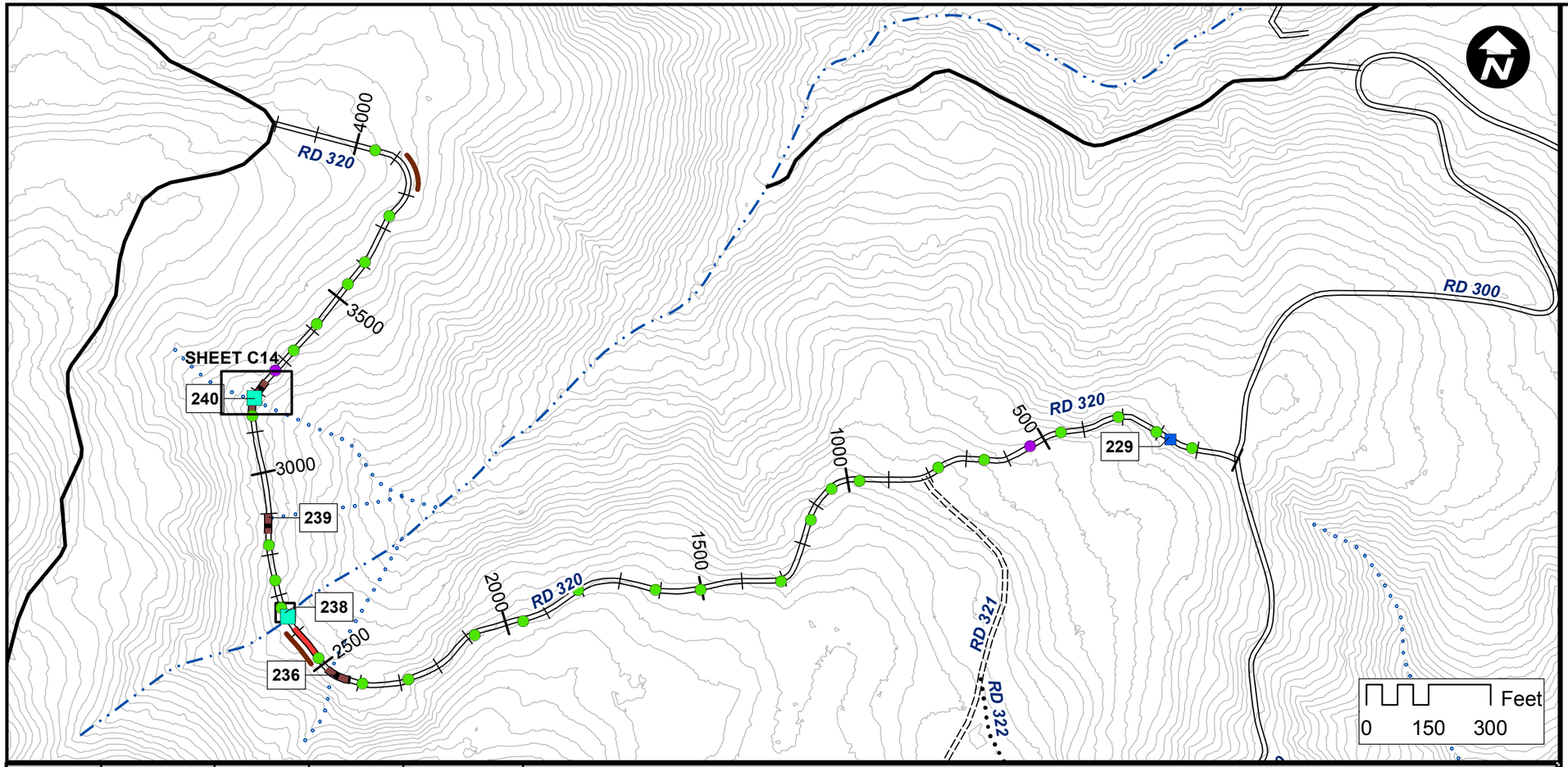
TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
1002 Columbia Street, Santa Cruz, CA 95060
(831) 425-5822 (831) 426-5800 (fax)

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

ROADS
330 & 340

BEAR CREEK
REDWOODS - PHASE ONE
ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

C5



ROAD	START STA	END STA	L (FT)	MAP POINT	NOTES
320	181			MP229	24" X 30 LF DRC
	2440	2490	50	MP236	ADD ROCK ON EITHER SIDE OF EXISTING FORD
	2510	2610	100	MP237	SUBGRADE STABILIZATION
	2510	2610	100		OUTSLOPE
	2621			MP238	REALIGN 2" PVC AND REPLACE CULVERT WITH 36" X 30 LF STC
	2850	2900	35	MP239	KEEP EXISTING ROCK FORD BUT ADD AB FOR 35 LF
	3170	3240	70	MP240	ROCK ROAD
	3170	3240	70		ROCKED SHOULDER
	3180				RED
	3180				1/4 TON RSP SLOPE PROTECTION
	3180				INSTALL 50 LF OF SUBDRAIN
	3180				24" X 40LF STC
	3810				OUTSLOPE ROAD AT TURNAROUND

PROPOSED FEATURES

- Reverse Grade Dip
- Ditch Relief Culvert
- Stream Crossing Culvert
- Knick
- (E) Culvert
- Reshape Road
- Rock Road
- Subgrade Stabilization

NOTE: FEATURES SHOWN ON THE SIDE OF THE ROAD ARE FOR SCHEMATIC PURPOSES ONLY.

1 Map Point

EXISTING ROADS + TRAILS

- Paved - Public
- Gravel - Private
- Primary Patrol Road
- ATV Patrol Road
- Legacy / closed

WATERCOURSES

- Perennial
- Intermittent
- Ephemerial

MATT W. WELD

REGISTERED PROFESSIONAL ENGINEER MATT W. WELD No. 62235 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

3/06/18
DATE

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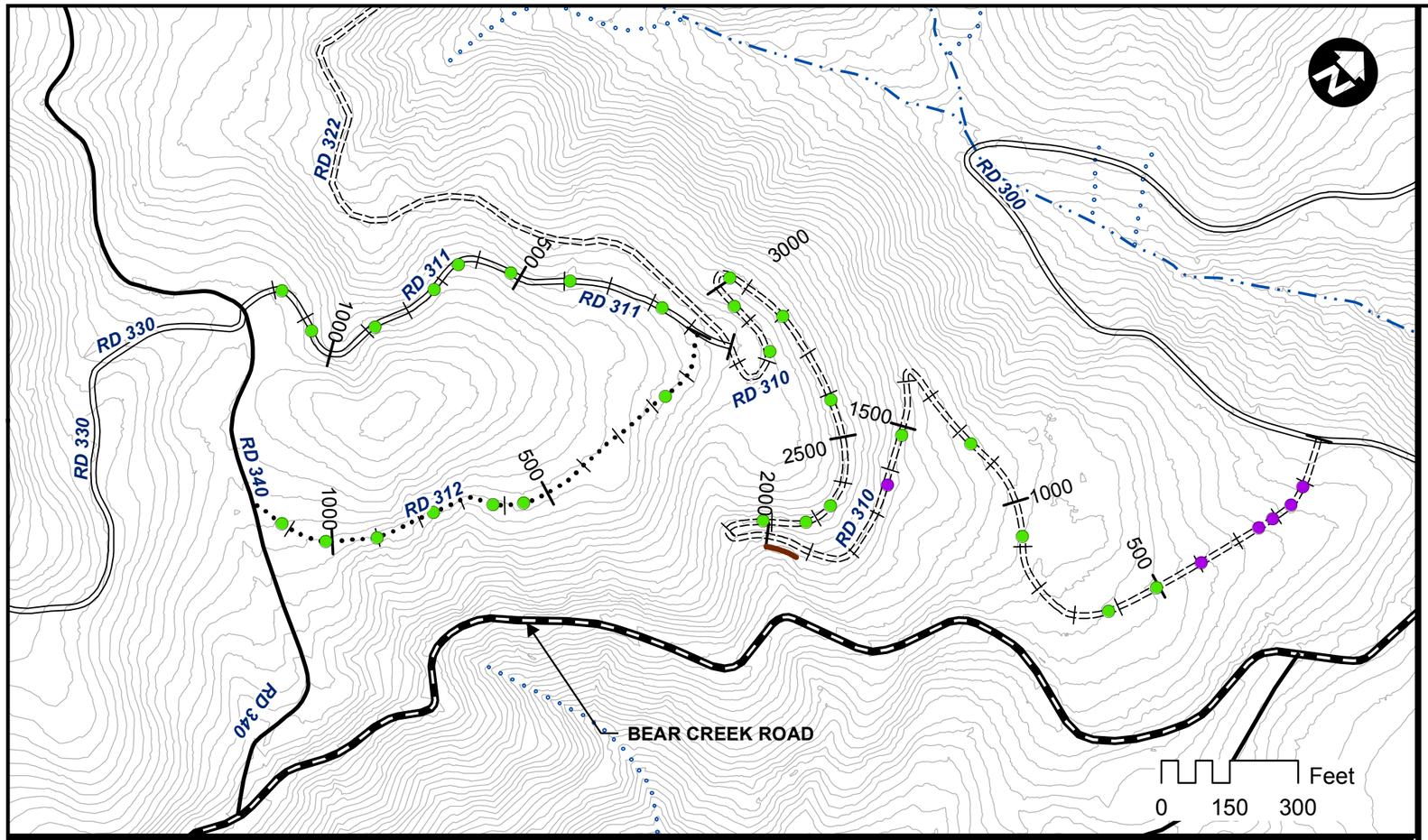
PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

ROAD 320

BEAR CREEK
REDWOODS - PHASE ONE
ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

C6



ROAD	START STA	END STA	L (FT)	MAP POINT	NOTES
310	1925	2000	75		RESHAPE ROAD BED TO OUTSLOPE

PROPOSED FEATURES

- Reverse Grade Dip
- Knick
- Reshape Road

NOTE: FEATURES SHOWN ON THE SIDE OF THE ROAD ARE FOR SCHEMATIC PURPOSES ONLY.

1 Map Point

EXISTING ROADS + TRAILS

- Paved - Public
- Gravel - Private
- Primary Patrol Road
- ATV Patrol Road
- Legacy / closed

WATERCOURSES

- Perennial
- Intermittent
- Ephemerial

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PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

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MATT W. WELD
No. 62235
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

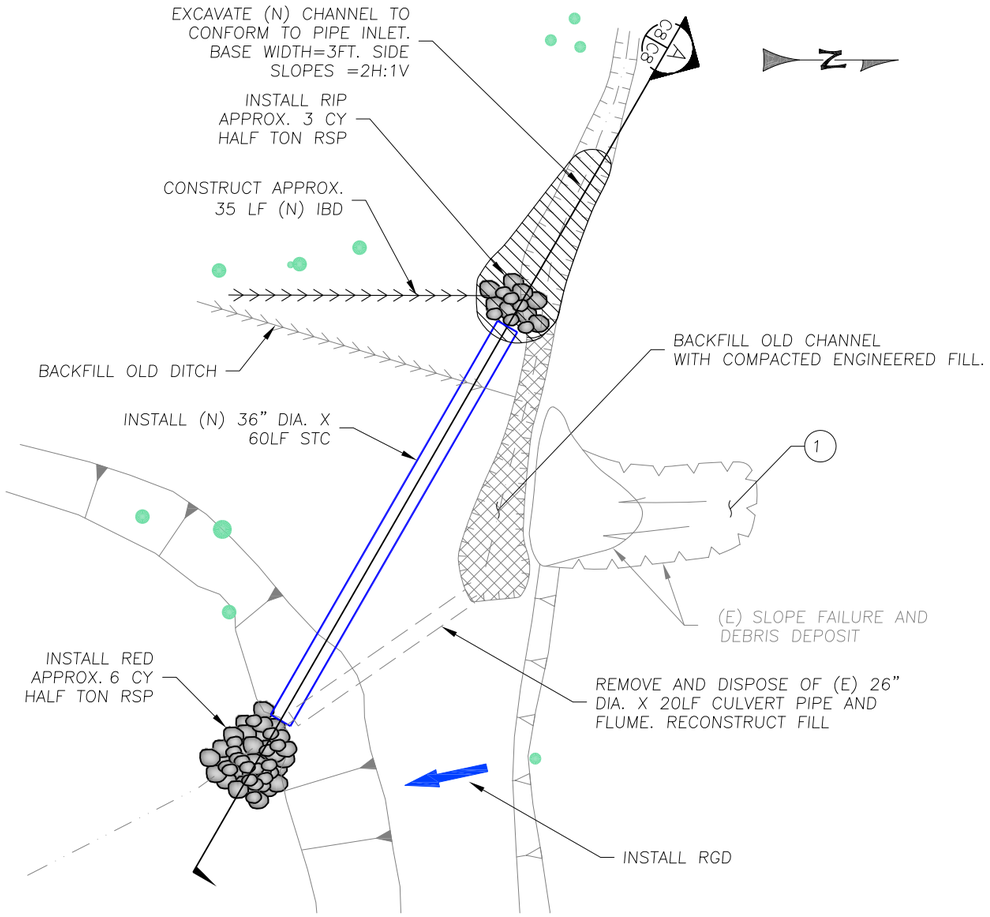
3/06/18
DATE

1:3,600

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS 100% SUBMITTAL

ROADS 310, 311, & 312

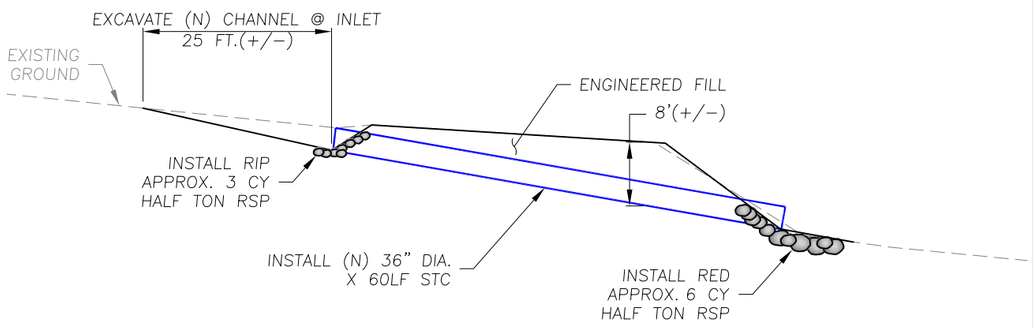
C7



MP202 - SITE PLAN

SCALE: 1" = 10'

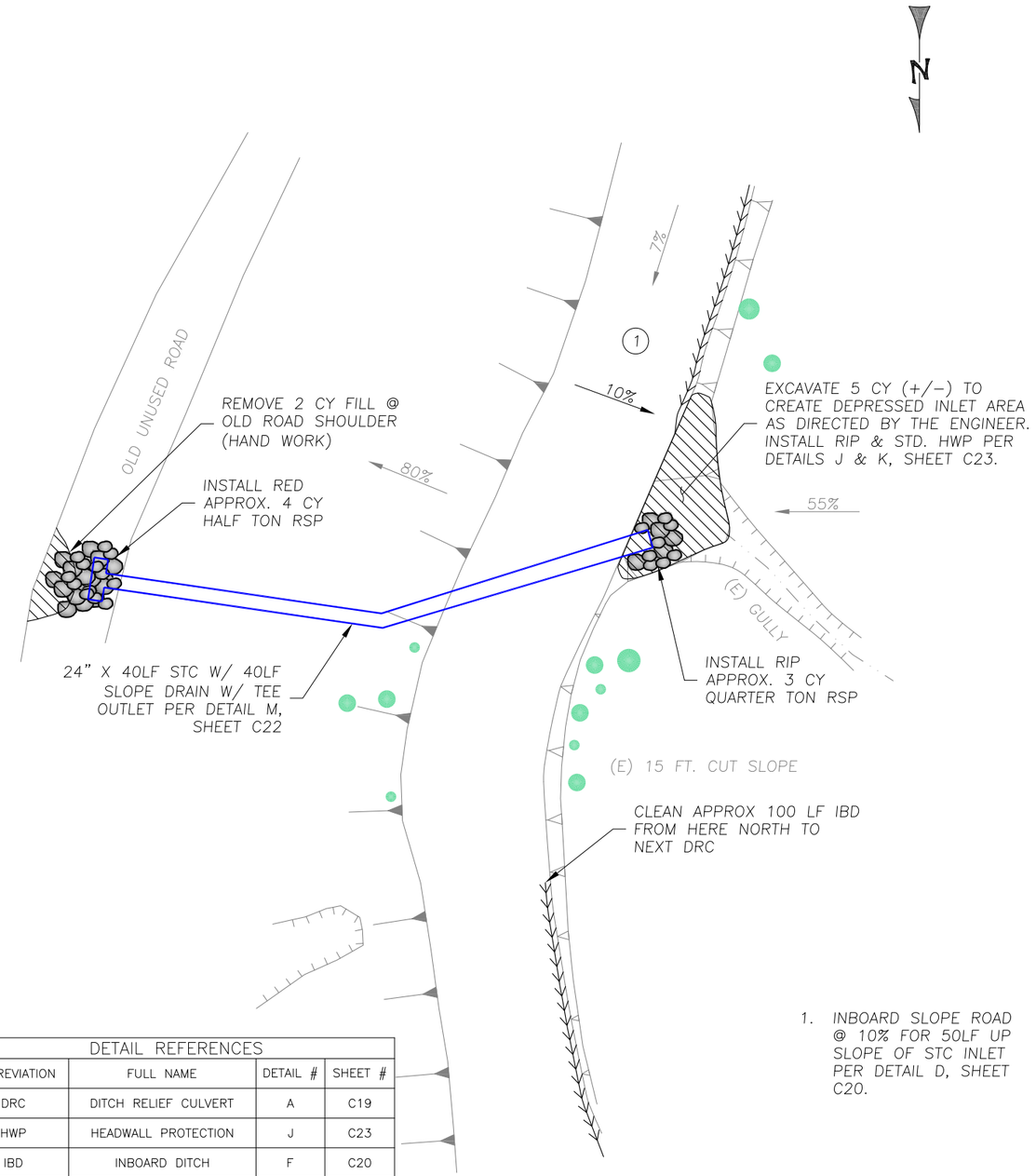
1) STABILIZE (E) SLOPE FAILURE USING APPROX. 80 CY CALTRANS CLASS 1 RSP, IN ACCORDANCE WITH GEOTECHNICAL REPORT BY CMAG ENGINEERING, INC., PROJECT No. 16-120-SCL, DATED 7-6-2016.



MP202 CULVERT SECTION

SCALE: 1" = 10'

A C8|C8



MP206 - SITE PLAN

SCALE: 1" = 10'

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22

1. INBOARD SLOPE ROAD @ 10% FOR 50LF UP SLOPE OF STC INLET PER DETAIL D, SHEET C20.

WATERWAYS CONSULTING INC.
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3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER * MATT W. WELD * No. 62235 Exp. 9-30-19 * CIVIL * STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP-202 + MP-206

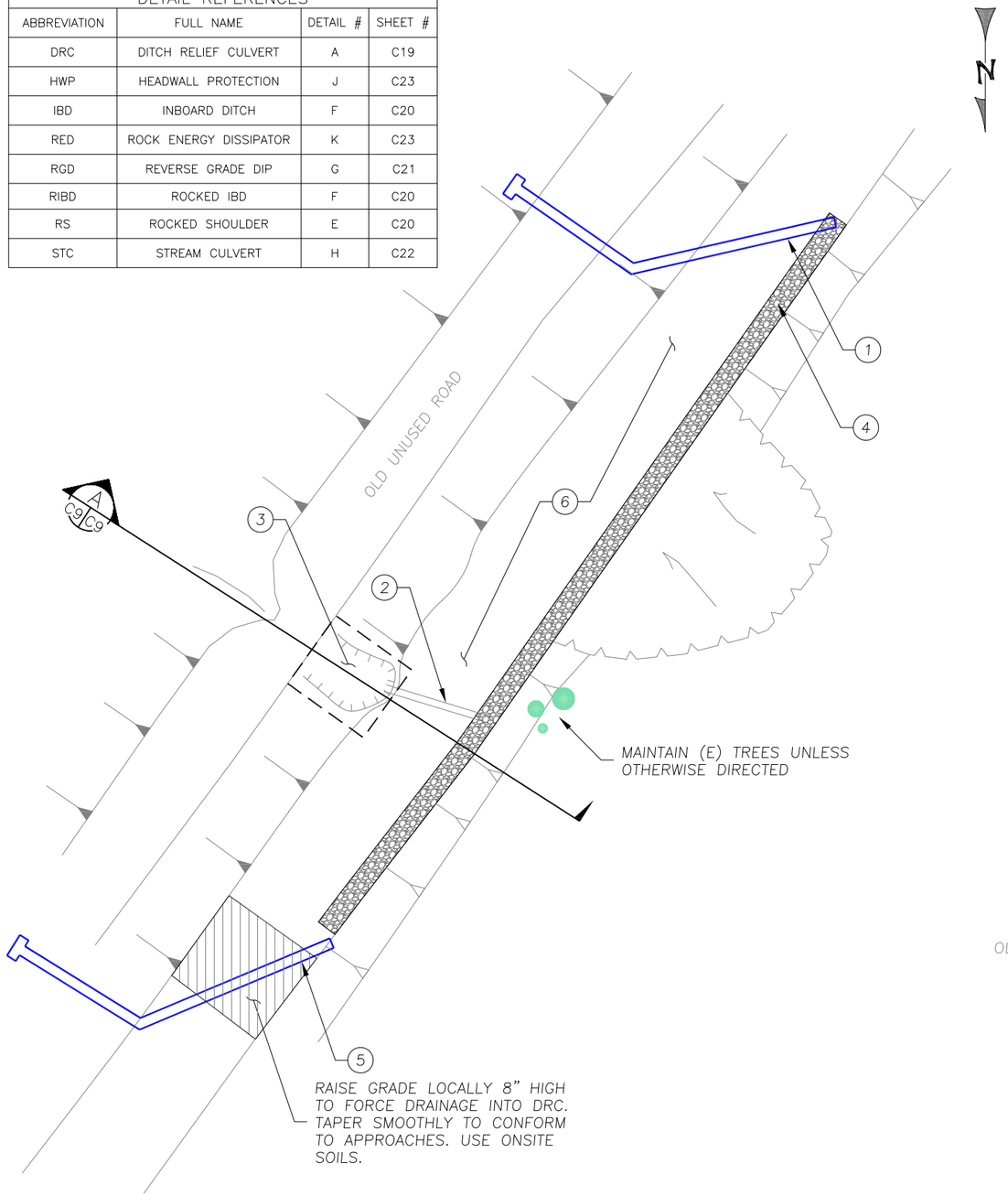
BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: -
DRAWN BY: -
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C8 | 8 OF 24

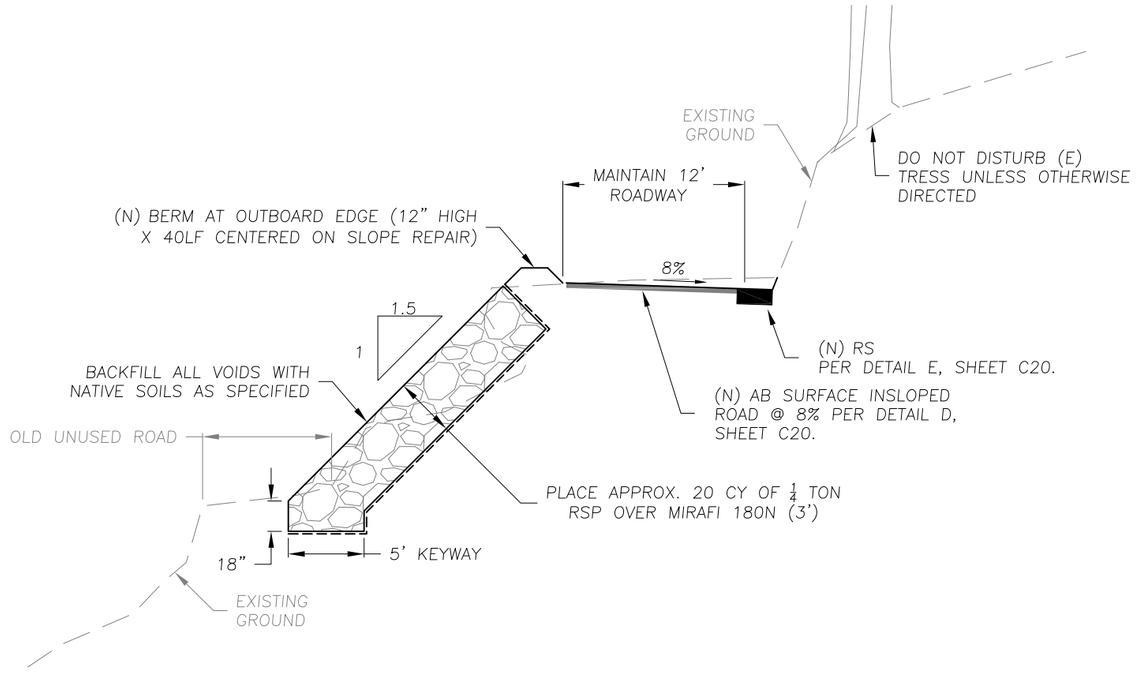
DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22



MP207 - SITE PLAN
SCALE: 1" = 10'

NOTES

1. INSTALL 18" DIA. X 30 LF DRC WITH 20' SLOPE DRAIN PER DETAIL M, SHEET C22. INSLOPE ROAD @ 8% APPROACHING INLET FOR 50 LF.
2. REMOVE AND DISPOSE (E) CULVERT.
3. CONSTRUCT (N) 1.5H:1V ROCK BUTTRESS AT GULLY. CONSTRUCT 5 FT. KEYWAY, SET 18 INCHES INTO COMPETENT MATERIAL AT BASE OF SLOPE.
   - 3.1. BUTTRESS WIDTH (ALONG ROAD) = 12 FT.
   - 3.2. BUTTRESS LENGTH (ALONG SLOPE) = 13.5 FT.
   - 3.3. THICKNESS PERPENDICULAR TO SLOPE = 3 FT.
4. CONSTRUCT APPROX. 130 LF (N) RS PER DETAIL E, SHEET C20.
5. INSTALL (N) 18" DIA. X 30 LF DRC WITH 20 LF SLOPE DRAIN PER DETAIL M, SHEET C22. REMOVE FILL AT OUTLET ON LOWER ROAD (APPROX. 8CY).
6. INSLOPE ROAD SECTION AND LOWER ROADBED TO ACHIEVE A UNIFORM PROFILE BETWEEN (N) DRC'S. MAX DEPTH OF EXCAVATION = 2FT. APPROX. CUT VOLUME = 35 CY.
7. ENGINEER TO INSPECT KEYWAY PRIOR TO ROCK PLACEMENT.



MP207 - SECTION AT ROCK BUTTRESS (A C9|C9)
SCALE: 1" = 5'

WATERWAYS CONSULTING INC.

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(831) 425-0522 • Fax: (831) 425-7391 • e-mail: tim@waterwaysgeo.com

3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

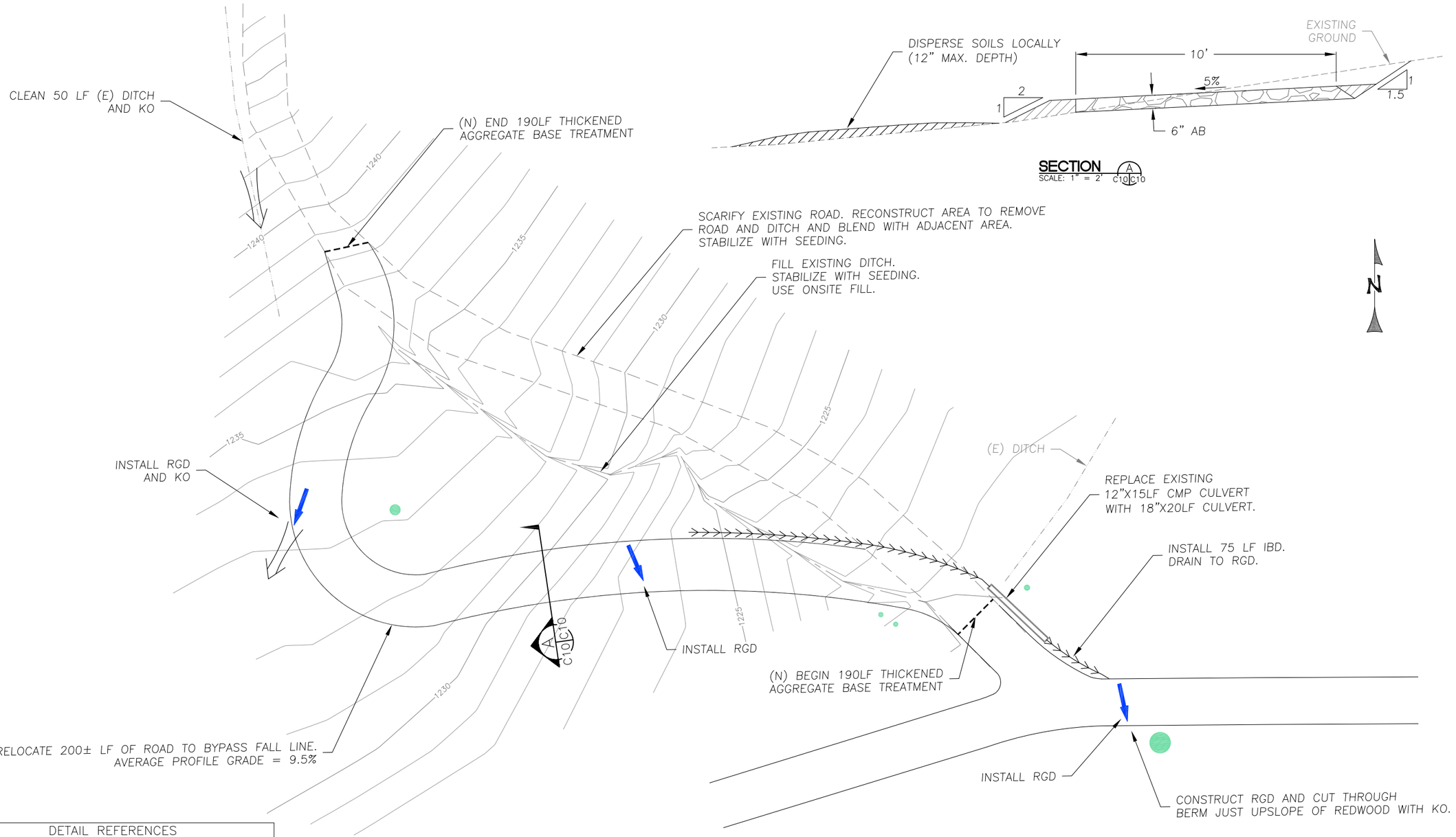
MP-207

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C9 | 9 OF 24



SECTION A C10|C10
SCALE: 1" = 2'

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22

NOTE:
1. STRIP VEGETATION AND ORGANICS.
2. SCARIFY SUBGRADE TO 12" AND RECOMPACT TO 90% RC.
3. APPLY BASE ROCK (6").

MP 210 - SITE PLAN
SCALE: 1" = 10'

WATERWAYS CONSULTING INC.

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3620 Columbia Street, Santa Cruz, CA 95065
(831) 425-8555 • Fax (831) 425-8522 • e-mail: tim@waterways.net

3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP-210

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

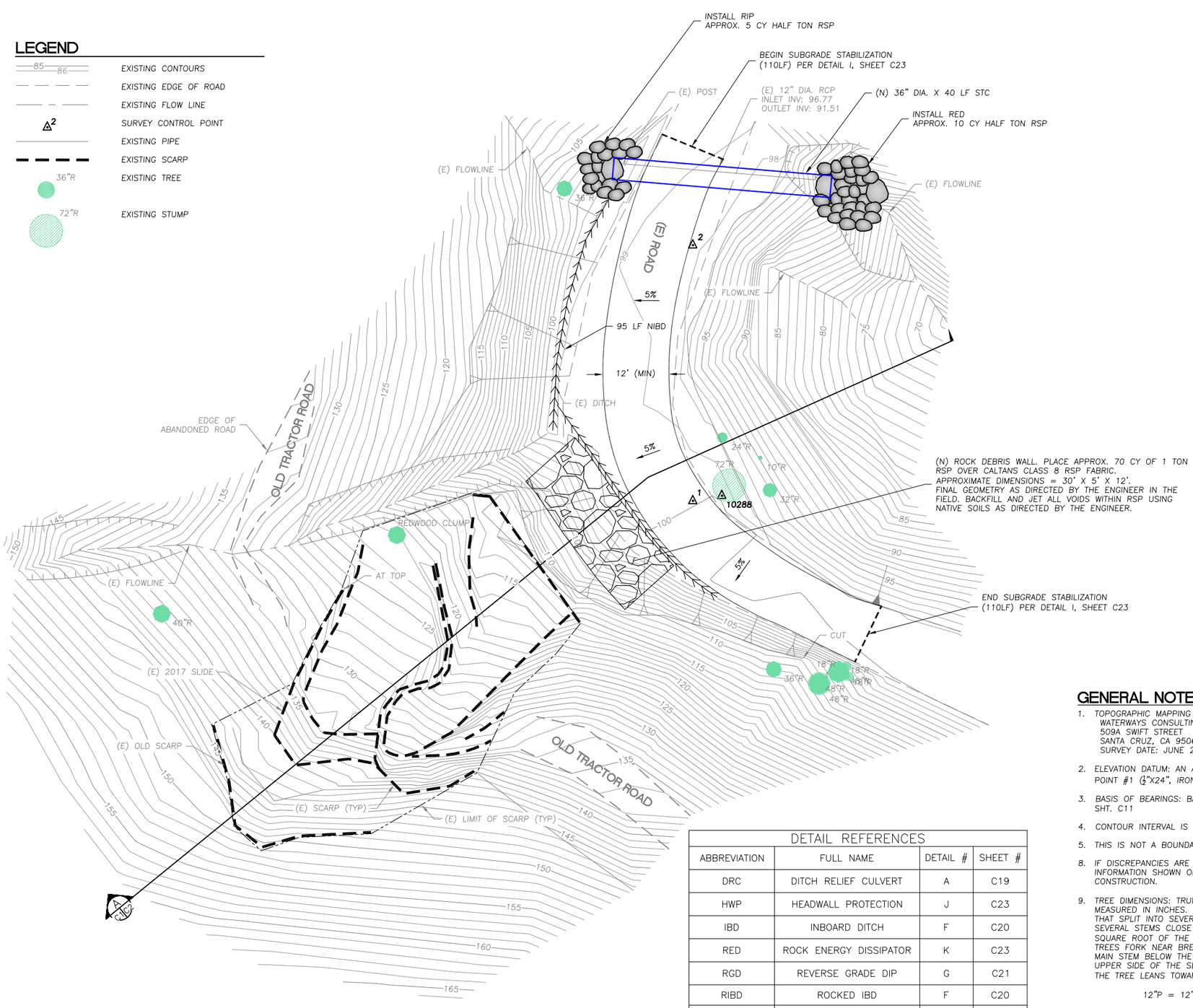
DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C10 | 10 OF 24

LEGEND

- EXISTING CONTOURS (85 / 86)
- EXISTING EDGE OF ROAD
- EXISTING FLOW LINE
- SURVEY CONTROL POINT (2)
- EXISTING PIPE
- EXISTING SCARP
- EXISTING TREE (36"R)
- EXISTING STUMP (72"R)



DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22

MP-216 SITE PLAN
SCALE: 1" = 10'

GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509A SWIFT STREET
   SANTA CRUZ, CA 95060
   SURVEY DATE: JUNE 21, 2017.
2. ELEVATION DATUM: AN ASSUMED ELEVATION OF 1000.00' WAS ESTABLISHED AT SURVEY CONTROL POINT #1 (1"X24", IRON ROD) SHOWN ON SHEET C11.
3. BASIS OF BEARINGS: BASIS OF BEARINGS BETWEEN POINTS #1 AND #2 IS N0°00'00"E, AS SHOWN ON SHT. C11
4. CONTOUR INTERVAL IS ONE FOOT. ELEVATIONS AND DISTANCES SHOWN ARE IN DECIMAL FEET.
5. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES ARE NOT SHOWN HEREON.
8. IF DISCREPANCIES ARE DISCOVERED BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
9. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. THE DBH FOR TREES THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND MAY BE CONSOLIDATED INTO A SINGLE DBH BY TAKING THE SQUARE ROOT OF THE SUM OF ALL SQUARED STEM DBH'S, UNLESS OTHERWISE NOTED. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE
10. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.

    TREE SPECIES
    R REDWOOD
11. THE IMPROVEMENTS SHOWN HEREON ARE INTENDED TO PROVIDE TEMPORARY CONTROL OF DRAINAGE AND DEBRIS UNTIL A FORMAL GEOTECHNICAL INVESTIGATION AND SLOPE STABILITY PLAN CAN BE PREPARED. THESE IMPROVEMENTS ARE NOT INTENDED TO PROVIDE GLOBAL STABILITY TO THE FAILING SLOPE.

WATERWAYS CONSULTING INC.
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3/06/18 DATE

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MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

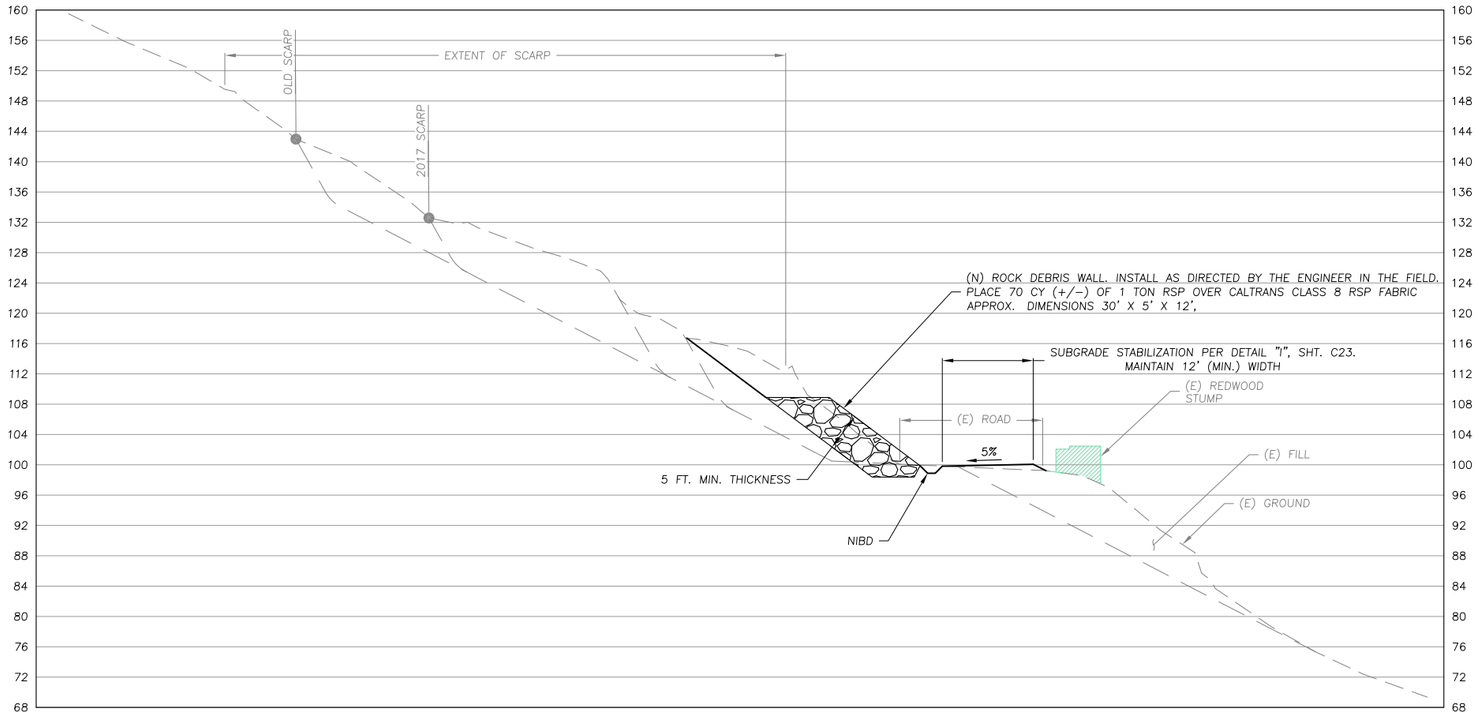
MP-216 SITE PLAN

BEAR CREEK
REDWOODS - PHASE
ONE ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: –
DRAWN BY: S.R.
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C11 | 11 OF 24



SECTION

SCALE: 1" = 10'

A C11 C12

NOTES

PENDING FURTHER INVESTIGATION, REPAIR OPTIONS MAY INCLUDE:

1. CONCRETE BLOCK BUTTRESS
2. ROCK BUTTRESS
3. HILFIKER GRAVITY WALL
4. SOLDIER PIN WALL

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3/06/18 DATE

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MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP-216 SECTION

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

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DRAWN BY:	S.R.
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16-017

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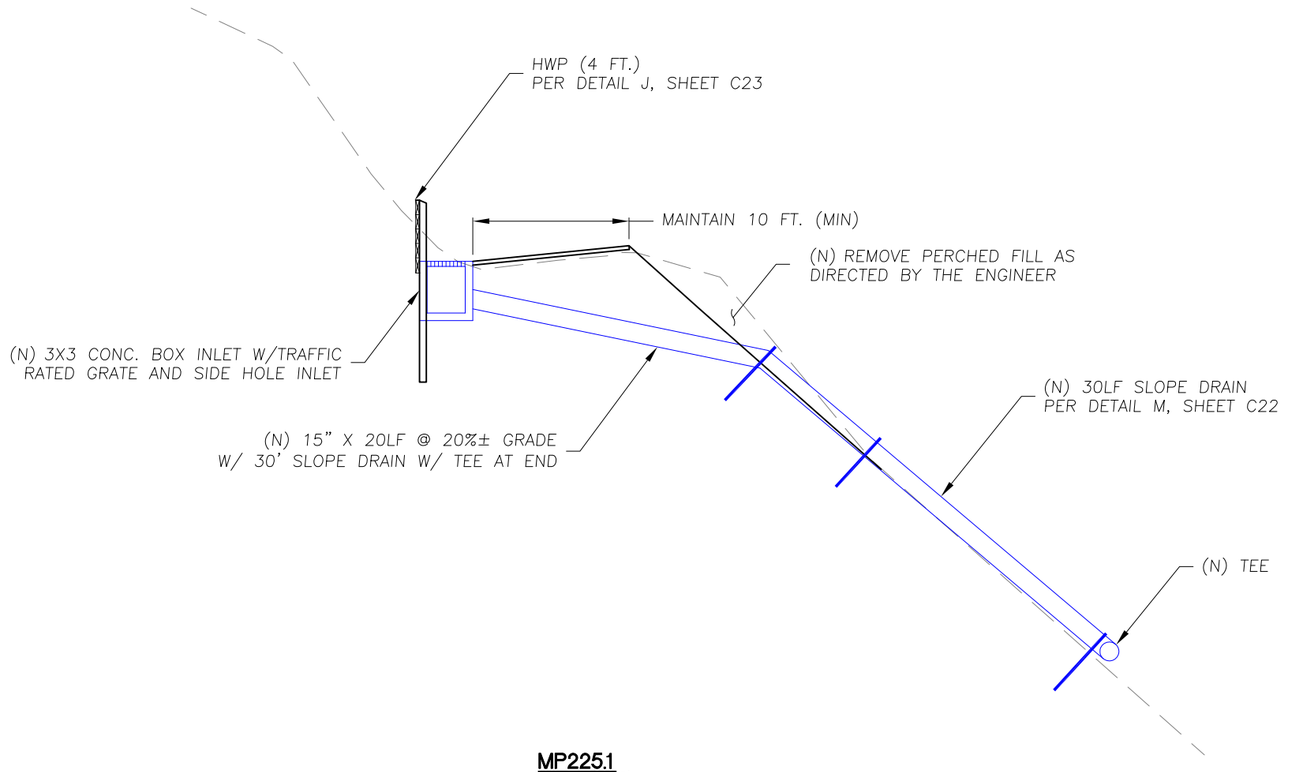
0 1"

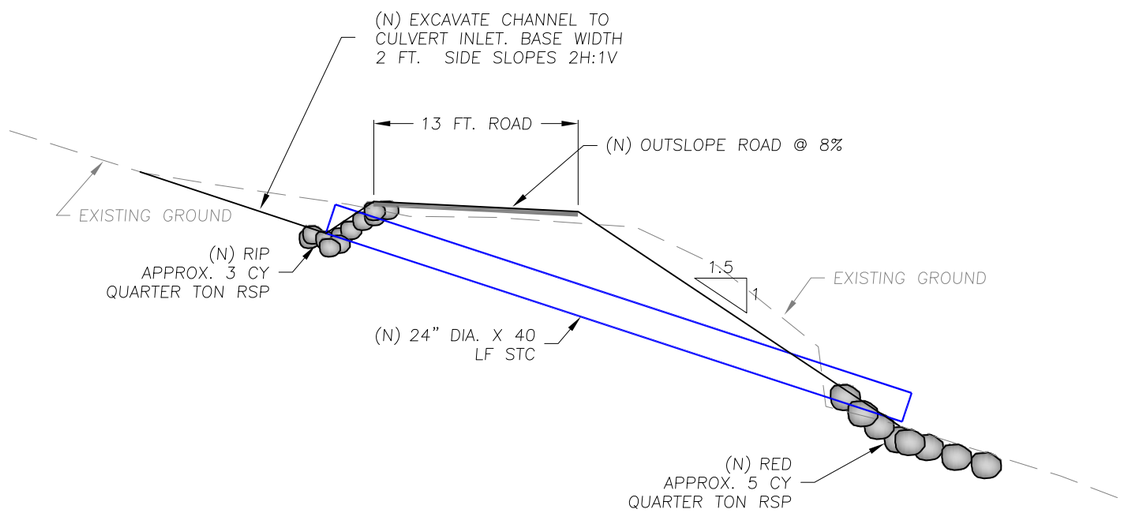
C12

12 OF 24



MP225.1
SCALE: 1" = 5'

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22



MP221 - SECTION AT CULVERT
SCALE: 1" = 5'

WATERWAYS CONSULTING INC.
TIMOTHY C. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY

3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

MP-221 + MP
225.1

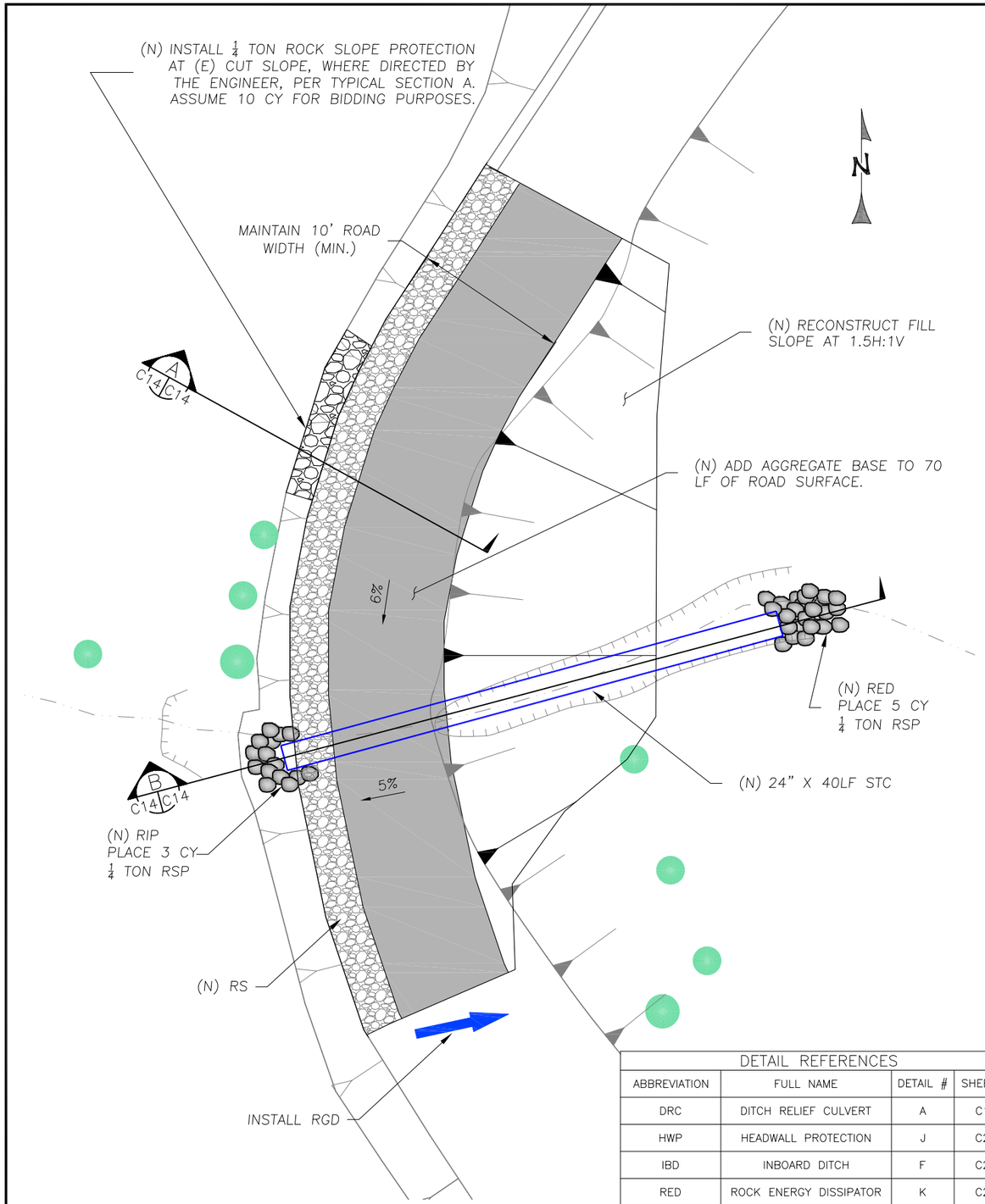
BEAR CREEK
REDWOODS - PHASE
ONE ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

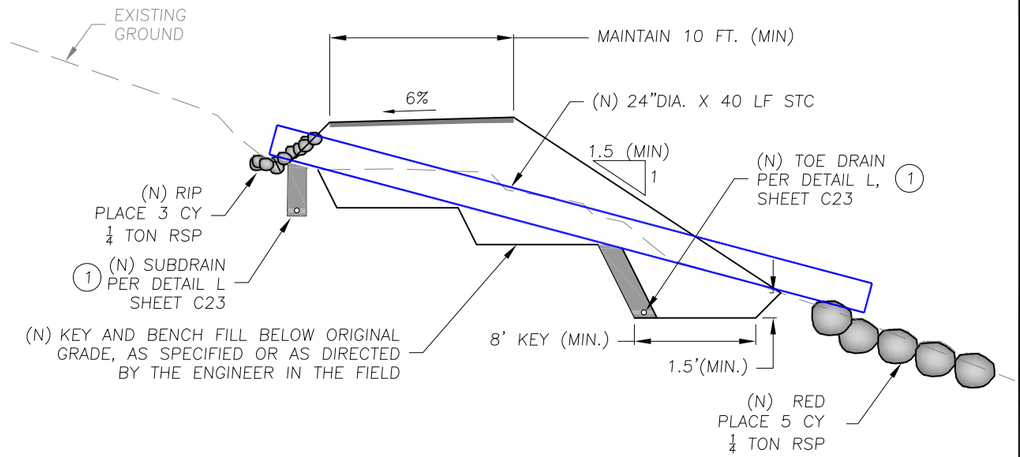
C13

13 OF 24

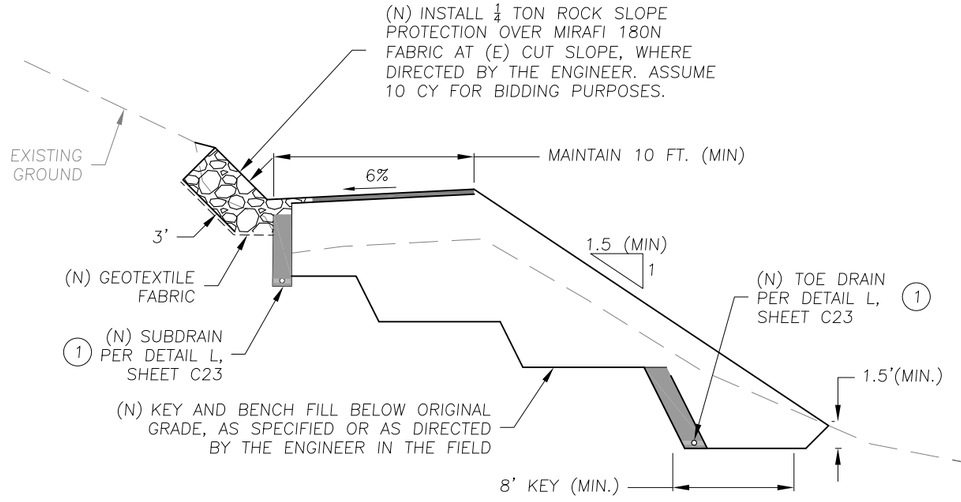


MP240 - SITE PLAN
SCALE: 1" = 5'

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22



MP240 CULVERT SECTION
SCALE: 1" = 5'
B C14 C14



1. DAYLIGHT LOCATIONS TO BE COORDINATED WITH THE ENGINEER.

MP240 SECTION
SCALE: 1" = 5'
A C14 C14

WATERWAYS CONSULTING INC.
TIMOTHY E. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
3332 Columbia Street, Santa Rosa, CA 95404
(707) 542-5812 • Fax: (707) 542-7385 • e-mail: tim@waterways.net

DATE 3/06/18

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

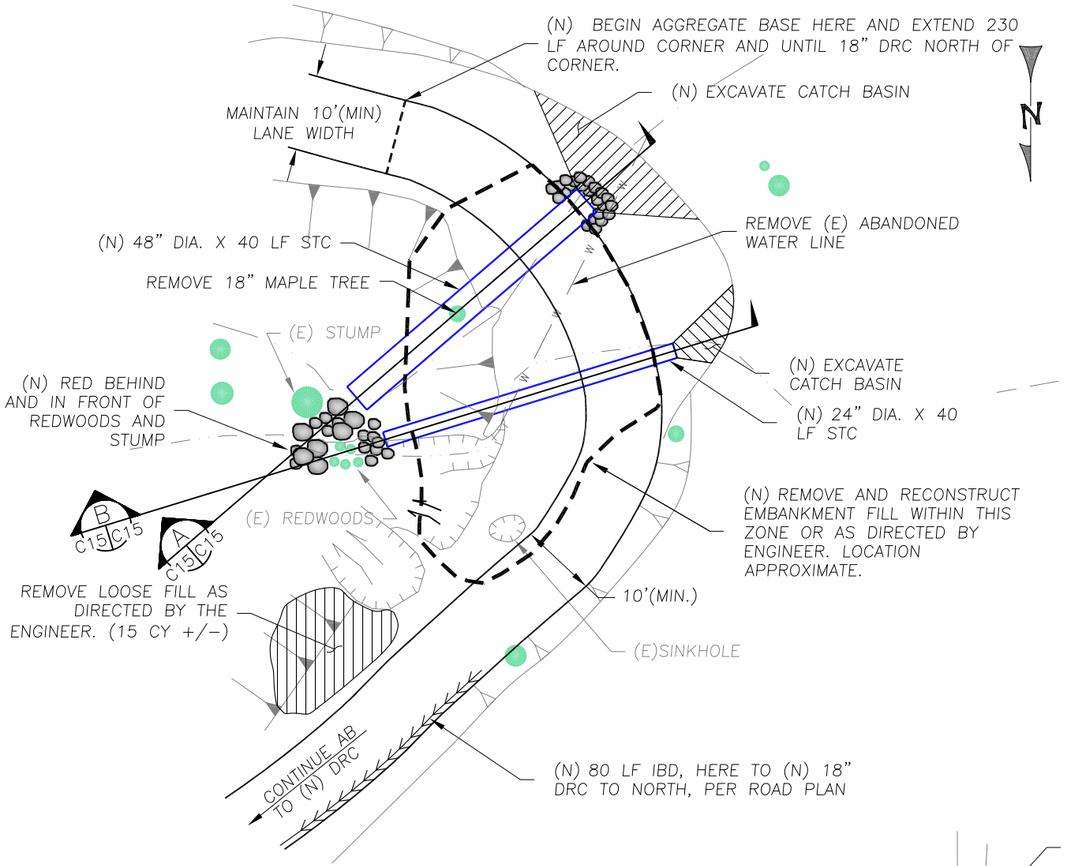
MP-240

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16-017

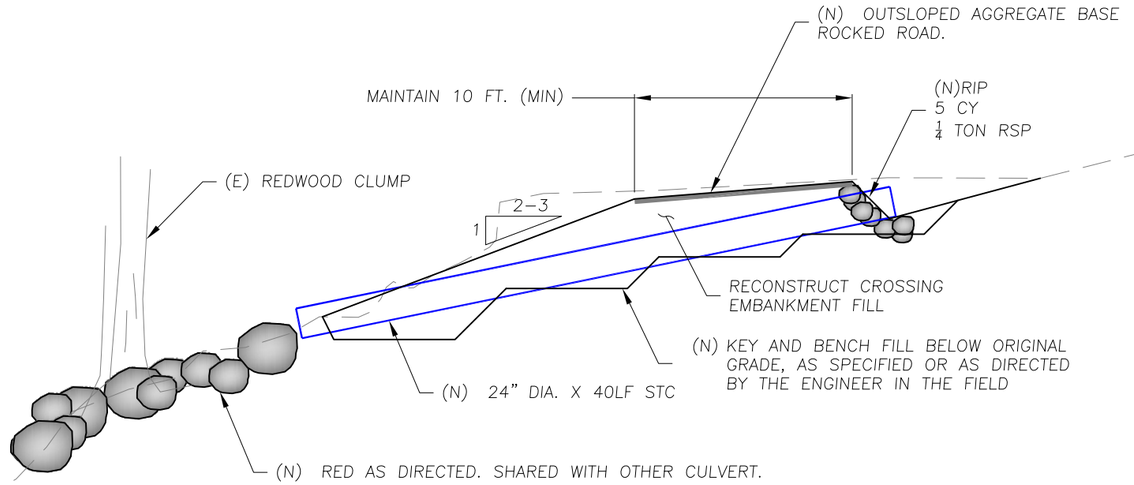
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C14

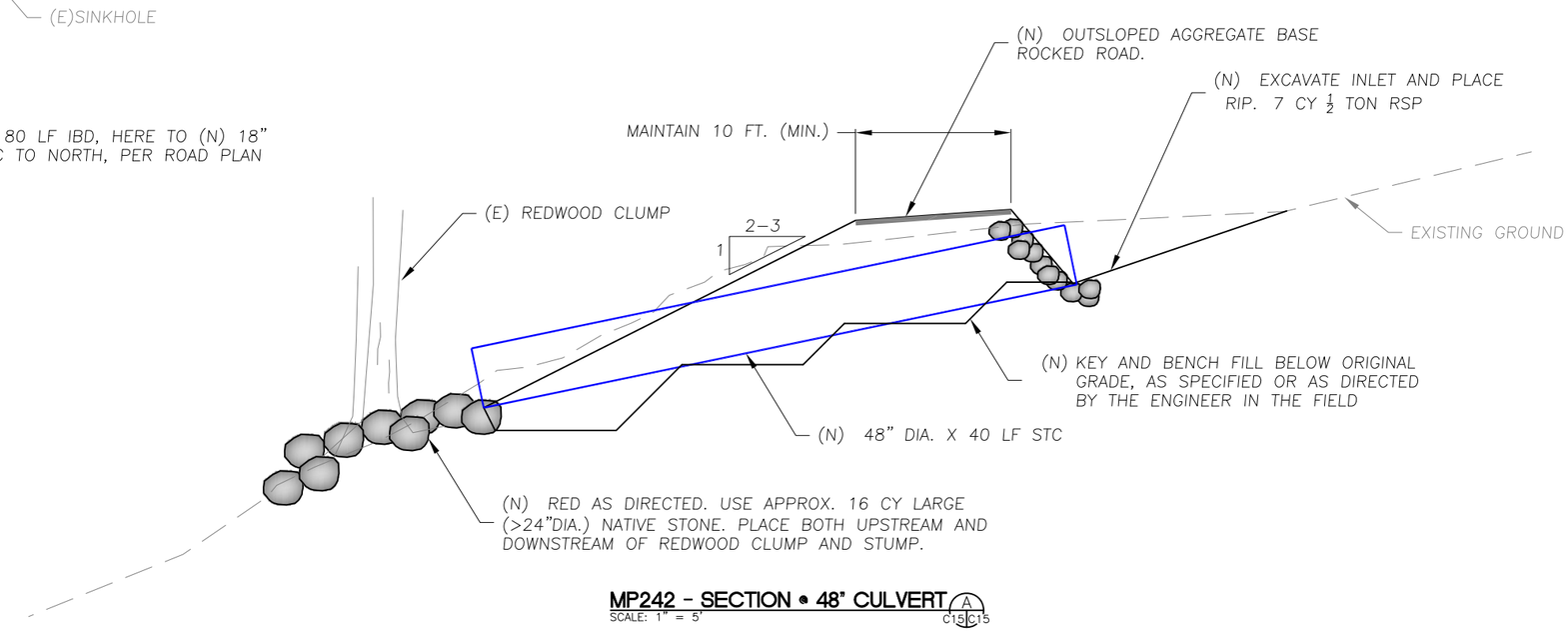


MP242 - SITE PLAN
SCALE: 1" = 10'

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22



MP242 - SECTION @ 24" CULVERT
SCALE: 1" = 5'
B C15 C15



MP242 - SECTION @ 48" CULVERT
SCALE: 1" = 5'
A C15 C15

WATERWAYS CONSULTING INC.

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3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATT W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP-242

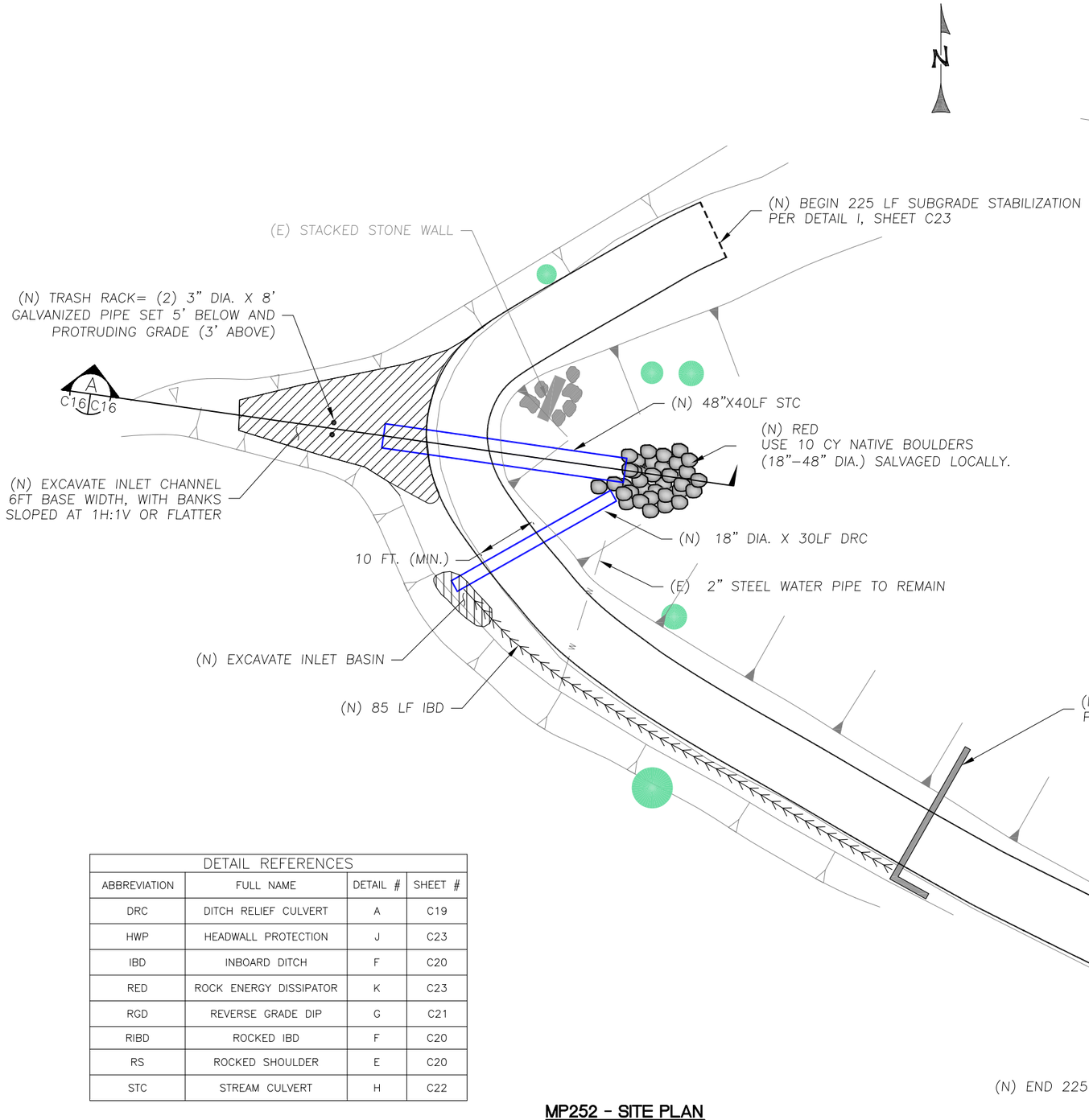
BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16-017

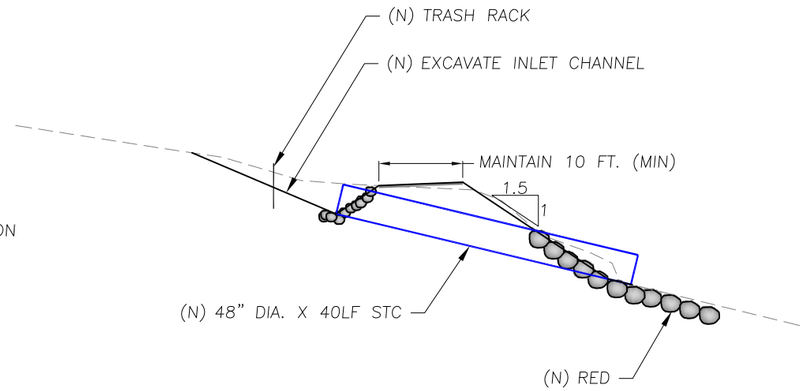
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C15

15 OF 24



MP252 - SITE PLAN
SCALE: 1" = 10'



MP252 - SECTION AT CULVERT (A C16/C16)
SCALE: 1" = 10'

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22

WATERWAYS CONSULTING INC.
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(831) 425-0928 • Fax (831) 425-7360 • e-mail: chris@waterways.net

DATE 3/06/18

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP-252

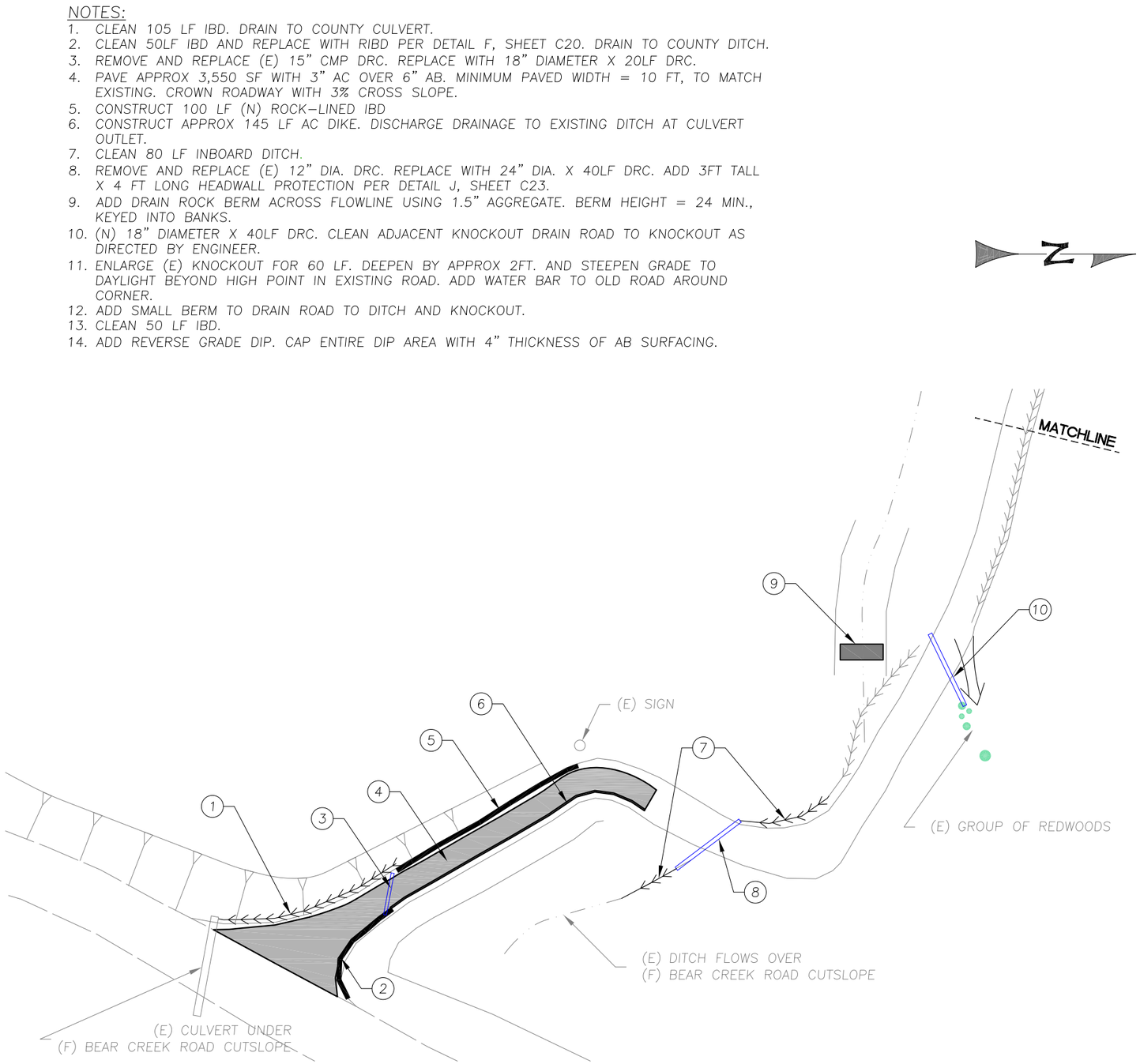
BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16-017

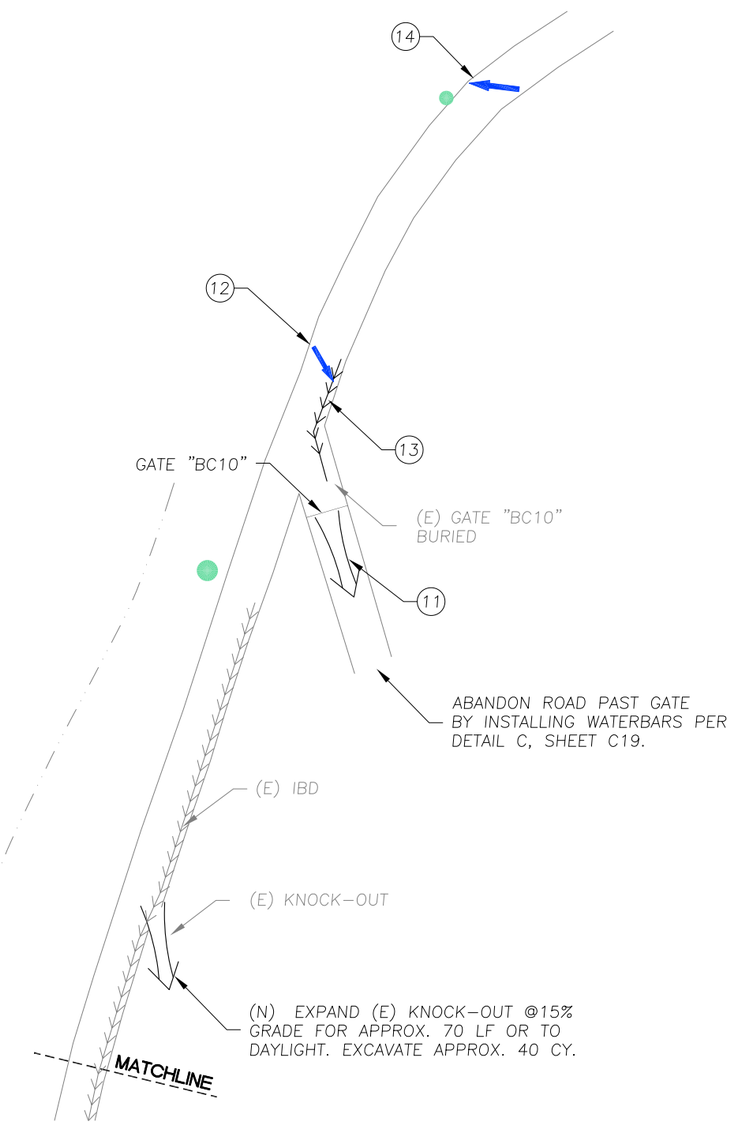
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

NOTES:

1. CLEAN 105 LF IBD. DRAIN TO COUNTY CULVERT.
2. CLEAN 50LF IBD AND REPLACE WITH RIBD PER DETAIL F, SHEET C20. DRAIN TO COUNTY DITCH.
3. REMOVE AND REPLACE (E) 15" CMP DRC. REPLACE WITH 18" DIAMETER X 20LF DRC.
4. PAVE APPROX 3,550 SF WITH 3" AC OVER 6" AB. MINIMUM PAVED WIDTH = 10 FT, TO MATCH EXISTING. CROWN ROADWAY WITH 3% CROSS SLOPE.
5. CONSTRUCT 100 LF (N) ROCK–LINED IBD
6. CONSTRUCT APPROX 145 LF AC DIKE. DISCHARGE DRAINAGE TO EXISTING DITCH AT CULVERT OUTLET.
7. CLEAN 80 LF INBOARD DITCH.
8. REMOVE AND REPLACE (E) 12" DIA. DRC. REPLACE WITH 24" DIA. X 40LF DRC. ADD 3FT TALL X 4 FT LONG HEADWALL PROTECTION PER DETAIL J, SHEET C23.
9. ADD DRAIN ROCK BERM ACROSS FLOWLINE USING 1.5" AGGREGATE. BERM HEIGHT = 24 MIN., KEYED INTO BANKS.
10. (N) 18" DIAMETER X 40LF DRC. CLEAN ADJACENT KNOCKOUT DRAIN ROAD TO KNOCKOUT AS DIRECTED BY ENGINEER.
11. ENLARGE (E) KNOCKOUT FOR 60 LF. DEEPEN BY APPROX 2FT. AND STEEPEN GRADE TO DAYLIGHT BEYOND HIGH POINT IN EXISTING ROAD. ADD WATER BAR TO OLD ROAD AROUND CORNER.
12. ADD SMALL BERM TO DRAIN ROAD TO DITCH AND KNOCKOUT.
13. CLEAN 50 LF IBD.
14. ADD REVERSE GRADE DIP. CAP ENTIRE DIP AREA WITH 4" THICKNESS OF AB SURFACING.



MP265 – SITE PLAN
SCALE: 1" = 30'



DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22

WATERWAYS CONSULTING INC.
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3332 Columbia Street, Santa Rosa, CA 95404
(707) 542-9500 • FAX (707) 542-7966 • e-mail: tim@waterwaysgeo.com

3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

MP-265

BEAR CREEK
REDWOODS – PHASE
ONE ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 03/06/2018
JOB NO.: 16–017

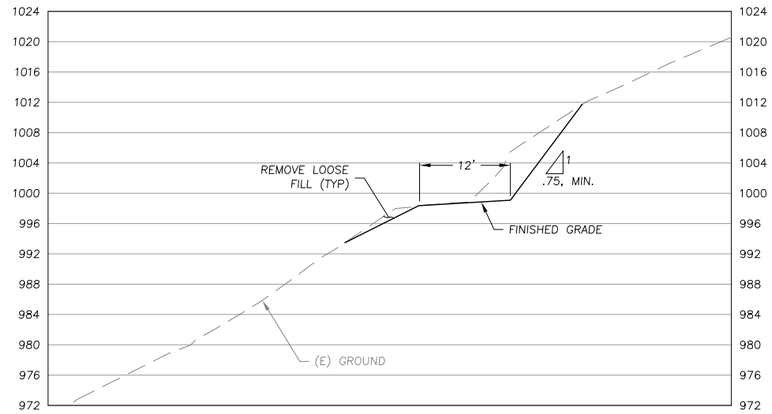
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C17

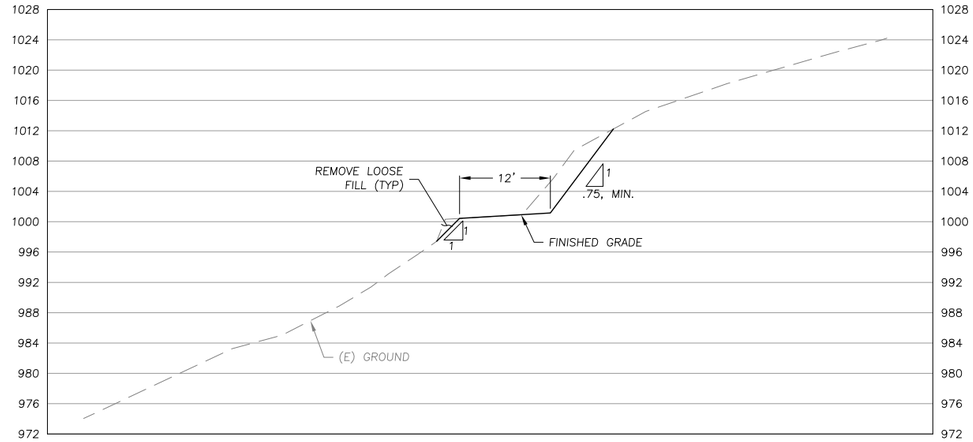
17 OF 24

NOTES:
SPREAD CLEAN SPOILS ALONG INSIDE EDGE OF ROAD TO OUT SLOPE ROAD AT 6%±.

MP 330-800 SITE PLAN
SCALE: 1" = 10'



SECTION
SCALE: 1" = 10'
B C18 C18



SECTION
SCALE: 1" = 10'
A C18 C18

GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509A SWIFT STREET
   SANTA CRUZ, CA 95060
   SURVEY DATE: JUNE 21, 2017.
2. ELEVATION DATUM: AN ASSUMED ELEVATION OF 1000.00' WAS ESTABLISHED AT SURVEY CONTROL POINT #1 (½"X24", IRON ROD) SHOWN ON SHEET C18.
3. BASIS OF BEARINGS: BASIS OF BEARINGS BETWEEN POINTS #1 AND #2 IS N0°00'00"E, AS SHOWN ON SHT. C18
4. CONTOUR INTERVAL IS ONE FOOT. ELEVATIONS AND DISTANCES SHOWN ARE IN DECIMAL FEET.
5. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES ARE NOT SHOWN HEREON.
8. IF DISCREPANCIES ARE DISCOVERED BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
9. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. THE DBH FOR TREES THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND MAY BE CONSOLIDATED INTO A SINGLE DBH BY TAKING THE SQUARE ROOT OF THE SUM OF ALL SQUARED STEM DBH'S, UNLESS OTHERWISE NOTED. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE

10. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.

TREE SPECIES	
F	FIR
M	MADRONE
O	OAK

TREE REMOVAL NOTES:
APPROXIMATE CENSUS OF TREES TO BE REMOVED:

COMMON NAME	NUMBER
FIR	2
MADRONE	1
OAK	1
TOTAL	4

LEGEND

85 86	EXISTING CONTOURS
▵2	SURVEY CONTROL POINT
	EXISTING CRACK
	EXISTING SCARP
18"O	EXISTING TREE
24"O	TREE TO BE REMOVED

DETAIL REFERENCES			
ABBREVIATION	FULL NAME	DETAIL #	SHEET #
DRC	DITCH RELIEF CULVERT	A	C19
HWP	HEADWALL PROTECTION	J	C23
IBD	INBOARD DITCH	F	C20
RED	ROCK ENERGY DISSIPATOR	K	C23
RGD	REVERSE GRADE DIP	G	C21
RIBD	ROCKED IBD	F	C20
RS	ROCKED SHOULDER	E	C20
STC	STREAM CULVERT	H	C22

WATERWAYS CONSULTING INC.
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509A Cornelia Street, Santa Cruz, CA 95060
(831) 423-8276 • FAX (831) 423-2760 • e-mail: tim@waterwaysgeo.com

DATE 3/06/18

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

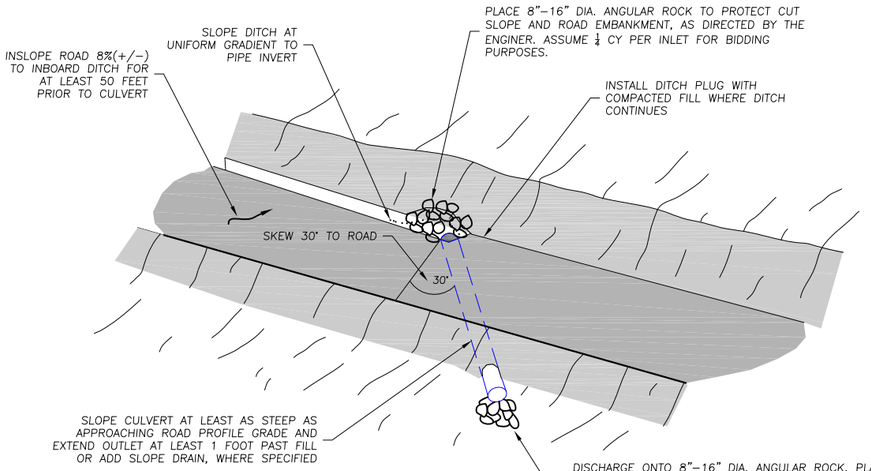
PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

MP 330-800

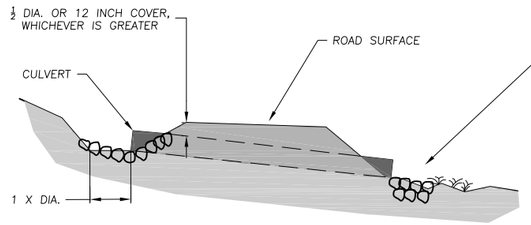
BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	M.L.B.
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16-017

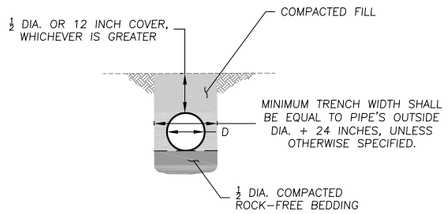
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



SITE PLAN



CULVERT PROFILE



SECTION

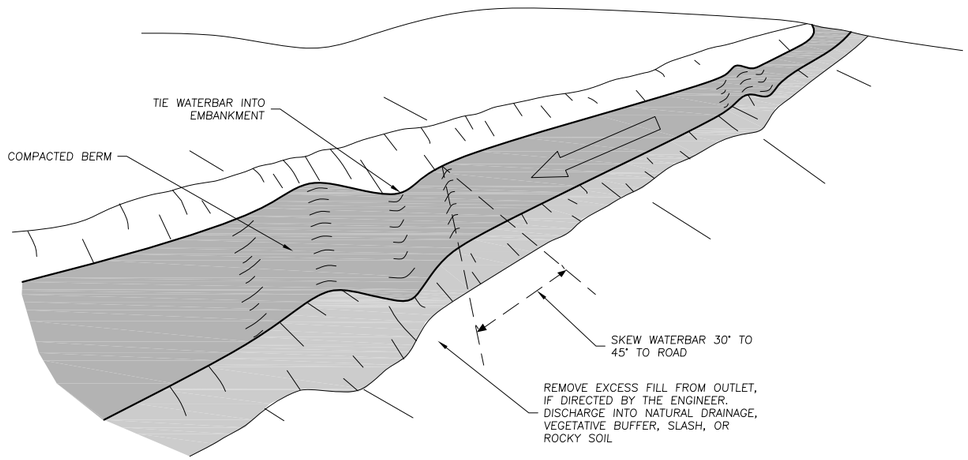
NOTES

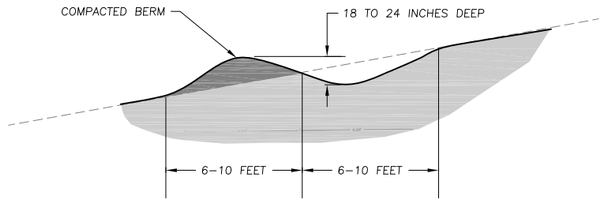
1. INSTALL DITCH RELIEF CULVERT (DRC) AT FLAGGED LOCATIONS OR AS IDENTIFIED ON PLANS.
2. DITCH RELIEF CULVERTS SHALL BE 18 INCH DIAMETER SMOOTH BORE, DOUBLE WALL HDPE (ASTM F2306) UNLESS OTHERWISE SPECIFIED, WITH WATER TIGHT FITTINGS CONFORMING TO ASTMD3212, WITH GASKETS CONFORMING TO ASTM F477. "ADS N–12 WT IB" PIPE MEETS THIS SPECIFICATION.
3. PLACE CULVERTS AT A 30 DEGREE SKEW ANGLE DOWN GRADE (WHERE FEASIBLE) WITH A GRADIENT EQUAL TO OR GREATER THAN THAT OF THE UPHILL ROAD PROFILE. EXTEND CULVERT OUTLETS A MINIMUM OF 1 FOOT BEYOND BASE OF ROAD FILL.
4. WHERE NECESSARY, OUTLET DITCH SHALL BE CONSTRUCTED AT A STEEPER GRADIENT THAN THE CULVERT, AT LEAST ONE PIPE DIAMETER IN WIDTH, AND WITH BANK TAPERED BACK TO A 1:1 OR FLATTER SLOPE.
5. THE CULVERT BEDDING SHALL BE PLACED TO A DEPTH OF ½ DIAMETER OF THE CULVERT, AND SHALL CONSIST OF APPROVED MINERAL SOIL, CONFORMING TO ASTM CLASS 1, 2, OR 3.
6. HE BACKFILL SHALL CONSIST OF APPROVED MINERAL SOIL, WITH NO ROCKS GREATER THAN 3 INCHES IN ANY DIMENSION PLACED CLOSER THAN 1 FOOT TO THE CULVERT. BACKFILL SHALL BE ADEQUATELY COMPACTED THROUGHOUT THE ENTIRE PROCESS TO 95 PERCENT ASTM 1557 UNLESS OTHERWISE SPECIFIED. DURING PLACEMENT AND COMPACTION OF FILL, THE MOISTURE CONTENT OF THE MATERIALS BEING PLACED SHALL BE MAINTAINED AS DIRECTED BY THE ENGINEER.
7. MINIMUM COVER SHALL BE THE GREATER OF 12" OR HALF THE PIPE DIAMETER.
8. PLACE A DITCH BLOCK IMMEDIATELY DOWNSLOPE OF THE CULVERT INTAKE TO PREVENT DITCH FLOW FROM BYPASSING THE PIPE INLET.
9. SPECIFICATIONS ARE INTENDED ONLY AS GUIDELINES; MODIFICATIONS MAY BE DIRECTED IN THE FIELD BY ENGINEER.

DITCH RELIEF CULVERT (A)
SCALE: N.T.S. C9, C17, C19

CLEAN DITCH RELIEF CULVERT

WHERE DITCH RELIEF CULVERTS ARE SPECIFIED TO BE CLEANED, THIS WORK SHALL CONSIST OF REMOVING ACCUMULATED SEDIMENT FROM THE INLET, CONTRIBUTING DITCH LINE, AND OUTLET FLOW PATH TO ESTABLISH A STABLE GEOMETRY OF UNOBSTRUCTED FLOW. ASSUME 1 CY OF EXCAVATION FOR BIDDING PURPOSES. GENERALLY, THIS WORK WILL REQUIRE HAND LABOR.





ROAD PROFILE

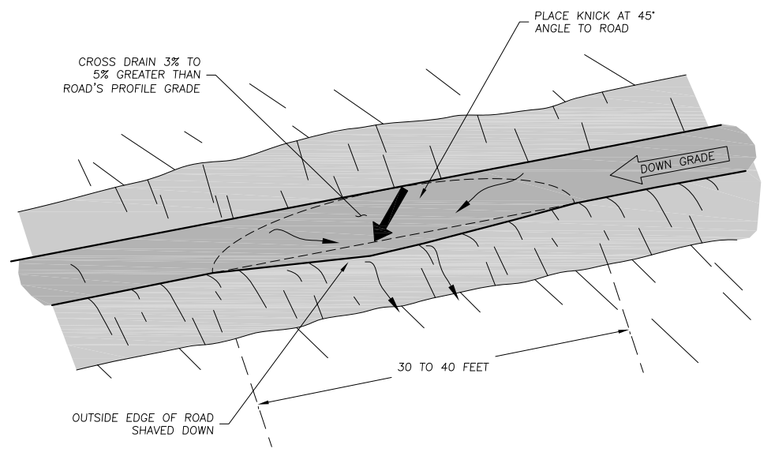
NOTES

1. LOCATE WATERBARS TO TAKE ADVANTAGE OF NATURAL DRAINAGE FEATURES AND MINIMIZE THE AMOUNT OF DISTURBANCE REQUIRED FOR WATERBAR CONSTRUCTION.
2. WATERBARS BEGIN AT THE INTERSECTION OF THE ROADBED SURFACE AND THE CUT SLOPE AND RUN THE ENTIRE WIDTH OF THE ROAD SURFACE PRISM.
3. WATERBAR LENGTH SHALL NOT EXCEED 1.5 TIMES THE WIDTH OF THE ROAD SURFACE.
4. SKEW WATERBARS APPROXIMATELY 45° TO ROAD ALIGNMENT.
5. CONSTRUCT FREE–FLOWING OUTLETS WITH MINIMUM 3% GRADE IN THE BOTTOM OF THE CHANNEL THAT DISCHARGES ONTO VEGETATIVE SURFACES OR LESS ERODIBLE MATERIAL WHERE POSSIBLE.
6. NATIVE MATERIALS USED TO CONSTRUCT DOWNSLOPE BERM SHALL BE COMPACTED WITH EQUIPMENT TO MINIMIZE WEAR RESULTING FROM TRESPASS AND/OR ADMINISTRATIVE USE.
7. CONSTRUCT WATERBAR DEPTH (MEASURED FROM THE BOTTOM OF THE WATERBAR CHANNEL TO THE TOP OF THE COMPACTED BERM) TO BETWEEN 18 AND 24 INCHES.

WATER BAR (C)
SCALE: N.T.S. C17, C19

NOTES

1. A KNICK IS A SEMI–CIRCULAR, SHAVED–DOWN SECTION OF THE OUTSIDE EDGE OF THE ROAD.
2. KNICK IS INSTALLED AT A 45–DEGREE ANGLE TO ROAD.
3. THE CENTER OF THE NICK IS OUTSLOPED 3 TO 5% GREATER THAN ROAD'S PROFILE GRADE.
4. DIP OUTLETS SHOULD BE LOCATED TO DRAIN INTO AREAS WITH ADEQUATE SEDIMENT FILTER QUALITY AND NON–ERODIBLE MATERIAL SUCH AS ROCK, SLASH, BRUSH, ETC.
5. DO NOT PUSH ANY FILL TO THE OUTLET OF THE KNICK.



KNICK (B)
SCALE: N.T.S. C19

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3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

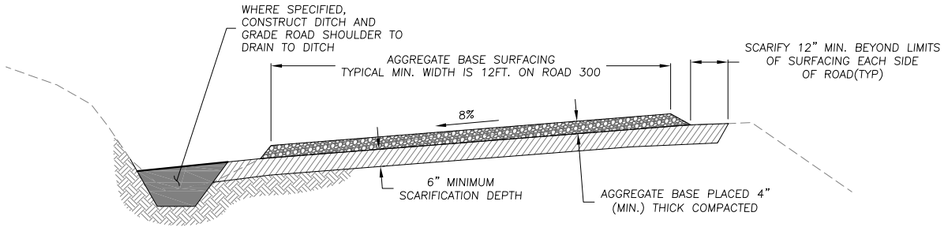
DETAILS (1 OF 5)

BEAR CREEK REDWOODS – PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

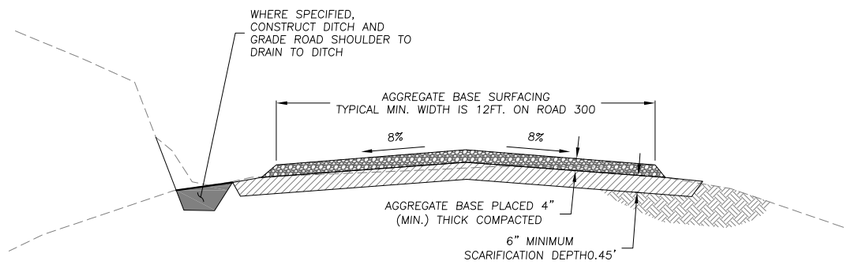
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE: **03/06/2018**
JOB NO.: 16–017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

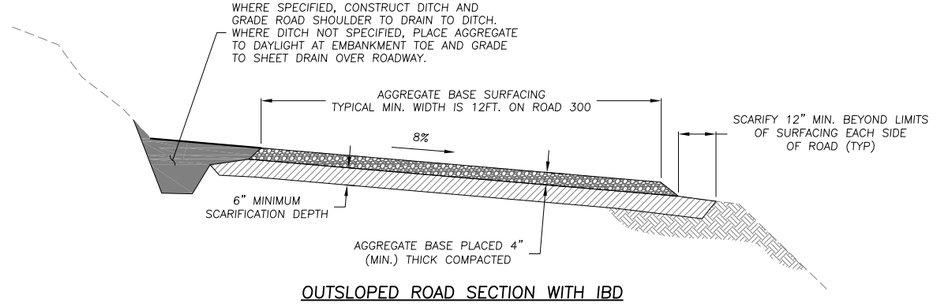
C19 | 19 OF 24



INSLOPED ROAD SECTION (WITH IBD)



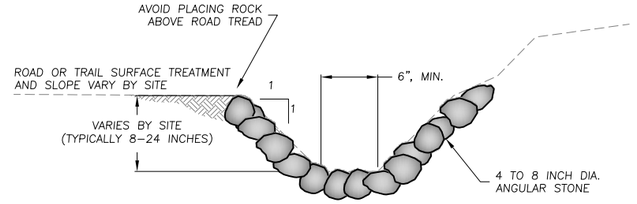
CROWNED ROAD SECTION WITH IBD



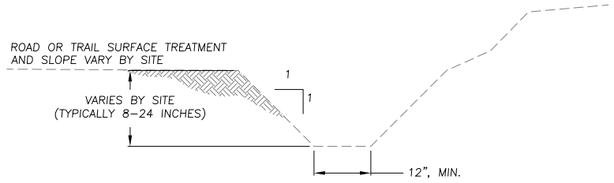
OUTSLOPED ROAD SECTION WITH IBD

NOTES
1. SCARIFY SUBGRADE BELOW ROAD SURFACING AND EXTENDING LATERALLY A MINIMUM OF 12 INCHES BEYOND PROPOSED SURFACING TO A DEPTH OF 6 INCHES, MOISTURE CONDITION AND COMPACT TO 90% RELATIVE COMPACTION.
2. OVER-EXCAVATION MAY BE REQUIRED IN LIMITED ARES OF POOR SUBGRADE CONDITIONS (E.G., UNSUITABLE SOILS OR EXCESSIVE MOISTURE) TO OBTAIN THE REQUIRED COMPACTION. THESE AREAS WILL BE IDENTIFIED BY THE ENGINEER IN THE FIELD. UNSUITABLE SOILS WILL BE DISPOSED ON SITE AT LOCATIONS TO BE FLAGGED BY THE ENGINEER AND REPLACED WITH LOCALLY SOURCED MINERAL SOILS.
3. WHERE "SUBGRADE STABILIZATION" IS SPECIFIED, REMOVE A MINIMUM OF 4 INCHES OF NATIVE MATERIAL, SCARIFY 6 INCHES, AND PLACE AN ADDITIONAL 4 INCH LIFT OF COMPACTED AGGREGATE BASE FOR A TOTAL OF 8 INCHES OF AGGREGATE BASE.
4. AGGREGATE BASEROCK SHALL CONSIST OF APPROVED 1-1/2" LIME-TREATED CLASS 2 AGGREGATE BASE. STEVENS CREEK QUARRY TYPICALLY PROVIDES A PRODUCT CONFORMING TO SPECIFICATIONS.
5. NEW AGGREGATE BASEROCK SHALL BE COMPACTED TO A MINIMUM 4" THICKNESS, UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR DIRECTED BY THE ENGINEER, AND TO 95% RELATIVE COMPACTION.
6. PLACE ROCK TO THE PLAN DIMENSIONS SHOWN ON THE DRAWINGS. ENGINEER MAY DIRECT THE CONTRACTOR TO PLACE ROCK TO TO ADDITIONAL WIDTH AT TURNOUTS AND OTHER AREAS. THESE EXTRA AREAS WILL BE MEASURED SEPARATELY FOR PAYMENT.

TYPICAL AGGREGATE BASE ROCKED ROAD SECTIONS (D)
SCALE: N.T.S.
C8,C9,C13,C14,C15,C16,C20



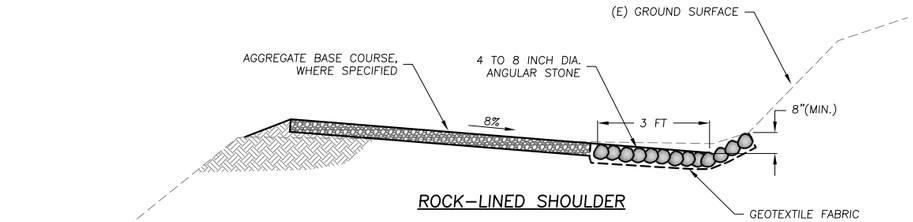
ROCK LINED DITCH



EARTHEN MATERIALS

NOTES
1. SLOPE DITCH TO DRAIN AT 3% MINIMUM PROFILE GRADE.
2. ARMOR DITCH WITH STONE WHERE SPECIFIED OR AS DIRECTED BY THE ENGINEER. MIRAFI 180N FILTER FABRIC MAY BE REQUIRED BENEATH THE STONE, WHERE DIRECTED BY THE ENGINEER IN THE FIELD.
3. THE ENGINEER MAY SPECIFIY VARIED DITCH DIMENSIONS AND LINING WHERE DITCH RELIEF CULVERTS ARE NOT TYPICALLY SPACED.

INBOARD DITCH (F)
SCALE: N.T.S.
C8,C10,C11,C15,C16,C17,C20



ROCK-LINED SHOULDER

NOTES
1. ROCKED SHOULDERS ARE TYPICALLY SPECIFIED WHERE WET CONDITIONS EXIST AND THERE IS INSUFFICIENT WIDTH OF ROADBED TO ALLOW AN IBD.
2. ROCKED SHOULDERS MAY BE SPECIFIED FOR USE WITH OR WITHOUT AGGREGATE BASE COURSE SPECIFIED OVER THE REMAINING ROAD SECTION.
3. PLACE 4"-8" DIAMETER STONE TO THE LINES AND GRADES SHOWN ON THE DRAWINGS. WITH TOP OF STONE FLUSH THE DESIGN FINISH GRADE OF THE ROAD SECTION. EXTEND THE ROCK A MINIMUM OF 8 INCHES UP THE CUT SLOPE, WHERE FEASIBLE.
4. PLACE ROCK OVER MIRAFI 180N, OR EQUIVALENT GEOTEXTILE FABRIC.
5. MAINTAIN POSITIVE SLOPE OF APPROX. 8% TOWARD THE SHOULDER, AS SHOWN.

ROCKED SHOULDER (E)
SCALE: N.T.S.
C9,C14,C20

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DATE 3/06/18

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

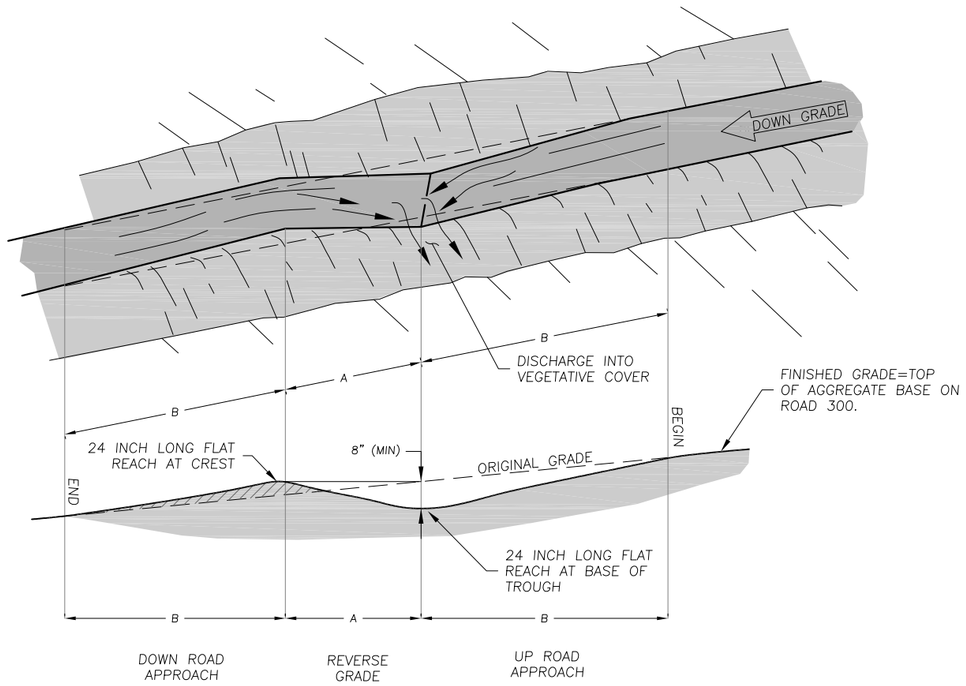
DETAILS
(2 OF 5)

BEAR CREEK
REDWOODS - PHASE
ONE ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE: **03/06/2018**
JOB NO.: 16-017

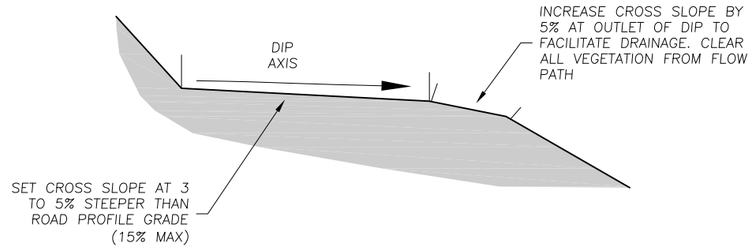
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C20 | 20 OF 24



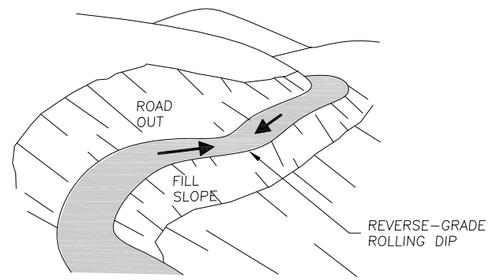
REVERSE GRADE DIP OVERVIEW

N.T.S.



ROAD SECTION

ROAD GRADE (%)	TROUGH	A: REVERSE GRADE	B: UP ROAD APPROACH DOWN ROAD TRAIL	
	MINIMUM DEPTH BELOW DONWSLOPE CREST	MINIMUM DISTANCE AND GRADE FROM TROUGH AXIS TO DOWNROAD CREST (FT)	DISTANCE FROM UP-ROAD START OF ROLLING DIP TO TROUGH AXIS (FT)	GRADE (%)
<5	8 INCHES	20 FT. AT 3%	20	8
5 TO 10			30	10
10 TO 15			50	19
15 TO 20			75	23



OBLIQUE VIEW

NOTES

1. REVERSE GRADE DIP LOCATIONS WILL BE FLAGGED BY THE ENGINEER IN THE FIELD, PRIOR TO START OF WORK.
2. THE ENGINEER AND DISTRICT SHALL BE NOTIFIED 5 DAYS PRIOR TO CONSTRUCTION OF THE FIRST REVERSE GRADE DIP SO THAT THE ENGINEER AND DISTRICT CAN ARRANGE TO BE ON SITE TO REVIEW INITIAL REVERSE GRADE DIP CONSTRUCTION FOR APPROVAL BEFORE THE CONTRACTOR PROCEEDS ON TO REMAINING REVERSE GRADE DIPS.
3. EXCAVATE THE UP ROAD HEAD BELOW THE EXISTING TREAD, WITH THE CREST AND DOWNROAD TAIL BUILT UP ON COMPACTED FILL.
4. CONSTRUCT DIP TO A MINIMUM OF 6 INCHES DEEP ACROSS THE ENTIRE WIDTH OF THE ROAD PRISM AND INCORPORATE A 2 FOOT LONG FLAT REACH AT THE BASE OF THE TROUGH (UNLESS OTHERWISE DIRECTED).
5. OUTSLOPE DIP AXIS 3%-5% STEEPER THAN ROAD/TRAIL GRADE. DIP AXIS MAY BE SKEWED DOWN ROAD AT 30 DEGREES TO FACILITATE INSTALLATION OF DIPS ON STEEPER ROAD GRADES.
6. LOCATE DIP OUTLETS TO DRAIN INTO AREAS WITH ADEQUATE SEDIMENT FILTER QUALITY AND NON-ERODIBLE MATERIAL SUCH AS ROCK, SLASH, BRUSH, ETC. WHERE DIRECTED BY THE ENGINEER, DIP OUTLETS WILL BE ARMORED WITH ¼ CY ROCK (4"-8" DIA).
7. WHERE NATURAL SLOPES EXCEED 50%, FILL SHALL NOT BE PUSHED OVER THE DIP OUTLET. A BACKHOE OR EXCAVATOR MAY BE REQUIRED TO PULL BACK FILL AT OUTLET OF EXISTING DIPS.
8. PLACE DIPS AT LOCATIONS SPECIFIED ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER

REVERSE GRADE DIPS (G)

SCALE: N.T.S.

C8,C10,C14,C21

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3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

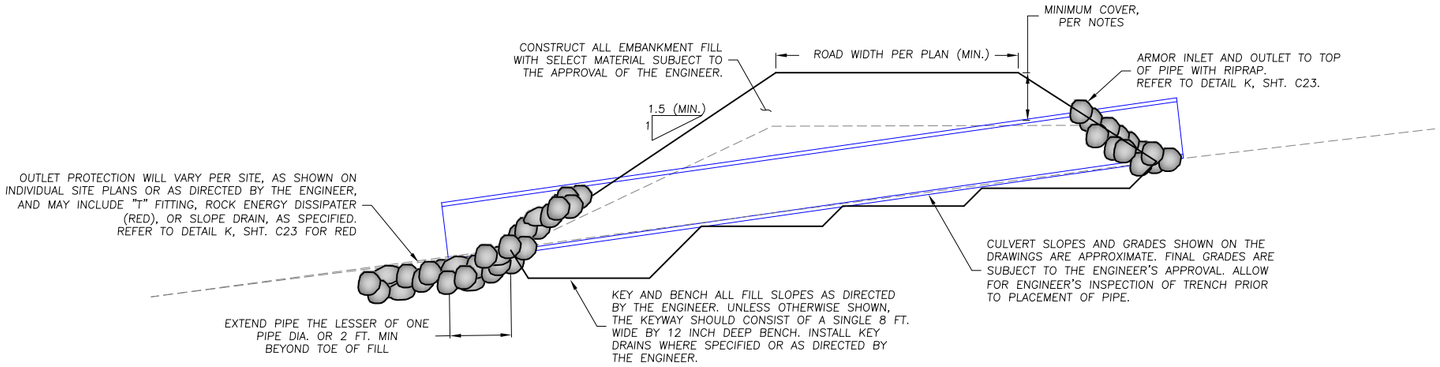
DETAILS (3 OF 5)

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

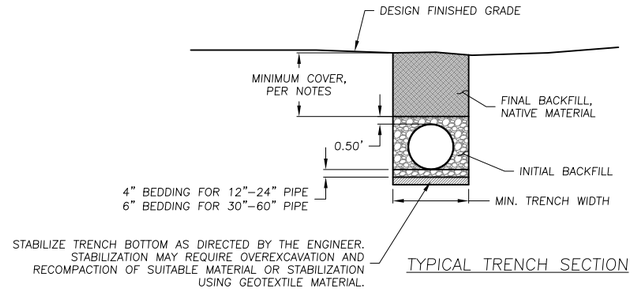
DESIGNED BY:
DRAWN BY:
CHECKED BY:
DATE: 03/06/2018
JOB NO.: 16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C21 | 21 OF 24



CULVERT PROFILE



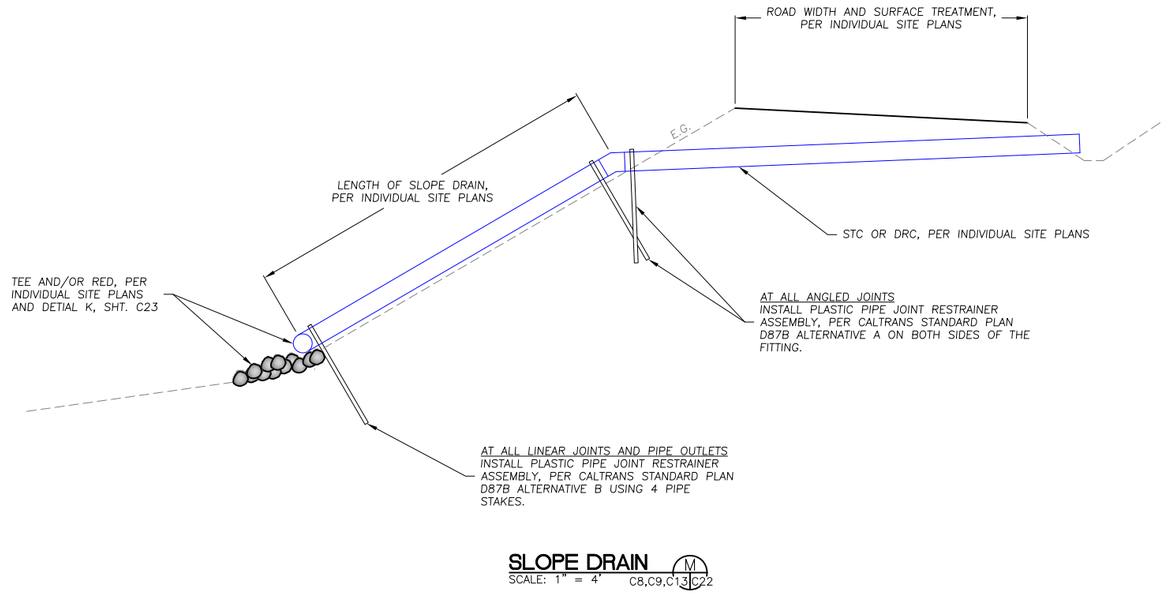
TYPICAL TRENCH SECTION

STREAM CROSSING CULVERT (H)

SCALE: N.T.S. C8,C11,C14,C15,C16,C22

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL CULVERT AND SLOPE DRAINS SHALL BE "ADS N–12 WT" DUAL–WALLED HDPE PIPE WITH WATER–TIGHT BELL AND SOCKET FITTINGS WITH RUBBER GASKETS.
2. ALL PIPE INSTALLATION SHALL COMPLY WITH THE MANUFACTURER'S SPECIFICATIONS AND THESE DRAWINGS.
3. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION.
4. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED. THIS MAY REQUIRE WRAPPING BEDDING AND BACKFILL IN GEOTEXTILE MEMBRANE, WHERE SPECIFIED OR AS DIRECTED BY THE ENGINEER.
5. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, EXCAVATE TO THE DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
6. BEDDING: SUITABLE MATERIAL SHALL BE CLASS 1, 2, OR 3 (ASTM D2321). NATIVE SOILS MAY BE USED, SUBJECT TO APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" FOR 4"–24"; 6" FOR 30"–60".
7. INITIAL BACKFILL: INITIAL BACKFILL SHALL BE CLASS 1 OR 2, IN ACCORDANCE WITH ASTM D2321. NATIVE SOILS MAY BE USED, SUBJECT TO APPROVAL OF THE ENGINEER.
8. FINAL BACKFILL: SUITABLE MATERIAL SHALL BE LOCAL CLEAN MINERAL SOILS WITH NO ROCK LARGER THAN 3 INCHES.
9. MINIMUM COVER: MINIMUM COVER, H, IN NON–TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 18" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR PIPES OVER 36" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.
10. CRITICAL DIP: INSTALL A CRITICAL DIP ON THE ROAD DOWN GRADE FROM THE CULVERT CROSSING, UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS OR DIRECTED BY THE ENGINEER. CRITICAL DIP SHALL CONFORM TO STANDARD DIMENSIONS FOR A REVERSE GRADE DIP.



SLOPE DRAIN (M)

SCALE: 1" = 4' C8,C9,C13,C22

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DATE 3/06/18

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

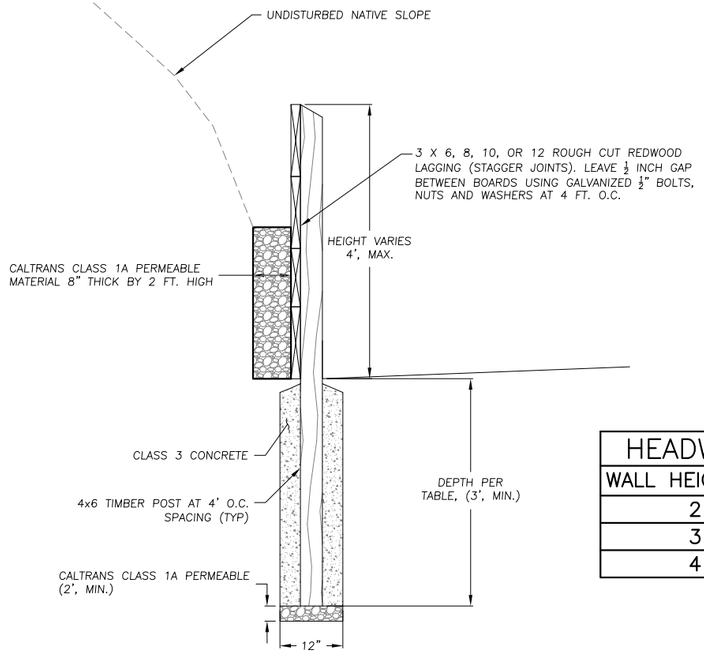
DETAILS (4 OF 5)

BEAR CREEK REDWOODS – PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16–017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C22 | 22 OF 24

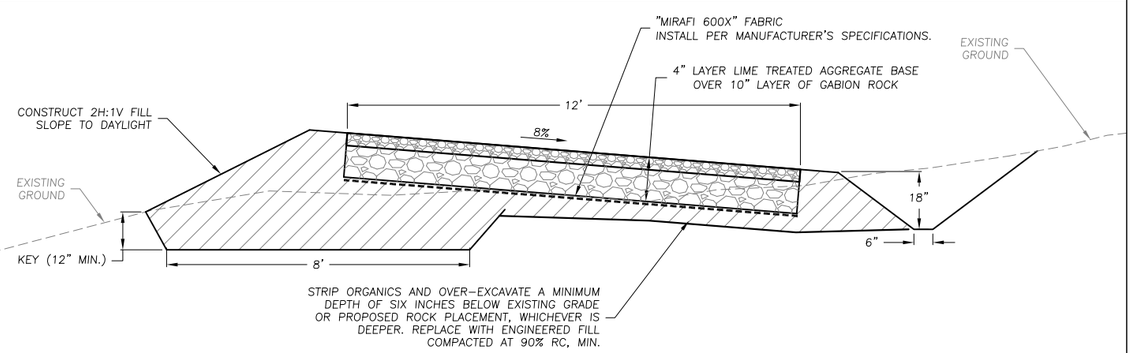


HEADWALL PROTECTION	
WALL HEIGHT(FT.)	PIER DEPTH
2	4
3	6
4	7

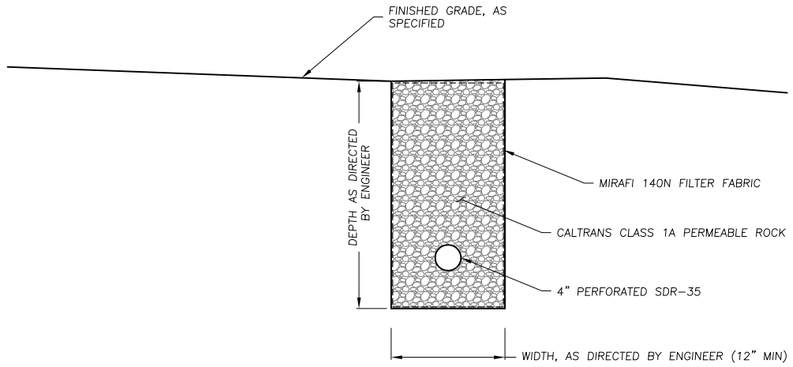
NOTES

1. STRIP SLOPE AND ROAD/DITCH LINE OF ALL LOOSE MATERIAL AND GRADE ROAD/DITCH TO FINISH SLOPE PRIOR TO CONSTRUCTION OF HEADWALL PROTECTION.
2. CLASS 3 CONCRETE SHALL CONSIST OF 505 LBS OF PORTLAND CEMENT PER CUBIC YARD AND HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 2000 PSI.

HEADWALL PROTECTION DETAIL (J)
SCALE: 1" = 1' C8,C13,C23



ROCKED ROAD TO DRC (I)
SCALE: 1" = 2' C11,C23



SUBDRAIN (L)
SCALE: N.T.S. C14,C16,C23

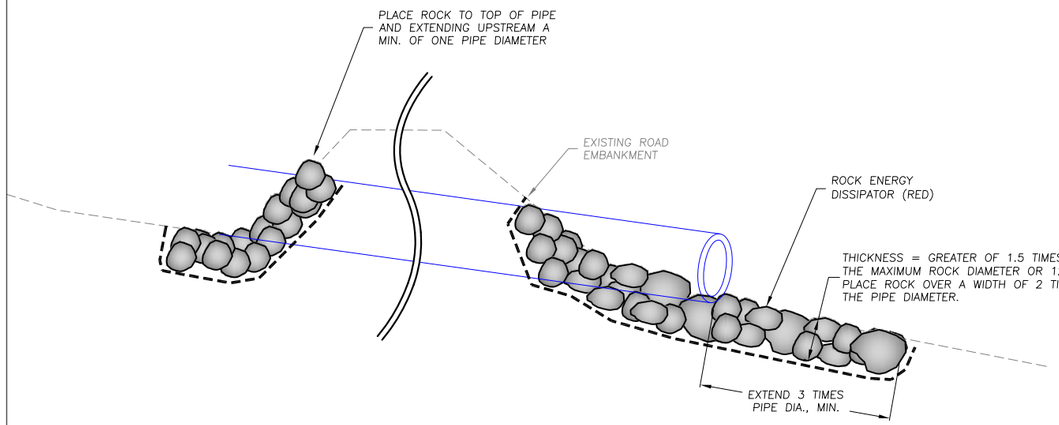


TABLE 1 – INLET/OUTLET PROTECTION STONE		
PIPE DIAMETER	D50 ROCK SIZE	
	DIAMETER	WEIGHT
<18"	8"	LIGHT
24"	12"	1/4T
36"	24"	1/2T
48"	30"	1/2-1T+

NOTES

1. THIS DETAIL APPLIES TO STREAM CROSSING CULVERTS ONLY. THIS DETAIL DOES NOT APPLY TO DITCH RELIEF CULVERTS.
2. ARMOR INLET AND OUTLET TO THE TOP OF THE CULVERT WITH ROCK RIPRAP, AS SHOWN.
3. RIPRAP SHALL CONSIST OF SOUND, DURABLE, ANGULAR ROCK CONFORMING TO SECTION 72-2.02, MATERIALS OF THE STATE STANDARD SPECIFICATIONS FOR THE ROCK SIZE CLASS SPECIFIED.
4. ROCK SIZE CLASSES NOT DESIGNATED BELOW SHALL BE AS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER.
5. OVER EXCAVATE CHANNEL IN AREAS SPECIFIED TO RECEIVE ROCK. KEY ROCK A MINIMUM OF 1.5 TIMES THE MAXIMUM ROCK DIAMETER INTO BED AND BANKS, UNLESS OTHERWISE SPECIFIED.
6. PLACE A NON-WOVEN GEOTEXTILE FABRIC BETWEEN ROCK AND SOIL WHERE SPECIFIED OR DIRECTED BY THE ENGINEER.
7. ALIGN DISSIPATER WITH NATURAL DRAINAGE PATH.
8. THE ROCK SIZES SPECIFIED IN TABLE 1 ARE TYPICAL. INDIVIDUAL SITE REQUIREMENTS MAY VARY, AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
9. PERIMETER OF ROCK SHALL CONFORM TO ADJACENT UNDISTURBED GRADE.

ROCK ENERGY DISSIPATOR (RED) (K)
SCALE: N.T.S. C8,C13,C14,C15,C16,C23

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3/06/18 DATE

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MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

DETAILS (5 OF 5)

BEAR CREEK REDWOODS - PHASE ONE ROAD AND TRAIL IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16-017

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C23 | 23 OF 24

GENERAL NOTES

1. PREPARED AT THE REQUEST OF:
   MIDPENNINSULA REGIONAL OPEN SPACE DISTRICT
   0330 DISTEL CIRCLE
   LOS ALTOS, CA 94022

1. THE "DISTRICT" SHALL BE MIDPENINSULA REGIONAL OPEN SPACE DISTRICT. THE ENGINEER SHALL BE WATERWAYS CONSULTING, OR THEIR DESIGNATED REPRESENTATIVE. THE "CONTRACTOR" SHALL BE THE DISTRICT OR INDEPENDENT CONTRACTOR TO PERFORM THE WORK DESCRIBED HEREIN. THE ENGINEER HAS BEEN RETAINED BY THE DISTRICT AND IS NOT AFFILIATED WITH THE CONTRACTOR.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING ANY REQUIREMENTS OF THE DISTRICT'S GENERAL AND SUPPLEMENTAL CONDITIONS FOR THE PROJECT.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.
4. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE DRAWINGS, SPECIFICATIONS, AND THE 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").
5. PROVIDE, AT CONTRACTOR'S SOLE EXPENSE, ALL MATERIALS, LABOR AND EQUIPMENT REQUIRED TO COMPLY WITH ALL APPLICABLE PERMIT CONDITIONS AND REQUIREMENTS.
6. CULTURAL RESOURCES: IN THE EVENT THAT HUMAN REMAINS AND/OR CULTURAL MATERIALS ARE FOUND, ALL PROJECT-RELATED CONSTRUCTION SHALL CEASE WITHIN A 100-FOOT RADIUS. THE CONTRACTOR SHALL, PURSUANT TO SECTION 7050.5 OF THE HEALTH AND SAFETY CODE, AND SECTION 5097.94 OF THE PUBLIC RESOURCES CODE OF THE STATE OF CALIFORNIA, NOTIFY THE SANTA CLARA COUNTY CORONER IMMEDIATELY.

EXAMINATION OF JOB SITE, DRAWINGS AND SPECIFICATIONS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE PROJECT DOCUMENTS WITH CONDITIONS AT THE SITE AND SHALL VERIFY EXISTING GRADES, ELEVATIONS AND CONDITIONS PRIOR TO COMMENCING WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER AND SHALL BE RESOLVED BEFORE PROCEEDING WITH THE WORK. ANY DEVIATION, SUBSTITUTION OR ALTERATION TO THE WORK SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. WHEN IT IS FOUND THAT FIELD CONDITIONS ARE NOT AS SHOWN ON THE DRAWINGS, THE CONTRACTOR MUST MAKE REVISIONS AND/OR ADJUSTMENTS TO THE SATISFACTION OF THE ENGINEER/OWNER PRIOR TO FURTHER CONSTRUCTION.
2. THE CONTRACTOR SHALL EXAMINE CAREFULLY THE PROJECT AREA, THE DRAWINGS AND SPECIFICATIONS. THE SUBMISSION OF A BID SHALL BE CONCLUSIVE EVIDENCE THAT THE CONTRACTOR HAS INVESTIGATED AND IS SATISFIED AS TO THE CONDITIONS TO BE ENCOUNTERED, AS TO THE CHARACTER, QUALITY, AND SCOPE OF WORK TO BE PERFORMED, THE QUANTITIES OF MATERIALS TO BE FURNISHED AND AS TO THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS.
3. IN THE EVENT THAT ANY UNUSUAL CONDITIONS NOT COVERED BY THE DRAWINGS AND SPECIFICATIONS ARE ENCOUNTERED DURING THE WORK, THE ENGINEER SHALL BE IMMEDIATELY CONTACTED FOR DIRECTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO IMMEDIATELY NOTIFY THE ENGINEER UPON DISCOVERY OF ANY CONFLICTS BETWEEN DRAWINGS AND FIELD CONDITIONS.
4. THE CONTRACTOR SHALL RECOGNIZE THAT THE CONDITIONS SHOWN ON THE DRAWINGS MAY DIFFER FROM THE ACTUAL PHYSICAL SITE. DIMENSIONS ARE APPROXIMATE. BEFORE PROCEEDING WITH THE WORK, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EVALUATE THE SITE IN RELATION TO THE DRAWINGS AND SPECIFICATIONS AND REPORT ANY DISCREPANCIES TO THE DISTRICT AND THE ENGINEER.
5. THE CONTRACTOR MUST ATTEND A PRE-BID MEETING WITH THE ENGINEER PRIOR TO SUBMITTING A PROPOSAL TO COMPLETE THE PROPOSED WORK. THE CONTRACTOR MAY BE REQUIRED TO ATTEND A PRE-CONSTRUCTION MEETING WITH THE ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE PURPOSE OF THESE MEETINGS IS TO ALLOW THE CONTRACTOR TO ASK QUESTIONS CONCERNING THE WORK AND TO MAKE SURE THE CONTRACTOR UNDERSTANDS THE SCOPE OF WORK, PERMIT CONDITIONS AND ENVIRONMENTAL CONSTRAINTS.
6. AT ALL TIMES DURING PROJECT CONSTRUCTION ACTIVITIES, COPIES OF THE APPROVED FINAL DRAWINGS, SPECIFICATIONS, AND PERMITS SHALL BE MAINTAINED AT THE CONSTRUCTION JOB SITE (WHERE SUCH COPIES SHALL BE AVAILABLE FOR PUBLIC REVIEW) AND ALL PERSONS INVOLVED WITH THE CONSTRUCTION SHALL BE BRIEFED ON THE CONTENT AND MEANING OF EACH PRIOR TO COMMENCEMENT OF CONSTRUCTION.

MAPPING

1. TOPOGRAPHIC MAPPING PROVIDED BY:
   GROUND SURVEY: WATERWAYS CONSULTING, INC.
   SURVEY DATES VARY (2016-2107)
   AERIAL SURVEY: SANTA CLARA COUNTY LIDAR COUNTOURS PROVIDED BY MIDPENINSULA REGIONAL OPEN SPACE DISTRICT
2. ELEVATION DATUM:
   GROUND BASED MAPS ARE BASED ON INDIVIDUAL ASSUMED LOCAL DATUM
   AERIAL MAPPING: NAVD88
   BASIS OF BEARINGS: NAD83 CALIFORNIA STATE PLANES, ZONE III
3. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL VARIES.
4. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, IF SHOWN, WERE COMPILED FROM RECORD INFORMATION AND FROM FIELD TIES TO EXISTING BOUNDARY MONUMENTATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
5. THE DISTRICT SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL PROPERTY LINES AND EASEMENTS AND CONFIRMING THAT PROPOSED PROJECT ELEMENTS ARE LOCATED ON DISTRICT OWNED LANDS OR ARE COORDINATED WITH OWNERS AND APPROPRIATE PERMISSIONS ARE GRANTED FOR THE WORK.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING AND LAYOUT, UNLESS OTHERWISE SPECIFIED.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED.
8. MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.
9. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN ARE APPROXIMATE. TREE TRUNK DIMENSIONS MAY BE SHOWN OUT-OF-SCALE FOR PLOTTING CLARITY. CAUTION SHOULD BE USED IN DESIGNING NEAR TREE TRUNKS. THERE ARE LIMITATIONS ON FIELD ACCURACY, DRAFTING ACCURACY, MEDIUM STRETCH AS WELL AS THE "SPREAD" OR "LEANING" OF TREES. REQUEST ADDITIONAL TOPOGRAPHIC DETAIL WHERE CLOSE TOLERANCES ARE ANTICIPATED. INDIVIDUAL TREES ARE NOT TYPICALLY LOCATED WITHIN DRIPLINE CANOPY AREAS SHOWN.

EXISTING UNDERGROUND UTILITIES

1. CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.
2. PRIOR TO BEGINNING WORK, CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.
3. EXISTING UTILITY LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.
4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION. IF THE CONTRACTOR FAILS TO ADEQUATELY PROTECT THE UTILITIES, ANY RESULTING DAMAGE SHALL BE REPAIRED AT CONTRACTOR'S COST.
5. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.
6. TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
7. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.
8. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

INSPECTIONS

1. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.
2. ALL WORK SHALL BE SUBJECT TO OBSERVATION, TESTING AND APPROVAL BY DISTRICT AND ENGINEER, IN ADDITION TO INSPECTIONS REQUIRED BY REGULATORY AGENCIES.
3. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER A MINIMUM OF 7 DAYS PRIOR TO COMMENCEMENT OF WORK AND A MINIMUM OF 4 DAYS IN ADVANCE OF REQUIRED INSPECTIONS. THE GEOTECHNICAL ENGINEER SHALL ALSO BE NOTIFIED AT LEAST FOUR (4) WORKING DAYS PRIOR TO ANY SITE CLEARING OR GRADING SO THAT THE WORK IN THE FIELD CAN BE COORDINATED WITH THE GRADING CONTRACTOR, AND ARRANGEMENTS FOR TESTING AND OBSERVATION CAN BE MADE. THE PROJECT ENGINEER (ENGINEER) SHALL BE PROVIDED AN OPPORTUNITY TO REVIEW PROJECT DRAWINGS WITH THE CONTRACTOR DURING THE PRE-CONSTRUCTION MEETING TO EVALUATE IF RECOMMENDATIONS HAVE BEEN PROPERLY INTERPRETED. THE ENGINEER SHALL ALSO PROVIDE KEYWAY EXCAVATION AND EARTHWORK OBSERVATIONS. THIS ALLOWS THE ENGINEER TO CONFIRM ANTICIPATED SOIL CONDITIONS AND EVALUATE CONFORMANCE WITH OUR RECOMMENDATIONS AND PROJECT DRAWINGS. IF THE ENGINEER IS NOT PROVIDED THIS OPPORTUNITY THEY ASSUME NO RESPONSIBILITY FOR MISINTERPRETATION OF THE RECOMMENDATIONS.
4. REGULATORY AGENCIES MAY REQUIRE A FINAL GRADING COMPLIANCE LETTER. WE CAN ONLY OFFER THIS LETTER IF WE ARE CALLED TO THE SITE TO OBSERVE AND TEST, AS NECESSARY, ANY GRADING AND EXCAVATION OPERATIONS FROM THE START OF CONSTRUCTION. WE CANNOT PREPARE A LETTER IF WE ARE NOT AFFORDED THE OPPORTUNITY OF OBSERVATION FROM THE BEGINNING OF THE GRADING OPERATION. THE CONTRACTOR MUST BE MADE AWARE OF THIS AND EARTHWORK TESTING AND OBSERVATION MUST BE SCHEDULED ACCORDINGLY. PLEASE CONTACT OUR OFFICE.
5. IF UNFORSEEN CONDITIONS ARE ENCOUNTERED DURING CONSTRUCTION, OR IF THE PROPOSED CONSTRUCTION WILL DIFFER FROM THAT PLANNED AT THIS TIME, THE ENGINEER SHALL BE NOTIFIED SO THAT SUPPLEMENTAL RECOMMENDATIONS CAN BE GIVEN.

CONSTRUCTION OBSERVATION SCHEDULE

1. IN ADDITION TO OBSERVATIONS OF WORK, ENGINEER WILL FLAG THE LOCATION OF PROPOSED FEATURES.
2. REQUIRED OBSERVATIONS BY ENGINEER SHALL INCLUDE, BUT NOT BE LIMITED TO:
   - FINAL DRAINAGE FEATURE LOCATIONS (INCLUDING RGD'S, KNICKS, ETC.), PRIOR TO INSTALLATION
   - COMPLETED CULVERT TRENCHES PRIOR TO PLACEMENT OF CULVERTS OR BEDDING MATERIALS
   - LIMITS OF GRADING, EXCAVATION AND SPOIL PLACEMENT
   - SUBGRADE PRIOR TO PLACEMENT OF ROCK OR FABRIC
   - KEYWAYS AND DRAINS FOR EMBANKMENT CONSTRUCTION
   - LIMITS OF PROPOSED BORROW SITES
   - BMP'S, INCLUDING DIVERSION AND DEWATERING SYSTEMS, PRIOR TO SITE DISTURBING ACTIVITIES
   - FILL PLACEMENT AND COMPACTION ENERGY DISSIPATER SHAPE AND POSITION

SCHEDULE

1. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL A DETAILED CONSTRUCTION SCHEDULE. DO NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

SAFETY

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.
2. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.
3. CONTRACTOR IS REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
4. THE CONTRACTOR SHALL CONFORM TO THE RULES AND REGULATIONS OF THE CONSTRUCTION SAFETY ORDERS OF THE CALIFORNIA DIVISION OF OCCUPATIONAL SAFETY AND HEALTH PERTAINING TO EXCAVATION AND TRENCHES THE CALIFORNIA CODE OF REGULATIONS TITLE 8, SUBCHAPTER 4 CONSTRUCTION SAFETY ORDERS, ARTICLE 6 EXCAVATION.

STAGING AND ACCESS

1. AUTHORIZED CONSTRUCTION ACCESS POINTS, ROUTES, AND STAGING AREAS ARE SHOWN ON THE DRAWINGS. CONSTRUCTION ACCESS AND STAGING AREAS WILL BE RESTRICTED TO EXISTING ROADS AND PREVIOUSLY CLEARED TURNOUTS OR LANDINGS, UNLESS OTHERWISE AUTHORIZED BY THE DISTRICT'S REPRESENTATIVE.
2. IMPACTS TO THE ACCESS ROUTES MUST BE MINIMIZED AND DISTURBANCE ALONG THE ACCESS ROUTE SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS UPON PROJECT COMPLETION.
3. THE CONTRACTOR SHALL CAREFULLY PRESERVE THE SURROUNDING PROPERTY BY CONFINING OPERATIONS WITHIN THE LIMITS OF WORK. CONSTRUCTION WORK OR EQUIPMENT OPERATIONS SHALL NOT BE CONDUCTED OUTSIDE THE DESIGNATED WORK AREA BOUNDARY WITHOUT APPROVAL OF THE DISTRICT.
4. KEYS WILL BE PROVIDED BY THE DISTRICT TO ALLOW CONTRACTOR ACCESS AT GATES "BC01", "BC05", AND "BC09".
5. THROUGH ROAD ACCESS OVER EXISTING DISTRICT ROADS SHALL BE MAINTAINED. IF THROUGH ACCESS CANNOT BE MAINTAINED, A SCHEDULE FOR CLOSURE MUST BE APPROVED BY A DISTRICT REPRESENTATIVE.

HOUSEKEEPING

1. MAINTAIN THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. STORE ALL MATERIALS WITHIN APPROVED STAGING AREAS.
2. CONSTRUCTION WATER IS AVAILABLE NEAR GATE "BC01" AND WILL BE IDENTIFIED AT THE PREBID MEETING.
3. THE CONTRACTOR SHALL MAINTAIN GOOD CONSTRUCTION SITE HOUSEKEEPING CONTROLS AND PROCEDURES (E.G., CLEAN UP ALL LEAKS, DRIPS, AND OTHER SPILLS IMMEDIATELY; KEEP MATERIALS COVERED AND OUT OF THE RAIN (INCLUDING COVERING EXPOSED PILES OF SOIL AND WASTES); DISPOSE OF ALL WASTES PROPERLY, PLACE TRASH RECEPTACLES ON SITE FOR THAT PURPOSE, COVER OPEN TRASH RECEPTACLES DURING WET WEATHER, REMOVE ALL CONSTRUCTION DEBRIS FROM THE SITE. THE CONTRACTOR IS RESPONSIBLE TO MAINTAIN ALL VEHICLES AND EQUIPMENT AND TO INSPECT THEM FREQUENTLY FOR LEAKS.
4. EQUIPMENT WASHING, REFUELING, AND/OR SERVICING SHALL NOT TAKE PLACE EXCEPT WITH APPROPRIATE PRECAUTIONS TO AVOID FUEL SPILLS, AT LEAST 100 FEET AWAY FROM THE POND AND ADJACENT STREAM CHANNELS, FOR VEHICLE AND EQUIPMENT MAINTENANCE.
5. PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS SHALL BE STORED OFFSITE.
6. SWEEP UP ANY SPILLED DRY MATERIALS IMMEDIATELY. USE ONLY WATER FOR DUST CONTROL.
7. CLEAN UP ANY SPILLS ON A DIRT AREA BY DIGGING UP AND PROPERLY DISPOSING OF CONTAMINATED SOIL AT AN APPROPRIATE FACILITY.

WATERWAYS CONSULTING INC.

TIMOTHY E. BEST, CEG
ENGINEERING GEOLOGY AND HYDROLOGY
2032 Columbia Street, Santa Cruz, CA 95060
(831) 425-8555 • FAX (831) 425-8554 • e-mail: tim@waterways.net

3/06/18 DATE

REGISTERED PROFESSIONAL ENGINEER ★ MATTHEW W. WELD ★ No. 62235 Exp. 9-30-19 ★ CIVIL ★ STATE OF CALIFORNIA

MATT W. WELD

PREPARED AT THE REQUEST OF:
MIDPENINSULA REGIONAL
OPEN SPACE DISTRICT

NOTES

BEAR CREEK
REDWOODS - PHASE
ONE ROAD AND TRAIL
IMPROVEMENTS
100% SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	03/06/2018
JOB NO.:	16-017

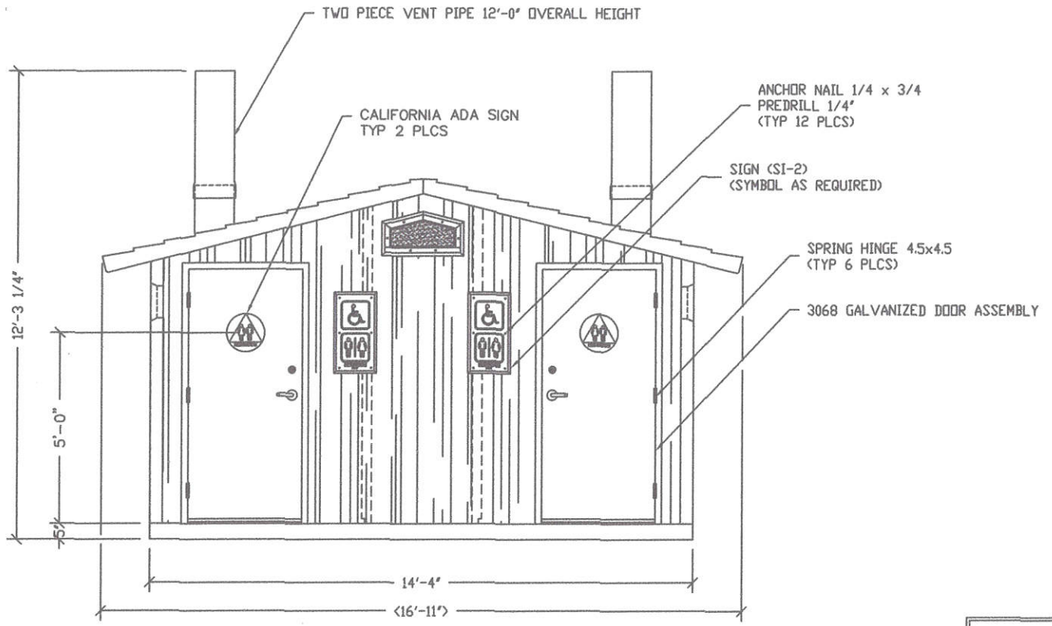
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C24

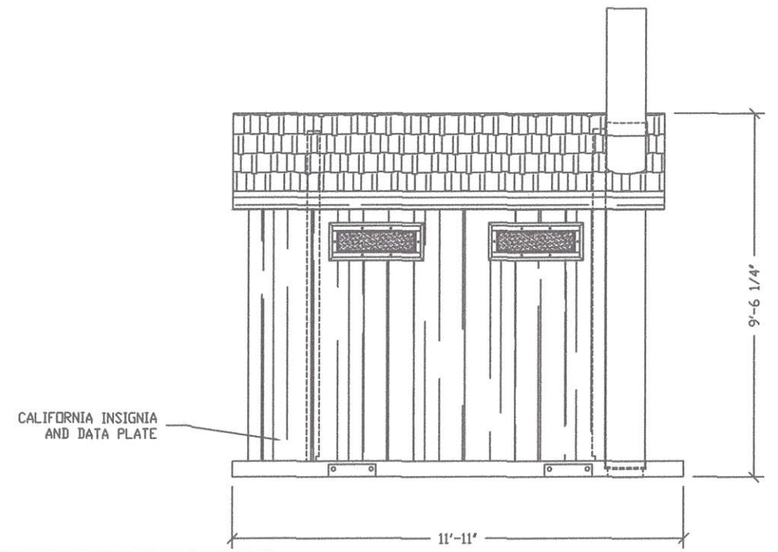
24 OF 24

*Restroom supplied and set in place by District.

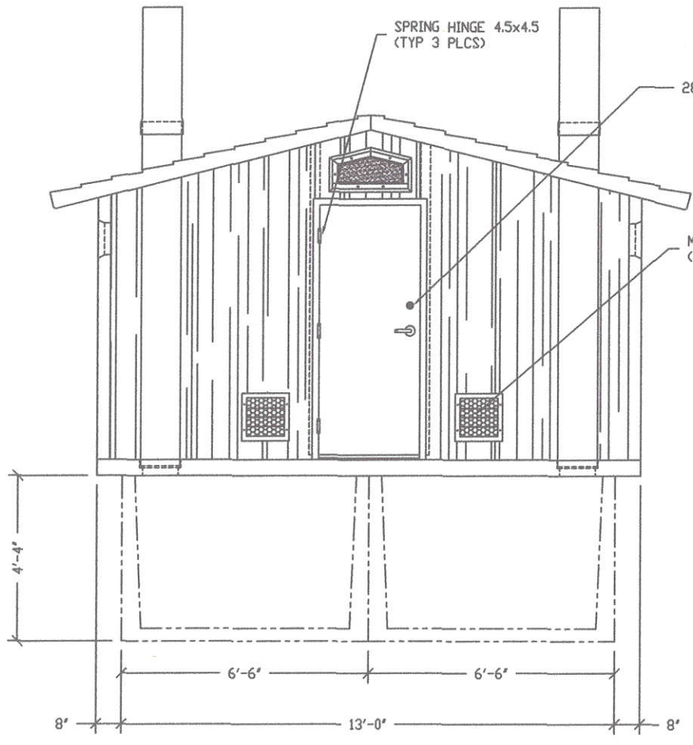
PROJECT PLANS E: ALMA PARKING AREA RESTROOM PLANS



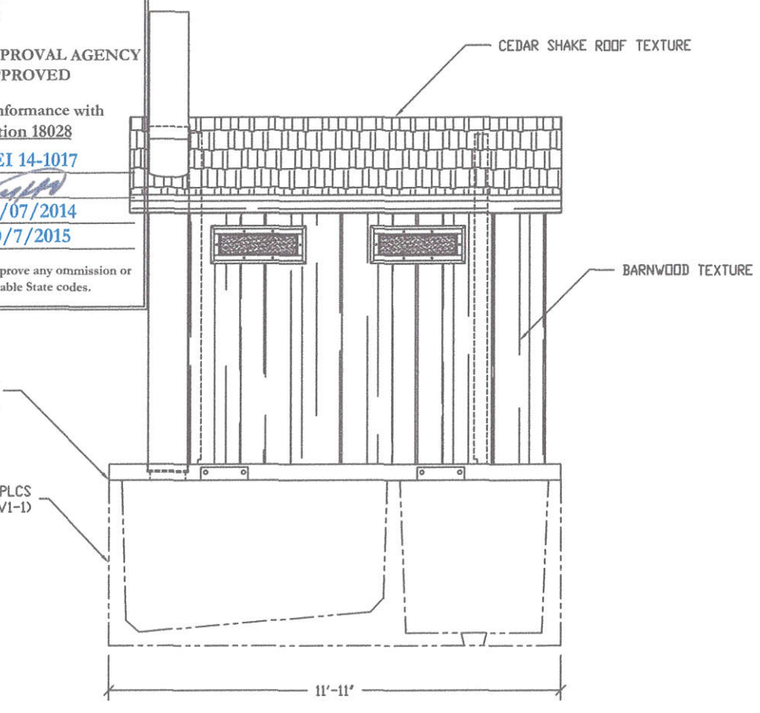
FRONT ELEVATION



RIGHT SIDE ELEVATION



REAR ELEVATION



LEFT SIDE ELEVATION

THE EXCAVATION REQUIRED FOR THE RESTROOM VAULT IS NOT INCLUDED IN THE CUT CALCULATION AND ADDS APPROXIMATELY 15 CY OF MATERIAL TO THE TOTAL.

THE CONTRACTOR SHALL EXCAVATE 12" BEYOND THE WIDTH AND LENGTH, AND 13" BEYOND THE DEPTH AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL PLACE AND COMPACT 12" OF CLASS II AGGREGATE BASE AND 1" OF SAND ON THE COMPACTED VAULT TOILET SUBGRADE. CONTRACTOR SHALL ALSO PLACE COMPACTED CLASS II AB AROUND SIDES OF VAULT UP TO GRADE.

www.p-e-i.com
PROGRESSIVE ENGINEERING, INC.
58640 STATE ROAD 15
GOSHEN, INDIANA 46528
(574) 533-0337 - Phone
(574) 533-9736 - Fax

STATE OF CALIFORNIA DESIGN APPROVAL AGENCY
STATE OF CALIFORNIA APPROVED

This document is certified as being in conformance with California Health & Safety - Code Section 18028

PLAN APPROVAL NO.:	PEI 14-1017
APPROVED BY:	
DATE APPROVED:	07/07/2014
DATE OF EXPIRATION:	10/7/2015

Approval of this document does not authorize or approve any ommission or deviation from the requirement of the applicable State codes.

EMBEDDED MATERIALS	
ITEM	QTY
VENT PIPE 3'-0"	2
VENT PIPE 9'-0"	2
3068 DOOR ASSEMBLY	2
2868 DOOR ASSEMBLY	1
ANCHOR NAIL 1/4x3/4	12
SPRING HINGE 4.5x4.5	9
SI-2	2
CALIFORNIA UNISEX SIGN	2

CU. FT. CONC.	SQ. FT. W.W.F.

APPROXIMATE WEIGHT

REGISTERED PROFESSIONAL ENGINEER
WILLIAM RICHARD HEIDEN, III
74138
CIVIL
STATE OF CALIFORNIA

July 5, 2014

3808 N. Sullivan Bldg. #7 Spokane, WA 99216
CXT Precast Products
901 N. Highway 77 Hillsboro, TX 76645

PROJECT TITLE
TIOGA with CHASE
BUILDING NUMBER T-3736

NOTICE

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CXT Incorporated

REV.	DESCRIPTION	APPROVAL	DATE
SCALE	1/4"=1'-0"	DATE	6-28-14
DRAWN	MATT BRANCO	FILE NO.	T-3736
CHECKED	RDW	PLOT	48

BUILDING ELEVATION

DWG NO.	SHEET	REV.
TWC-02	2 / 16	

Project Specifications B: Parking Area and Trailhead

MIDPENINSULA REGIONAL OPEN SPACE DISTRICT

ALMA COLLEGE PARKING AREA AND TRAILHEAD

TECHNICAL SPECIFICATIONS

Prepared by:

Harris Design

and

Fall Creek Engineering

100% CONSTRUCTION DOCUMENTS
JANUARY 31, 2018

TECHNICAL SPECIFICATIONS
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SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

A. Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

C. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

D. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

E. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.4 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA, licensed arborist in jurisdiction where Project is located, current member of ASCA, or registered Consulting Arborist as designated by ASCA.

1.5 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones (zones protected by construction fencing or sensitive species fencing) unless approved by the District Representative::

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

B. Organic Mulch: Ground or shredded bark or wood and bark chips, free from deleterious materials.

C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by District's Representative.

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart. High-visibility orange color, nonfading.
2. Height of Fencing: 4 feet.
3. Gates: Use section of plastic protection-zone fencing as gate.

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Protection Zones: Mulch areas inside protection zones and other areas indicated with 6-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.2 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected area except by entrance gates.

1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to District's Representative.
2. Access Gates: Install where indicated.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by District's Representative.

C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by District's Representative.

D. Maintain protection-zone fencing and signage in good condition as acceptable to District's Representative and remove when construction operations are complete and equipment has been removed from the site.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. Do not allow exposed roots to dry out before placing permanent backfill.

3.4 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Temporarily support and protect roots from damage until they are permanently covered with soil.
3. Cover exposed roots with burlap and water regularly.
4. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

B. Root Pruning at Edge of Protection Zone: Prune roots by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:

1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
3. Cut branches with sharp pruning instruments; do not break or chop.

4. Do not apply pruning paint to wounds.

B. Chip removed branches and spread over areas identified by District's Representative.

3.6 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

C. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.7 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.8 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by District's Representative.

1. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
3. Perform repairs within 24 hours.
4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by District's Representative.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off District's property.

END OF SECTION 015639

SECTION 03 10 00

CONCRETE FORMING AND ACCESORIES

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all work of this section.

1.2 SCOPE

A. Design, furnish and install forms for concrete as indicated on drawings and specified here. Remove forms and shores at specified time. Clean up.

1.3 RELATED WORK (See also Table of Contents)

A. Plain Steel Reinforcement Bars: Section 032100.

B. Cast-In-Place Concrete: Section 033000.

1.4 QUALITY ASSURANCE

A. General:
   1. Conform to all requirements of ACI 347 and CBC Section 1906.1 and 1906.2.
   2. Concrete formwork shall be designed and constructed to safely support fluid concrete and superimposed construction loads without excessive deflection or concrete leakage. Provide bracing to maintain accurate alignment and to resist all anticipated lateral loads. Forms shall conform with drawings as to shape, line, and dimension. Design, engineering and construction of forms shall be Contractor's responsibility. Formwork for exposed concrete shall be constructed to tolerances indicated in ACI 303R.
   3. Cooperate and coordinate with other trades who furnish and/or install piping, conduit, reglets, anchors, inserts, sleeves, hangers, etc., as their work requires; including provisions for recesses and chases.

B. Submittals: (Submit under provisions of Section 013300)
   1. Product Data. Provide manufacturers data and installation instructions for the following:
      a. Tie rods and spreaders.
      b. Formwork for exposed concrete.
      c. Form coatings and release agents.

C. Standards and References: (Latest Edition unless otherwise noted)

1. 2013 California Building Code (CBC).
2. "Recommended Practice for Concrete Formwork", ACI 347, American Concrete Institute, latest edition.
3. Standard Grading and Dressing Rules #17, West Coast Lumber Inspection Bureau (For Douglas Fir Form Lumber).
4. U.S. Product Standard PS 1-83 (For Plywood Form Lumber).
5. “Guide to Cast-In-Place Architectural Concrete Practice”, ACI 303R, American Concrete Institute, latest edition.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Form Material:
   1. Smooth Concrete exposed to view: 5/8 inch minimum APA Plyform or steel.
   2. Concrete concealed from view: 5/8 inch minimum APA Plyform, steel or clean and sound 1 x 8 Standard Grade Douglas Fir.

B. Fiber Forms: Tubular column forms spirally constructed of laminated plies of fiber. Plies shall be laminated using a non-water sensitive adhesive and surface wax impregnated for moisture protection. Forms shall give a smooth and seamless appearance to the cast concrete. Provide reveals, as shown on the drawings, as supplied by the form manufacturer. Forms shall be as manufactured by Sonoco Products, plastic lined; Burke Smoothtube by Burke Co.; or approved equal.

C. Form Clamps: Assembly to have cone washers, (1 inch break back) 3/8” inch center rod.

D. Form Ties:
   1. Concrete exposed to view: Snap ties allowing full 1 inch break back.
   2. Concrete concealed from view: Snap ties or wire.
   3. Verify special spacing requirements with architectural drawings at exposed concrete.

E. Spreaders: Metal (no wood).

F. Form Coating: Non-grain and non-staining types of form coating that will not leave a residual matter on the face of the concrete or adversely affect proper bonding of any subsequent paint or other surface applications.
   1. Form coating containing mineral oils or other non-drying materials will not be permitted for any concrete work.

G. Joint Tape: No. 471 plastic film tape 3 inches wide, as manufactured by the Industrial Tape Division of 3M Company.

H. Expansion Joint Filler (Preformed): ½ inch thick; Flexcell by Celotex Corporation, Elastic Fiber Expansion Joint by Phillip Carey Mfg. Co., or Sealtight Fiber Expansion Joint by W.R. Meadows, Inc.

I. Extruded Polystyrene Foam: ASTM C578 type IV. Dow Chemical Corp. "Styrofoam", UC Industries "Foamular", or approved equal.

PART 3 - EXECUTION

3.1 FORM CONSTRUCTION

A. Construct substantial forms to the shapes, lines, grades and elevations shown, sufficiently tight to prevent leakage of mortar, and tied, clamped and braced to prevent spreading, shifting or settling. Plywood joints shall be square and tight; plywood shall be arranged in such manner as to minimize number of joints and to provide a smooth, attractive finished concrete surface.

B. Apply form coating to forms before reinforcing steel is in place.

C. Sleeves, anchors and bolts, including those for angle frames, supports, ties and other materials in connection with concrete construction, shall be secured in position before the concrete is placed.

D. Proper provisions shall be made for openings, blockouts, sleeves, offsets, sinkages, recesses and depressions required by other trades and suppliers prior to placing concrete.
   1. The Contractor shall also see that sleeves have been installed and other provisions have been made for the installation of mechanical, electrical and other equipment.
   2. Coordinate with all trades to insure proper placement of all items in forms and to provide proper blockouts wherever required.

E. Concrete work out of alignment, level or plumb will be cause for rejection of the whole work affected and, if so rejected, such work shall be removed and replaced, as directed by Architect, with no additional cost to the Owner.

F. Form Not Required: Concrete footings may be poured directly against cut earth where feasible and when the Architect’s approval has been obtained.
   1. See structural drawings for requirements for placing concrete footings directly against earth without forms.

G. Use ¾ inch minimum wood chamfer strips typical at all exposed corners unless noted otherwise on drawings.

3.2 CLEANING OF FORMS

A. All dirt, chips, sawdust, rubbish, water, etc. shall be completely removed from form by water hosing and air pressure before any concrete is deposited therein. No wooden ties or blocking shall be left in concrete except where indicated for attachment of other work.

B. Thoroughly clean and patch all holes in formwork and re-coat as required before reusing. Forms not suited to obtain concrete surfaces and tolerances in conformity with Contract requirements will be rejected by Architect.
   1. Reuse of forming materials shall be limited only as required to produce the finishes as specified, free from blemishes and other defects unless covered by other building materials in which case blemish free concrete is not required.

3.3 INSPECTION OF FORMS

A. Notify the Architect at least 48 hours in advance of the beginning of pouring operations and at the completion of formwork and location of all construction joints. An inspection of forms and joints will be made for approval of finished work and general layout only. The foregoing inspection shall in no way relieve the Contractor of responsibility of design and safety or formwork, bulkheads and shorings.

3.4 REMOVAL OF FORMS AND SHORING

A. Do not remove forms until concrete has attained sufficient strength to support its weight and any construction loading. Concrete must be allowed to cure long enough to avoid damage during form removal. Contractor or his representative in charge of concrete construction shall be present during removal of forms and shores, and shall be personally responsible for safety of this operation at all times and under all conditions.

B. As a minimum, formwork and shoring shall remain in place for the following periods:
   1. Concrete on grade: 24 hours
   2. Walls and Columns: 3 days
   3. Formwork may be removed and reshores installed before the times indicated above, provided the concrete has cured sufficiently to avoid damage when formwork is removed. Shores must be immediately replaced with reshores in a sequence designed to avoid inducing stress in the concrete member.

3.5 ADJUSTING AND CLEANING

A. Upon completion of this Work, clean up and remove from Site all equipment and debris resulting from this work.

B. Surfaces to be painted shall be smooth and free of substances such as dirt, wax, excessive latence, grease or materials that would prevent proper bonding of finishes.
   1. Removal of foregoing contaminants, and complete removal of parting and curing compounds affecting proper paint bond, shall be responsibility of this Section of Work. Sandblast cleaning shall not be employed without specific approval of Structural Engineer.

END OF SECTION 031000

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Requirements of Division 1 apply to all work of this Section.

1.2 SCOPE

A. Unless noted otherwise, furnish and install reinforcing for all concrete, including dowels, chairs, spacers, bolsters, etc., necessary for supporting and fastening reinforcement in place as shown on the Drawings and specified herein.

1.3 RELATED WORK (See also Table of Contents)

A. Cast-In-Place Concrete: Section 033000.

1.4 QUALITY ASSURANCE

A. General:
   1. Acceptable Manufacturers: Regularly engaged in the manufacture of steel bar and welded wire fabric reinforcing.
   2. Installer Qualifications: Installation shall be done only by an installation firm normally engaged in this business. All work shall be performed by qualified mechanics working under an experienced supervisor.
   3. Welding Qualifications: Welding procedures, welding operators and welders shall be qualified in accordance with AWS D1.4 - "Structural Welding Code Reinforcing Steel".
      a. Welders whose work fails to pass inspection shall be re-qualified before performing further welding.
   4. Reinforcement Work shall conform to ACI 301 and CBC Section 1907, as minimum standards.
   5. Allowable Tolerances:
      a. Fabrication:
         1) Sheared length: 1 inch.
         2) Depth of truss bars: Plus 0 minus ½-inch.
         3) Ties: Plus or minus ½-inch.
         4) All other bends: Plus or minus 1 inch.
      b. Placement:
         1) Concrete cover to form surfaces: Plus or minus ¼-inch.
         2) Minimum spacing between bars: Plus or minus ¼-inch.
         3) Crosswise of members: Spaced evenly within 2 inches of stated

separation.
4) Lengthwise of members: Plus or minus 2 inches.
c. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 2 bar diameters.

B. Standards and References: (Latest Edition unless otherwise noted):
1. American Concrete Institute (ACI).
a. ACI 301 - "Specifications for Structural Concrete for Buildings".
b. ACI 315 - "Details and Detailing of Concrete Reinforcing".
c. ACI 318 – “Building Code Requirements for Structural Concrete”

2. American Society for Testing and Materials (ASTM).
a. ASTM A82 - "Cold Drawn Wire for Concrete Reinforcement".
b. ASTM A185 - "Welded Steel Wire Fabric for Concrete Reinforcement".
c. ASTM A615 - "Deformed and Plain Billet-Steel Bars for Concrete Reinforcement".
d. ASTM A706 – “Low Alloy Steel Deformed Bars for Concrete Reinforcement”.
3. Concrete Reinforcing Steel Institute (CRSI) - "Manual of Standard Practice".
4. 2013 California Building Code (CBC).

C. Submittals: (Submit under provisions of Section 013300)
1. Shop Drawings: Prepare in accordance ACI 315. Indicate bending diagrams, assembly diagrams, splicing and laps of bars and shapes, dimensions and details of bar reinforcing and assemblies. Correctness of all reinforcing requirements and work is the responsibility of Contractor. Identify such shop drawings with reference thereon to sheet and detail numbers from Contract Drawings.
a. Do not use scaled dimensions from Contract Drawings in determining the lengths of reinforcing bars.
b. No reinforcing steel shall be fabricated without approved shop drawings.
c. Any deviations from the contract documents must be clearly indicated as a deviation on the shop drawings.
d. Areas of high congestion, including member joints and embed locations shall be fully detailed to verify clearances and assembly parameters and coordination with other trades.
2. Certified mill test reports of supplied reinforcing indicating chemical and physical analysis. Tensile and bend tests shall be performed by the mill in accordance with ASTM A615.
3. Product Data:
a. Manufacturer's specifications and installation instructions for splice devices.
b. Bar Supports.

4. Certificates of Compliance with specified standards:
   a. Reinforcing bars.
   b. Welded wire fabric.
   c. Welding electrodes.
5. Samples: Only as requested by Architect.

D. Tests and Inspections:
1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2013 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, District and submitted for review by the District's Representative. Requirements below are minimum requirements; additional requirements may be required in final testing program.
2. All reinforcing steel whose properties are not identifiable by mill test reports shall be tested in accordance with ASTM A615. One Series of tests for each missing report to be borne by the Contractor.
3. When inspections are indicated for reinforcement placement on the Structural drawings, a special inspector shall be employed to inspect reinforcing placement per CBC Section 1704.
4. When tests are indicated for reinforcing steel on the structural drawings, the reinforcing steel used shall be tested in accordance with ASTM A615. One tensile and one bend test for each 2-1/2 tons of steel or fraction thereof, shall be made.
5. Inspect shop and field welding in accordance with AWS D1.4, including checking materials, equipment, procedure and welder qualification as well as the welds. Inspector will use non-destructive testing or any other aid to visual inspection that he deems necessary to assure himself of the adequacy of the weld.
6. Tests and inspection shall be performed by Contractor's testing agency except when needed to justify rejected work, in which case the cost of retests and reinspection shall be borne by the Contractor.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.

B. Handle and store materials to prevent contamination.
1. Store reinforcement in a manner that will prevent excessive rusting or coating with grease, oil, dirt, and other objectionable materials. Storage shall be in separate piles or racks so as to avoid confusion or loss of identification after bundles are broken.

C. Deliver and store welding electrodes in accordance with AWS D1.4.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcement Bars: ASTM A615, Grade 40 for No. 3 and smaller bars; ASTM A615, Grade 60 for No. 4 and larger bars.
   1. Bar reinforcement to be welded shall meet chemical requirements of ASTM A706.

B. Stirrups and Ties: ASTM A615, Grade 60 for No.4 and larger bars, ASTM A615, Grade 40 for No. 3 and smaller bars.

C. Steel Dowels: Same grade as bars to which dowels are connected.

D. Welded wire Fabric: ASTM A185.

E. Tie Wires: FS-QQ-W-461, annealed steel, black, 16 gauge minimum.

F. Welding Electrodes: AWS D1.4, low hydrogen, E70XX series.

G. Bar Supports:
   1. Typical, unless noted otherwise; CRSI Class 2 wire supports.
      a. Do not use wood, brick or other objectionable materials.
      b. Do not use galvanized supports.
   2. Supports placed against ground: Pre-cast concrete blocks not less than 4 inches square with embedded wire.

H. Mechanical Couplers: Comply with ACI 318 section 12.14.3.

PART 3 - EXECUTION

3.1 FABRICATION

A. Shop fabricate reinforcement to meet requirements of Drawings.

B. Fabricate reinforcement in accordance with the requirements of ACI 315 where specific details are not shown or where Drawings and Specifications are not more demanding.

C. Steel reinforcement shall not be bent or straightened in a manner that will injure the material. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of bars for bending will not be permitted.

D. Reinforcing shall not be field bent or straightened without District's Representative review.

E. Provide offsets in rebar (1:6 maximum) where required to maintain

clearances.

3.2 CONDITION OF SURFACES

A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions have been corrected.

3.3 GENERAL

A. Concrete shown without reinforcing shall be reinforced as similar parts shown with reinforcing except where concrete is specifically noted to be unreinforced.

3.4 PLACEMENT

A. All reinforcement shall be accurately set in place, lapped, spliced, spaced rigidly and securely held in place and tied with specified wire at all splices and crossing points. All wire tie ends shall point away from the form. Carefully locate all dowel steel to align with wall and column steel.
   1. Bars shall be in long lengths with laps and splices as shown. Offset laps in adjacent bars. Place steel with clearances and cover as shown. Bar laps shall be as indicated on the Drawings. Tie all laps and intersections with the specified wire.
   2. Maintain clear space between parallel bars not less than 1-1/2 times nominal diameter, but in no case shall clear space be less than 1-1/2 times maximum size concrete aggregate.
   3. Reinforcing dowels for slabs shall be placed as detailed. Sleeves may be used if reviewed by the District’s Representative before installation. Install dowel through all construction and expansion joints for all slabs on grade.

B. Bar Supports: Support and securely fasten bars with chairs, spacers and ties to prevent displacement by construction loads or placement of concrete beyond the tolerances specified. Conform to CRSI as a minimum standard.

C. Steel Adjustment:
   1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
   2. Do not move bars beyond allowable without concurrence of District’s Representative.
   3. Do not heat, bend, or cut bars without concurrence of District’s Representative.
   4. Reinforcement shall not be bent after being embedded in hardened concrete.

D. Splices:
   1. Splice reinforcing as shown.

2. Lap Splices: Tie securely with wire to prevent displacement of splices during placement of concrete.
3. Splice Devices: Install in accordance with manufacturer's written instructions. Obtain District's Representative review before using.
4. Do not splice bars except at locations shown without concurrence of District's Representative.
   a. Where splices in addition to those indicated are required, indicate location on shop drawings clearly and highlight "for District Representative's approval".

E. Welding:
1. Welding is not permitted unless specifically detailed on Drawings or approved by District's Representative.
2. Employ shielding metal-arc method and meet requirements of AWS D1.4.
3. Welding is not permitted on bars where the carbon equivalent is unknown or is determined to exceed 0.55.
4. Welding shall not be done within two bar diameters of any bent portion of a bar which has been bent cold.
5. Welding of crossing bars is not permitted.

F. Welded Wire Fabric: Install in long lengths, lapping 24 inches at end splices and one mesh at side splices. Offset laps in adjacent widths. Place fabric in approximately the middle of the slab thickness unless shown otherwise on the Drawings by dimension. Wire tie lap joints at 12-inch centers. Use concrete blocks to support mesh in proper position.

G. Reinforcement shall be free of mud, oil or other materials that may reduce bond at the time concrete is placed. Reinforcement with tightly adhered rust or mill scale will be accepted without cleaning provided that rusting has not reduced dimensions and weights below applicable standards. Remove loose rust.

H. Protection against rust:
1. Where there is danger of rust staining adjacent surfaces, wrap reinforcement with impervious tape or otherwise prevent rust staining.
2. Remove protective materials and clean reinforcement as required before proceeding with concrete placement.

I. Drawing Notes: Refer to notes on Drawings for additional reinforcement requirements.

J. Mechanical and Electrical Drawings: Refer to Mechanical and Electrical Drawings for formed concrete requiring reinforcing steel. All such steel shall be included under the work of this Section.

END OF SECTION 032000

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Sections:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material certificates.

C. Material test reports.

D. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

F. Preinstallation Conference: Conduct conference at Project Site.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed for #5 and larger bars and Grade 40 deformed for #4 and smaller bars.

B. Epoxy Coating

1. Steel Reinforcement Bars: ASTM A775 – Standard Specification for Epoxy-Coated Steel Reinforcing Bars
2. Prefabricated Reinforcement: ASTM A934 – Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars

3. Steel Wire and Welded Wire Reinforcement: ASTM A884 – Standard Specification for Epoxy Coated Steel Wire and Welded Wire Reinforcement

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I gray.

B. Normal-Weight Aggregates: ASTM C 33, graded

1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.5 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40
3. Slump Limit: 4 inches plus or minus 1 inch.

4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
6. Slump Limit: Air content in first subparagraph below is maximum recommended by ACI 302.1R for trowel-finished floors.
7. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

C. Proportion structural lightweight concrete mixture as follows:

1. Minimum Compressive Strength: shall meet standard requirements of 4,000 psi at 28 days.
2. Calculated Equilibrium Unit Weight: 110 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C 567.
3. Slump Limit: 4 inches plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size greater than 3/8 inch.
5. Air Content: 7 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size 3/8 inch or less.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
7. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate.

2.6 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by District’s Representative.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

3.7 FINISHING SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance..

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by District’s Representative. Remove and replace concrete that cannot be repaired and patched to District’s approval.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: The Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

SECTION 10 14 26

SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-illuminated post and panel signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For post and panel signage.

1. Include fabrication and installation details and attachments to other work.

2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.

3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.

C. Samples: For each exposed product and for each color and texture specified.

D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for signs.

2.2 POST AND PANEL SIGNS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:

1. Ace Sign Systems, Inc.
2. Allen Industries, Inc.
3. APCO Graphics, Inc.
4. ASI Sign Systems, Inc.
5. Bunting Graphics, Inc.
6. Charleston Industries, Inc.
7. Clarke Systems.
8. Diskey Sign Company.
9. Fossil Industries, Inc.
10. Nelson-Harkins Industries.
11. Poblocki Sign Company, LLC.
12. Supersine Company (The); Division of Stamp-Rite, Inc.
13. Vista System.
14. Vomar Products, Inc.

C. Post and Panel Sign: Sign of single-panel with smooth, uniform surfaces and support assembly; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Solid-Sheet Sign Panels Returns, and Back: Aluminum or Stainless-steel sheet with finish specified in "Sign-Panel-Face Finish and Applied Graphics" Subparagraph below and as follows:
   a. Surface-Applied Graphics: Applied vinyl film, baked enamel or powder coat, or paint.
   b. Etched and Filled Graphics: Sign face etched or routed to receive enamel-paint infill.
   c. Inset, Cutout Characters: Sign face routed to receive push-through acrylic graphics.

2. Posts: Pressure-treated hemlock fir post.
   a. Shape: Rectangular.
   b. Size: See Drawings
   c. Installation Method: Direct burial.

3. Sign-Panel-Face Finish and Applied Graphics:
   a. Integral Aluminum Finish: Clear anodized, Light bronze anodized, Medium bronze anodized, or Anodized color as selected by State’s Representative from full range of industry colors and color densities.
   b. Integral Stainless-Steel Finish: As selected by State’s Representative from full range of industry finishes.
   c. Baked-Enamel or Powder-Coat Finish and Graphics: Manufacturer's standard, in color as selected by State’s Representative from manufacturer's full range.
   d. Painted Finish and Graphics: Manufacturer's standard, factory-applied exterior-grade sign paint, acrylic polyurethane, in color as selected by State’s Representative from manufacturer's full range.

2.3 MATERIALS

A. Stainless-Steel Sheet: Type 316.

B. Acrylic Sheet: ASTM D 4802, Type UVF (UV filtering).

C. Polycarbonate Sheet: Coated, mar-resistant, UV-stabilized polycarbonate, with coating on both sides.

D. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1. For exterior exposure, furnish nonferrous-metal, stainless-steel, or hot-dip galvanized devices unless otherwise indicated.

2. Exposed Metal-Fastener Components, General:
   a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

C. Anchoring Materials:

1. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
   a. Water-Resistant Product: At exterior locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Mill joints to tight, hairline fit. Form joints exposed to weather to resist water penetration and retention.

2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.

3. Conceal fasteners and anchors unless indicated to be exposed; locate exposed fasteners where they will be inconspicuous.

4. Internally brace signs for stability and for securing fasteners.

B. Post Fabrication: Fabricate posts designed to withstand wind pressure indicated for Project location and of lengths required for installation method indicated for each sign.

1. Direct Burial: Fabricate posts 12 inches longer than height of sign to permit embedment in concrete-filled postholes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using installation methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.

2. Install signs so they do not protrude or obstruct according to accessibility standard.

3. Before installation, verify that sign components are clean and free of materials or debris that would impair installation.

4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 INSTALLING POSTS

A. Direct-Burial Method:

1. Excavation: Excavate posthole to dimensions indicated.

2. Setting in Cast-in-Place Concrete: Set post in position, support to prevent movement, and place concrete in posthole as indicated.

END OF SECTION 101426

SECTION 12 93 00

SITE FURNISHINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: bench, bicycle bollard, folding bollard, and boot brush.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's product data for all items.

PART 2 - MATERIALS

2.01 BENCH

A. Bench shall be 88 Series PL bench by Dumor, Inc. Mifflintown PA, S-1 embedment mount, with cedar-color recycled plastic slats, 8 feet length or 6 feet length as indicated, with steel supports with bronze polyester powder finish.

B. Bench shall have arms at each end.

C. Contractor shall provide anchor bolts and concrete footings (not supplied with bench).

2.02 BICYCLE BOLLARD

A. Bicycle bollards shall be as manufactured by Columbia Cascade (800) 547-1940, model # 2560, timber bollard with bike loops, 12 inches square, 36 inches tall, with (2) Wall CycLoops model 2174, galvanized steel.

B. Contractor shall provide concrete footings and galvanized steel bolts (not supplied with bollard).

2.03 FOLDING BOLLARD

A. Folding Bollards shall be as manufactured by TrafficGuard (877) 727-7347, Model HRP36 Trafficguard round post, color safety yellow with 3M reflective stickers, with rust-free, 1 inch stainless steel bollard pins with one pin having a 13/32 inch hole for a padlock.

B. Contractor shall provide anchor bolts and concrete footings (not supplied with bollard).

C. Padlock to be provided by Owner.

2.04 BOOT BRUSH

A. Boot brush shall be Deluxe Scrusher model, Manufacturer: Chaseburg Manufacturing Inc., 312 Depot Street, PO Box 7, Chaseburg, WI 54621, Phone: 1-800-658-9018 or 608-452-304.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install all site furnishings per manufacturer's instructions.

B. Bench seats to be level with legs vertical.

C. Bollards shall be installed 90 degrees to finished pavement surface.

D. Provide anchor bolts as required as per manufacturer's recommendations, with the full number of bolts recommended provided and installed.

E. Install Boot Brush on concrete slab, 6 inches thick, 2 feet by 2 feet in size to accommodate boot brush. Secure boot brush with concrete anchors provided by contractor.

3.02 LAYOUT AND ADJUSTMENTS

A. Locate site furniture on site for approval by landscape architect.

B. It is understood and agreed that should minor changes and deviations from the locations established on the drawings be required by the Owner's Representative, this shall be done by the Contractor at no additional cost thereto.

END OF SECTION

SECTION 13100
PRECAST CONCRETE RESTROOM BUILDING

PART 1 GENERAL

1.02 SCOPE

This specification covers the manufacture, shipping, and installation of one precast concrete restroom facility.

1.03 STANDARDS

ASTM C33	Concrete Aggregates
ASTM C39	Method of Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM CMS	Method of Test for Slump of Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C192	Method of Making and Curing Test Specimens in the Laboratory
ACI 1211.1	Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete
PCI MNL 116	Quality Control for Plants and Production of Precast Pre-stressed Concrete Products

1.04 MANUFACTURER CRITERIA

The manufacturer supplying the requested precast concrete multi-flush facility must meet the following:

A. Manufacturer must be ISO 9001 certified at the time of bid.

B. Manufacturing plant must be PCI certified at the time of bid.

C. Manufacturer must not have defaulted on any contract within the last five years.

D. Manufacturer shall provide stamped, engineered drawings prior to award of contract.

E. Manufacturer must be pre-approved prior to bidding.

F. Manufacturer must show four (4) examples of precast concrete facilities produced, installed, and in use as an example of their ability to perform on this contract.

Preselected manufacturers meeting these criteria are:

CXT, Incorporated, Spokane Industrial Park, 3808 North Sullivan Road, Building 7, Spokane, WA 99216, Phone: 800-696-5766

1.05 DESIGN CRITERIA

The restroom facility shall be designed to meet the following criteria. Calculations and Engineer's stamped drawings shall be submitted and approved by the City prior to manufacture of the building.

A. Snow Load: The restroom facility will be engineered to withstand a 120 pound per square foot snow load.

B. Wind Load: The restroom facility shall be engineered to withstand a 100 mile per hour wind load.

C. Earthquake: The restroom facility shall be engineered to withstand the effects of a Zone Four earthquake.

D. Additional Design Standards: The restroom facility shall be designed to meet the requirements of the Americans with Disabilities Act Requirements and Uniform Federal Accessibility Standards as of the date of this specification.

PART 2 MATERIALS

2.01 RESTROOM

A. Restroom shall be constructed of Precast concrete, and shall be the “Tioga with Chase Double Vault” model, as available from CXT Precast Products (800) 696-5766.

B. Exterior walls shall have a “Barnwood” texture with a San Beige color.

C. Roof shall be “cedar shake” texture and “Nuss Brown” color.

D. Restroom shall comply with ADA and California Title 24 requirements for accessibility.

F. Restroom shall come complete with wheelchair symbol sign, combination men’s/women’s signs, and shall also have Braille text.

2.01 CONCRETE

A. Concrete - General

1. The concrete mix design will be designed to ACI 2.11.1 to produce concrete of good workability.

2. Concrete will contain a minimum of 610 pounds of cement per cubic yard. Cement will be a low alkali type I or III conforming to ASTM C-150.

3. Coarse aggregates used in the concrete mix design will conform to ASTM C33 with the designated size of coarse aggregate #67.

4. Minimum water/cement ratio will not exceed 0.45. Slump will not exceed 4 inches.

5. Air-entraining admixtures will conform to ASTM C260. Water reducing admixtures will conform to ASTM C494, Type A. Other admixtures will not be used without customer approval.

B. Colored Concrete

1. Color additives will conform to ASTM C979. 12”x12”x1” color samples of each color and texture shall be submitted to the Ditrict for approval.

2. The following will contain colored concrete:
   a. Roof panels
   b. Walls
   c. Screen paneled. Metal frames

3. The same brand and type of color additive will be used throughout the manufacturing process.

4. All ingredients will be weighed and the mixing operation will be adequate to ensure uniform dispersion of the color.

C. Cold Weather Concrete

1. Cold weather concrete placement will be in accordance with ACI 306.

2. Concrete will not be placed if ambient temperature is expected to be below 35 degrees F. during the curing period unless heat is readily available to maintain the surface temperature of the concrete at least 45 degrees F.

3. Materials containing frost or lumps of frozen materials will not be used.

D. Hot Weather Concrete

The temperature of the concrete will not exceed 80 degrees F. at the time of placement and when the ambient reaches 90 degrees F. the concrete will be protected with moist covering.

E. Concrete Reinforcement

1. All reinforcing steel will conform to ASTM A615. All welded wire fabric will conform to ASTMA 185.

2. All reinforcement will be new, free of dirt, oil, paint, grease, loose mill scale and loose or thick rust when placed.

3. Details not shown of drawings or specified will be to ACI318.

4. Steel reinforcement will be centered in the cross-sectional area of the walls and will have at least 1 inch of cover on the under surface of the floor and roof.

5. The maximum allowable variation for center-center spacing of reinforcing steel will be 1/2 inch.

6. Full lengths of reinforcing steel will be used when possible. When splices are necessary on long runs, splices will be alternated from opposite sides of the components for adjacent steel bars. Lap bars #4 or smaller a minimum of 12 inches. Lap bars larger than #4 a minimum of 24 bar diameters.

7. Reinforcing bars will be bent cold. No bars partially embedded in concrete will be field bent unless approved by the customer.

2.02 SEALERS AND CURING COMPOUNDS

A. Curing compounds, if used, will be colorless, complying with ASTM C309, Type I or 1-D.

B. Weatherproofing sealer for exterior of building will be a clear water repellent penetrating sealer.

2.03 CAULKING, GROUT, ADHESIVE AND SEALER

A. All caulking will remain flexible and non-sag at temperatures from -40 to +140 degrees Fahrenheit.

B. Interior joints will be caulked with a paintable polyurethane sealant.

C. Exterior joints will be caulked with a tri-polymer sealant caulk that compliments the exterior color.

D. Grout will be a non-shrink type and will be painted to match the color of surrounding concrete as nearly as possible.

E. Epoxy concrete adhesive will be two component, rigid, non-sag gel adhesive for bonding to dry or damp surfaces, moisture insensitive.

F. Cement base coating is formulated with a very fine aggregate system and a built-in bonding agent.

2.04 PAINT

A. All paints and materials shall conform to all Federal specifications or be similar "top-of-the-line-components." Paints will not contain more than .06 percent by weight of lead.

B. Type of paints for precast concrete toilet facility

1. Inside concrete surfaces

a. Interior floors will be a 1-part water based epoxy with a silica sand suspension to provide uniform texture. The color will be gray.

b. Interior walls and ceilings will be a modified acrylic, water repellent penetrating stain. The color will be white.

2. Metal surfaces both inside and out: DTM ALKYD

3. Exterior concrete surfaces

a. Exterior slab will be clear sealer
b. Exterior walls and roof will be a water repellent penetrating stain in the same color as the walls or roof followed by a clear acrylic anti-graffiti sealer.

2.05 GRAB BARS

Grab bars will be 18 gauge, Type 316L stainless steel with 1-1/2 inch clearance. Grab bars will each be able to withstand 300 pound top loading.

2.06 TOILET PAPER DISPENSERS

Dispensers will be constructed of 1/4 inch thick, type 316L stainless steel. Dispenser will be capable of holding six (6) standard rolls of toilet paper. Toilet paper holder fastening system will be able to withstand 300 pound top loading.

2.07 HEAVY DUTY FIBERGLASS DOORS & DOOR FRAMES

A. Doors and doors frames shall be dark brown colored and made of ABS textured material. Doors to have 1 ½” thick rigid block urethane core. Doors by Corrim Company or approved equal.

B. Door Jamb depth shall be 5 ¾", dark brown color with a minimum 15 mils thick of gel coat. Door jambs to be cast in concrete.

C. Door Hinges: Door hinges shall be with dull chrome plated 4-1/2" x 4-1/2", adjustable tension, automatic-closing, 3 per door. Hinges shall be made of 316L stainless steel.

D. Lockset

1. Lockset shall meet ANSI A156.2 Series 4000, Grade 1 cylindrical lockset for exterior door. Lockset shall be made of 316L stainless steel.

2. Lever handle both inside and out. Either handle operates latch unless outside handle is locked by inside push button. Push button will automatically release when inside lever handle is turned or door is closed. Inside lever always active. Emergency slot on exterior so door can be unlocked from outside with a coin, screwdriver or etc.

E. Dead Bolt: Deadbolt will be a Lori Lock standard model with a double cylinder, 2 ¾" backset. The cylinder will be a standard 1-1/8" Schlage Mortise cylinder with compression ring. All components shall be made of 316L stainless steel.

F. Door Stop: Doorstop will have a 316L Stainless Steel base, U.S. 26D finish with gray rubber 2-7/16" diameter bumper with a 1" projection.

G. Door Sweep: Door sweep will be provided at the bottom of door and will be an adjustable brush type.

2.08 MIRROR

Mirror to be 18" x 24" stainless steel.

2.09 WALL VENT

Wall vent will be cast into the concrete wall. The units' frame and components shall be made of 316L stainless steel. The louver will be inverted Y. Provide an insect screen on or attached to the louver.

2.10 FLOOR DRAIN

A. Floor Drain manufacture shall be Smith Model # 2005 or approved equal

B. Drain shall have galvanized cast iron body.

2.10 WINDOWS

A. Windows and cleanout cover frames will be constructed from 316L stainless steel.

B. Window glazing will be 1/4 inch thick translucent pebble finished polycarbonate.

2.10 PLUMBING

A. Waste and vent material will be ABS or PVC plastic and will be plumbed to meet Uniform Building Codes.

PART 3 MANUFACTURE

3.01 CONCRETE

A. Mixing and delivery of concrete will be in accordance with ASTM C94, section 10.6 through 10.9 with the following additions:

1. Aggregate and water shall be adjusted to compensate for differences in the saturated surface-dry condition.

2. Concrete will be discharged as soon as possible after mixing is complete. This time will not exceed 30 minutes.

B. Placing and Consolidating Concrete: Concrete will be consolidated by the use of mechanical vibrators. Vibration will be sufficient to accomplish compaction but not to the point that segregation occurs.

C. Concrete Finishes:
1. Interior floor and exterior slabs will be floated and troweled. A light broom finish will be applied to the exterior and interior slabs.

D. Cracks and Patching

1. Cracks in concrete components which are judged to affect the structural integrity of the building will be rejected.

2. Small holes, depressions and air voids will be patched with a suitable material. The patch will match the finish and texture of the surrounding surface.

3. Patching will not be allowed on defective areas if the structural integrity of the building is affected.

E. Curing and Hardening Concrete: Concrete surfaces will not be allowed to dry out from exposure to hot, dry weather during initial curing period.

3.02 FINISHING AND FABRICATION

A. Structural Joints

1. Wall components will be joined together with two welded plate pairs at each joint. Each weld plate will be 6 inches long and with one pair located in the top quarter and one pair in the bottom quarter of the seam. Weld plates will be anchored into the concrete panel and welded together with a continuous weld. The inside seams will be a paintable caulk. The outside seams will use a caulk in a coordinating building color PRECAST or clear.

2. Walls and roof will be joined with weld plates, 3 inches x 6 inches, located at each building corner.

3. The joint between the floor slab and walls will be joined with a grout mixture on the inside, a matched colored caulk on the outside and two weld plates 6 inches long per wall.

B. Painting/Staining

1. An appropriate curing time will be allowed before paint is applied to concrete.

2. Some applications may require acid etching. A 30% solution of hydrochloric acid shall be used, flushed with water and allowed to thoroughly air dry.

3. Painting will not be done outside in cold, frosty or damp weather.

4. Painting will not be done outside in winter unless the temperature is 50° F. or higher.

5. Painting will not be done in dusty areas.

6. Schedule of finishes

a. Inside concrete surfaces

1) Inside floors will be 1 coat of 1-part water based epoxy with a silica sand suspension to provide uniform texture.

2) Interior walls and ceilings will be 2 coats of a modified acrylic, water repellent penetrating stain, followed by 1 coat of clear sealer.

b. Metal surfaces both inside and out

1) 2 coats of DTM ALKYD.

c. Exterior concrete surfaces

1) Exterior slab will be 1 coat of clear sealer

2) Exterior walls will be 2 coats of water repellent penetrating stain in the same color as the walls or roof followed by 1 coat of clear acrylic anti-graffiti sealer.

3.02 TESTING

A. The following tests will be performed on concrete used in the manufacture of the toilet facility. All testing will be performed in a PCI certified laboratory. Testing will only be performed by qualified individuals who have been certified ACI Technician Grade 1. Sampling will be in accordance with ASTM C172.

1. The slump of the concrete will be performed on the first batch of concrete in accordance with ASTM C143. This slump will be in the 3"- 4" range.

2. The air content of the concrete will be checked per ASTM C231 on the first batch of concrete. The air content will be in the range of 5.5% +/-1%.

3. Cylinders shall be taken to test the concrete compressive strength. The compressive strength of the cylinders will be tested to ASTM C39.

a. One (1) cylinder for release, one (1) for 7 days and one (1) for 28 days shall be prepared.

b. The release must be a minimum strength of 2500 psi, the 7 day must be a minimum of 4500 psi and the 28 day must be a minimum of 5000 psi.

4. A copy of all test reports are to be sent to the Inspector as soon as the 28-day test results are available.

PART 4 DELIVERY AND INSTALLATION

A. Work by the Contractor

1. The Contractor shall prepare the building foundation pad in accordance with the approved building and site plans and specifications.

a. Cut and recompact subgrade to 95% relative compaction subject to testing by the District.

b. Install 6 inch minimum section of Class 2 gravel, 3/4 inch minus roadbase and compact to 95% compaction. Finish pad shall be level and true to grade in accordance with the plan section.

2. The Contractor shall provide:

a. Exact location by stakes or other approved method.

b. Clear and level site free of overhead and/or underground obstructions.

c. Access to the building pad for truck delivery and sufficient area for the crane to install and the equipment to perform the contract requirements.

B. Work by Manufacturer

1. Delivery and Installation:

Manufacturer shall deliver to the site the precast concrete restroom facility and install it on the prepared pad in accordance with the layout and grade stakes provided.

a. Proper notice and coordination for delivery and setup shall be provided by the Contractor. Notice shall be provided 45 days in advance of delivery date. Actual delivery date shall be coordinated with the Contractor and Engineer.

b. Delivery to site made on normal highway trucks and trailers. Crane for unloading and setting concrete facility in proper place shall be provided and coordinated by the manufacturer.

2. Prior to leaving the site, the manufacturer's field representative Contractor, and Engineer shall fully and completely inspect the toilet facility for compliance with the approved plans and specifications. Restroom shall be a turnkey facility ready for use.

PART 5 WARRANTY

A. The manufacturer shall provide a written warranty covering the structure for a period of one year from date of acceptance by the City. The manufacturer warrants that all goods sold pursuant hereto will, when delivered and installed, conform to specifications set forth above. Goods shall be deemed accepted and meeting specifications unless notice identifying the nature of any non-conformity is provided to the manufacturer in writing within one (1) year of delivery. The manufacturer, at its option, will repair or replace the goods or issue credit for the customer provided it is first given the opportunity to inspect such goods.

B. This warranty shall not apply to any goods, which have been subject to misuse, negligence, acts of God or accidents.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing site utilities.
7. Temporary erosion- and sedimentation-control measures.

1.2 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the District and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by the District or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on the District's premises where indicated.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to the District.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by the District or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

3.5 CLEARING AND GRUBBING

Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Use only hand methods for grubbing within protection zones.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

D. All soil can be placed onsite. Location to be approved by District Representative.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off the District's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 31 12 33

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

PART 1 - GENERAL

1.1 SUMMARY

A. Discharges of storm water from the project must comply with the NPDES 2017 General Construction Permit for "Storm Water Discharges Associated with Construction Activities" hereinafter called the "Permit." Manage work activities to reduce the discharge of pollutants to surface waters, groundwater, or municipal separate storm sewer systems including work items for:

1. Prepare Storm Water Pollution Prevention Plan. SWPPP preparation includes obtaining SWPPP acceptance, amending the SWPPP, preparing a CSMP and a SAP, and monitoring and inspecting WPC practices at the job site.

2. Storm Water Annual Report. Storm Water Annual Report preparation includes certifications, monitoring, inspection and sampling results, and obtaining Storm Water Annual Report acceptance.

3. Storm Water Sampling and Analysis Day. Storm Water Sampling and Analysis Day includes reporting of storm water quality per qualifying rain event. If specified for the risk level, the work includes preparation, collection, analysis, and reporting of storm water samples for turbidity, pH, and other constituents.

4. Rain Event Action Plan. If specified for the project risk level, REAP preparation includes preparing and submitting REAP forms and monitoring weather forecasts.

B. Do not start work until:

1. SWPPP is accepted

2. WDID is issued

3. SWPPP review requirements have been fulfilled. If the RWQCB requires time for SWPPP review, allow 30 days for the RWQCB to review the SWPPP as specified under "Submittals" of these special provisions.

C. This project is Risk Level X.

1.2 DEFINITIONS AND ABBREVIATIONS

active and inactive areas	(1) Active areas have soil disturbing work activities occurring at least once within 14 days, and (2) Inactive areas are areas that have not been disturbed for at least 15 days.
ATS	Active Treatment System
BMPs	Best Management Practices are water pollution control practices.
Caltrans	California State Department of Transportation
construction phase	Construction phases are (1) Construction including work activities for building trails and structures, (2) Plant Establishment including maintenance on vegetation installed for final stabilization, and (3) Suspension where work activities are suspended and areas are inactive.
CSMP	Construction Site Monitoring Program.
HMA	Hot Mix Asphalt
NAL	Numeric Action Level.
NEL	Numeric Effluent Limit.
NPDES	National Pollutant Discharge Elimination System.
NOI	Notice of Intent.
normal working hours	The hours normally worked on this project.
PCC	Portland Cement Concrete
QSD	Qualified SWPPP Developer.
QSP	Qualified SWPPP Practitioner.
qualified rain event	A qualified rain event is a storm that produces at least 0.5 inch of precipitation with a 48 hour or greater period between storms.
REAP	Rain Event Action Plan.
RWQCB	Regional Water Quality Control Board.

SAP	Sampling and Analysis Plan.
SSC	Suspended Sediment Concentration.
SWRCB	State Water Resources Control Board.
SWPPP	Storm Water Pollution Prevention Plan.
WDID	Waste Discharge Identification Number.
WPC	Water Pollution Control.
WPC Manager	Water Pollution Control Manager. The WPC Manager implements water pollution control work described in the SWPPP and oversees revisions and amendments to the SWPPP.

1.3 SUBMITTALS

A. Within 20 days after contract approval, start the following process for SWPPP acceptance:

1. Submit 3 copies of the SWPPP and allow 20 days for the District Representative's review. If revisions are required, the District Representative provides comments and specifies the date that the review stopped.

2. Change and resubmit the SWPPP within 15 days of receipt of the District Representative's comments. The District Representative's review resumes when the complete SWPPP is resubmitted.

3. When the District Representative accepts the SWPPP, submit an electronic and 2 printed copies of the accepted SWPPP.

4. If the RWQCB reviews the accepted SWPPP, the District Representative submits one copy of the accepted SWPPP to the RWQCB for their review and comment. RWQCBs requiring time to review SWPPPs include:
   a. Central Coast Regional Water Quality Control Board

5. If the District Representative requests changes to the SWPPP based on RWQCB comments, amend the SWPPP within 10 days.

B. Submit:

1. Storm water training records including training dates and subjects for employees and subcontractors. Include dates and subjects for ongoing training, including tailgate meetings.

2. Employee training records:
    a. Within 5 days of SWPPP acceptance for existing employees
    b. Within 5 days of training for new employees
    c. At least 5 days before subcontractors start work for subcontractor's employees

C. Prepare a Storm Water Annual Report for the reporting period from July 1st to June 30th. For the prior reporting period, submit the report no later than July 15th if construction occurs from July 1st through June 30th or within 15 days after contract acceptance if construction ends before June 30th.

D. Submit the Storm Water Annual Report as follows:

1. Submit 2 copies of the Storm Water Annual Report and allow 10 days for the District Representative's review. If revisions are required, the District Representative provides comments and specifies the date that the review stopped.

2. Change and resubmit the Storm Water Annual Report within 5 days of receipt of the District Representative's comments. The District Representative's review resumes when the complete Storm Water Annual Report is resubmitted.

3. When the District Representative accepts the Storm Water Annual Report, insert the WPC Manager's signed certification and the District Representative's signed certification.

E. Submit one electronic copy and 2 printed copies of the accepted Storm Water Annual Report.

F. Submit as required:

1. NAL Exceedance Reports

2. NEL Exceedance Reports

3. Visual Monitoring Reports

4. Inspection Reports

5. BMP Status Report

G. At least 5 days before operating any construction support facility, submit:

1. A plan showing the location and quantity of WPC practices associated with the construction support facility

2. A copy of the NOI approved by the RWQCB and the SWPPP approved by the RWQCB if Contractor will be operating a batch plant or a crushing plant under the General Industrial Permit

1.4 QUALITY CONTROL AND ASSURANCE

A. Training

1. Provide storm water training for:
   a. Project managers
   b. Supervisory personnel
   c. Employees involved with WPC work

2. Train all employees, including subcontractor's employees, in the following subjects:
   a. WPC rules and regulations
   b. Implementation and maintenance for:
      (1) Temporary Soil Stabilization
      (2) Temporary Sediment Control
      (3) Tracking Control
      (4) Wind Erosion Control
      (5) Material pollution prevention and control
      (6) Waste management
      (7) Non-storm water management
      (8) Identifying and handling hazardous substances
      (9) Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances

3. Employees must receive initial WPC training before working on the job site.

4. Conduct weekly training meetings covering:
   a. WPC BMP deficiencies and corrective actions
   b. BMPs that are required for work activities during the week
   c. Spill prevention and control
   d. Material delivery, storage, use, and disposal
   e. Waste management
   f. Non-storm water management procedures

5. Training for personnel to collect water quality samples must include:
   a. SAP review
   b. Health and safety review
   c. Sampling simulations

6. If Contractor operates construction support facilities, protect storm water systems or receiving waters from the discharge of potential pollutants by using WPC practices.

7. Construction support facilities include:
   a. Staging areas
   b. Storage yards for equipment and materials
   c. Mobile operations
   d. Batch plants for PCC and HMA
   e. Crushing plants for rock and aggregate
   f. Other facilities installed for Contractor's convenience such as haul roads

8. If Contractor operates a batch plant to manufacture PCC, HMA, or other material; or a crushing plant to produce rock or aggregate; obtain coverage under the General Industrial Permit. Contractor must be covered under the General Industrial Permit for batch plants and crushing plants located:
   a. Outside of the job site
   b. Within the job site that serve one or more contracts

9. Discharges from manufacturing facilities such as batch plants must comply with the general waste discharge requirements for Order No. 97-03-DWQ, NPDES General Permit No. CAS000001, issued by the SWRCB for "Discharge of Stormwater Associated with Industrial Activities Excluding Construction Activities." For the General Industrial Permit, go to:

   http://www.waterboards.ca.gov/

B. Water Pollution Control Manager

1. Assign one WPC Manager to implement the SWPPP. The WPC Manager must comply with the Permit qualifications for a QSP and a QSD. Contractor may assign a different QSD to prepare the SWPPP.

2. The QSD must have the following qualifications:
   a. Registration or certification described in the Permit

C. The QSP must meet the qualifications of the QSD or have the following certifications:

1. Certification described in the Permit

D. At the job site, the WPC Manager must:

1. Be responsible for WPC work

2. Be the primary contact for WPC work

3. Oversee the maintenance of WPC practices

4. Oversee and enforce hazardous waste management practices

5. Have the authority to mobilize crews to make immediate repairs to WPC practices

6. Ensure that all employees have current water pollution control training

7. Implement the accepted SWPPP and amend the SWPPP when required

E. WPC Manager must oversee:

1. Inspections of WPC practices identified in the SWPPP

2. Inspections and reports for visual monitoring

3. Preparation and implementation of REAPs

4. Sampling and analysis

5. Preparation and submittal of:
   a. NAL exceedance reports
   b. NEL exceedance reports
   c. SWPPP annual certification
   d. Annual reports
   e. BMP status reports

PART 2 - STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

2.1 GENERAL

A. SWPPP work includes preparing a SWPPP including a CSMP, obtaining SWPPP acceptance, amending the SWPPP, inspecting and reporting on WPC practices at the job site. The SWPPP must comply with the Permit.

B. Contractor may request, or the District Representative may order, changes to the WPC work. Changes may include the addition of new WPC practices.

C. The SWPPP must include sections as specified for the project risk level as follows:

1. For risk level 1:
   a. Schedule
   b. CSMP

2. For risk level 2:
   a. Schedule
   b. CSMP
   c. Adherence to Effluent Standards for NALs
   d. REAP

3. For risk level 3:
    a. Schedule
    b. CSMP
    c. Adherence to Effluent Standards for NALs and NELs
    d. REAP

D. The SWPPP must include WPC practices for:

1. Storm water and non-stormwater from areas outside of the job site related to project work activities such as:
    a. Staging areas
    b. Storage yards
    c. Access roads

2. Activities or mobile operations related to contractor obtained NPDES permits

3. Construction support facilities

E. The SWPPP must include a copy of permits obtained by DPR such as Fish & Game permits, US Army Corps of Engineers permits, RWQCB 401 Certifications, and RWQCB Waste Discharge Requirements for Aerially Deposited Lead Reuse.

F. Amend the SWPPP annually and resubmit it by July 15th.

G. Amend the SWPPP if:

1. Changes in work activities could affect the discharge of pollutants

2. WPC practices are added by change order work

3. WPC practices are added at Contractor's discretion

4. Changes in the amount of disturbed soil are substantial

5. Objectives for reducing or eliminating pollutants in storm water discharges have not been achieved

6. There is a Permit violation

H. Whenever Contractor amends the SWPPP, follow the same process specified for SWPPP acceptance.

I. Retain a printed copy of the accepted SWPPP at the job site.

2.2 SWPPP SCHEDULE

A. The SWPPP schedule must:

1. Describe when work activities will be performed that could cause the discharge of pollutants into storm water

2. Describe WPC practices associated with each construction phase

3. Identify soil stabilization and sediment control practices for disturbed soil areas

2.3 CONSTRUCTION SITE MONITORING PROGRAM (CSMP)

A. The QSD must prepare a CSMP as part of the SWPPP. The CSMP must be developed before starting work and be revised to reflect current construction activities as necessary.

B. The CSMP must include sections for the project risk level as follows:

1. For risk level 1:
   a. Visual Monitoring
   b. SAP for Non-Visible Pollutants
   c. SAP for temporary active treatment systems

2. For risk level 2:
   a. Visual Monitoring
   b. SAP for Non-Visible Pollutants
   c. SAP for sediment and turbidity
   d. SAP for pH
   e. SAP for temporary active treatment systems

3. For risk level 3:
   a. Visual Monitoring
   b. SAP for Non-Visible Pollutants
   c. SAP for sediment and turbidity
   d. SAP for pH
   e. SAP for receiving waters
   f. SAP for temporary active treatment systems

2.4 VISUAL MONITORING

A. The WPC Manager must oversee the performance of visual inspections for qualifying rain events.

B. For each qualifying rain event, perform visual inspections and record observations during normal working hours as follows:

1. Record the time, date, and rain gauge reading

2. Observe:
   a. Within 2 days before the storm:
      (1) Drainage areas for spills, leaks, or uncontrolled pollutants
      (2) Proper implementation of WPC practices
      (3) Storm water storage areas for leaks and adequate freeboard
   b. Every 24 hours during the storm:
      (1) WPC practices for effective operation
      (2) WPC practices needing maintenance and repair
   c. Within 2 days after the storm event:
      (1) Discharge locations
      (2) WPC practices to evaluate the design, implementation, and effectiveness
      (3) To identify where additional WPC practices may be needed

C. Perform non-stormwater discharge visual inspections as follows:

1. At least once during each of the following periods:
   a. January through March
   b. April through June
   c. July through September
   d. October through December

2. Observe flowing and contained storm water for the presence of floating and suspended materials, sheen on the surface, discoloration, turbidity, odors, and sources of observed pollutants

3. Observe the job site for the presence of authorized and unauthorized non-stormwater discharges and their sources

D. The WPC Manager must prepare visual inspection reports that include the following:

1. Name of personnel performing the inspection, inspection date, and date inspection report completed

2. Storm and weather conditions

3. Locations and observations

4. Corrective actions taken

E. Maintain visual inspections reports at the job site as part of the SWPPP.

2.5 SAMPLING AND ANALYSIS PLAN (SAP)

A. Include a SAP in the CSMP to monitor the effectiveness of WPC practices.

B. Assign trained personnel to collect water quality samples. Document their training in the SAP.

C. Describe the following water quality sampling procedures in the SAP:

1. Sampling equipment
2. Sample preparation
3. Collection
4. Field measurement methods
5. Analytical methods
6. Quality assurance and quality control
7. Sample preservation and labeling
8. Collection documentation
9. Sample shipping
10. Chain of custody
11. Data management and reporting
12. Precautions from the construction site health and safety plan
13. Laboratory selection and certifications

D. Whenever assigned field personnel take samples, comply with the equipment manufacturer's recommendation for collection, analysis methods, and equipment calibration.

E. Samples taken for laboratory analysis must follow water quality sampling procedures and be analyzed by a State-certified laboratory under 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants."

F. The SAP must identify the State-certified laboratory, sample containers, preservation requirements, holding times, and analysis method. For a list of State-certified laboratories, go to:

http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx

G. Include procedure for sample collection during precipitation.

H. Retain water quality sampling documentation and analytical results with the SWPPP at the job site.

I. Show pollutant sampling locations on SWPPP drawings.

J. If discharges or sampling locations change because of changed work activities or knowledge of site conditions, amend the SAP.

K. If the project is risk level 2 or risk level 3, include procedures for collecting and analyzing at least 3 samples for each day of each qualifying rain event. Describe the collection of effluent samples at all locations where the storm water is discharged off-site.

2.6 ANALYTICAL RESULTS AND EVALUATION

A. Submit an electronic copy (in file format .xls, .txt, .csv, .dbs, or .mdb) and a printed copy of water quality analytical results, and quality assurance and quality control within 48 hours of field analysis sampling, and within 30 days for laboratory analysis. Also provide an evaluation of whether the downstream samples show levels of the tested parameter that are higher than the control sample.

B. Electronic water quality analysis results must have the following information:

1. Sample identification number
2. Contract number
3. Constituent
4. Reported value
5. Analytical method
6. Method detection limit
7. Reported limit

2.7 SAP FOR NON-VISIBLE POLLUTANTS

A. The SAP must include a description of the sampling and analysis strategy for monitoring non-visible pollutants.

B. The SAP must identify potential non-visible pollutants present at the job site associated with any of the following:

1. Construction materials and waste

2. Existing contamination due to historical site usage

3. Application of soil amendments, including soil stabilization materials, with the potential to change pH or contribute toxic pollutants to storm water

C. SWPPP drawings must show the locations planned for storage and use of potential non-visible pollutants.

D. The SAP must include sampling procedures for the following conditions when observed during a storm water visual inspection. For each of the following, collect at least one sample for each qualifying storm event:

1. Materials or waste containing potential non-visible pollutants that are not stored under watertight conditions

2. Materials or waste containing potential non-visible pollutants that are stored under watertight conditions, but a breach, leakage, malfunction, or spill is observed; the leak or spill has not been cleaned up before precipitation; and material or waste could discharge non-visible pollutants to surface waters or drainage system

3. Chemical applications, including fertilizer, pesticide, herbicide, methyl methacrylate concrete sealant, or non-pigmented curing compound used during precipitation or within 24 hours preceding precipitation, and could discharge pollutants to surface waters or drainage system

4. Applied soil amendments, including soil stabilization materials that could change pH levels or contribute toxic pollutants to storm water runoff and discharge pollutants to surface waters or drainage system, unless available independent test data indicates acceptable concentrations of non-visible pollutants in the soil amendment

5. Storm water runoff from an area contaminated by historical usage of the site that could discharge pollutants to surface waters or drainage systems

E. The SAP must provide sampling procedures and schedule for:

1. Sample collection during the first 2 hours of each rain event that generate runoff

2. Sample collection during normal working hours

3. Each non-visible pollutant source

4. Uncontaminated control sample

F. The SAP must identify locations for sampling downstream and control samples, and reasons for selecting those locations. Select control sample locations where the sample will not come in contact with materials, waste, or areas associated with potential non-visible pollutants or disturbed soil areas.

2.8 SAP FOR SEDIMENT AND TURBIDITY

A. If the project is risk level 2 or risk level 3, sample and analyze for turbidity:

Parameter	Test Method	Detection Limit (Min)	Unit
Turbidity	Field test with calibrated portable instrument	1	NTU

B. If the project is risk level 3 and the turbidity NEL has been exceeded, sample and analyze for SSC:

Parameter	Test Method	Detection Limit (Min)	Unit
SSC	ASTM Method D3977-97	5	Mg/L

2.9 SAP FOR pH

A. If the project is risk level 2 or risk level 3, sample and analyze for pH:

Parameter	Test Method	Detection Limit (Min)	Units
pH	Field test with calibrated portable instrument	0.2	pH units

B. Work with the potential of causing either high pH or low pH discharges requires a SAP and sampling of effluent.

2.10 SAP FOR RECEIVING WATERS

A. If the project is risk level 3, there is a direct discharge, and the NEL has been violated, the SAP shall describe procedures for obtaining samples from representative and accessible locations:

1. Upstream of the discharge point

2. Downstream of the discharge point

B. Show receiving water sampling locations on SWPPP drawings.

C. If there are several discharge points, describe procedures for obtaining samples from a single upstream and a single downstream location.

2.11 RAIN EVENT ACTION PLAN (REAP)

A. REAP work includes preparing and submitting REAP forms and monitoring weather forecasts. The WPC Manager must submit a REAP to protect the job site at least 48 hours before a predicted rain event.

B. Prepare a REAP when the National Weather Service is predicting at least a 50 percent probability of precipitation within 72 hours.

C. For the REAP, use approved forms and include:

1. Site location

2. Risk level

3. Contact information including 24-hour emergency phone numbers for:
    a. WPC Manager
    b. Erosion and sediment control providers or subcontractors
    c. Storm water sampling providers or subcontractors

4. Storm Information

5. Construction phase information for:
    a. Construction including active and inactive areas for work activities for building roads and structures
    b. Plant Establishment including maintenance on vegetation installed for final stabilization where areas are inactive
    c. Suspension where work activities are suspended and areas are inactive

6. Construction phase information including:
    a. Construction activities
    b. Subcontractors and trades on the job site
    c. Pre-storm activities including:
        (1) Responsibilities of the WPC Manager
        (2) Responsibilities of the crew and crew size
        (3) Stabilization for active and inactive disturbed soil areas
        (4) Stockpile management

(5) Corrective actions taken for deficiencies identified during pre-storm visual inspection

d. Activities to be performed during storm events including:
   (1) Responsibilities of the WPC Manager
   (2) Responsibilities of the crew and crew size
   (3) BMP maintenance and repair

e. Description of flood contingency measures

D. Contractor must have the REAP onsite at least 24 hours before a predicted rain event. A printed copy of each REAP must be at the job site as part of the SWPPP.

E. Implement the REAP including mobilizing crews to complete activities no later than 24 hours before precipitation occurs.

PART 3 - IMPLEMENTATION REQUIREMENTS

3.1 SWPPP IMPLEMENTATION

A. Obtain, install, and maintain a rain gauge at the job site. Observe and record daily precipitation.

B. Monitor the National Weather Service Forecast Office on a daily basis. For forecasts, go to and enter the zip code of the project location:

http://www.srh.noaa.gov/forecast

C. Whenever Contractor or the District Representative identifies a deficiency in the implementation of the accepted SWPPP:

1. Correct the deficiency immediately, unless the District Representative agrees to a later date for making the correction

2. Correct the deficiency before precipitation occurs

D. If Contractor fails to correct the deficiency by the agreed date or before the onset of precipitation, DPR may correct the deficiency and deduct the cost of correcting the deficiency from payment.

E. Continue SWPPP implementation during any temporary suspension of work activities.

F. Install WPC practices within 15 days or before predicted precipitation, whichever occurs first.

3.2 NUMERIC ACTION LEVELS (NALS)

A. If the project is risk level 2 or risk level 3, then it is subject to NALs:

Parameter	Test Method	Detection Limit (Min)	Unit	Numeric Action Level
pH	Field test with calibrated portable instrument	0.2	pH units	Lower NAL = 6.5 Upper NAL = 8.5
Turbidity	Field test with calibrated portable instrument	1	NTU	250 NTU

3.3 NUMERIC EFFLUENT LIMITS (NELS)

A. If the project is risk level 3, then it is subject to NELs:

Parameter	Test Method	Detection Limit (Min)	Unit	Numeric Effluent Limit
pH	Field test with calibrated portable instrument	0.2	pH units	Lower NEL = 6.0 Upper NEL = 9.0
Turbidity	Field test with calibrated portable instrument	1	NTU	500 NTU

B. The storm event daily average for storms up to the 5-year, 24-hour storm, must not exceed the NEL for turbidity.

C. If Contractor intends to utilize ATS, the storm event daily average for storms up to the 10-year, 24-hour storm, must not exceed the NEL for turbidity.

D. The daily average sampling results must not exceed the NEL for pH.

3.4 STORM WATER SAMPLING AND ANALYSIS DAY

A. Storm Water Sampling and Analysis Day work includes preparation, collection, analysis, and reporting of storm water samples for turbidity, pH, and other constituents. If the project is risk level 2 or risk level 3, and there is a qualified rain event that produces runoff, comply with the project's SAP for preparation, collection, analysis, and reporting of storm water samples. Collect:

1. Samples for each non-visible pollutant source and a corresponding uncontaminated control sample

2. Samples for turbidity, pH, and other constituents as specified

3. At least 3 samples for each day of each qualifying rain event

4. Samples for all locations where the storm water is discharged off-site

B. Perform sample collection during:

1. First 2 hours of each qualified rain event that produces runoff

2. Normal working hours

C. If the project is risk level 3, there is a direct discharge, and the NEL has been violated, obtain receiving water samples.

D. Contractor is not required to physically collect samples during dangerous weather conditions such as flooding or electrical storms.

E. If downstream samples show increased levels, assess WPC practices, site conditions, and surrounding influences to determine the probable cause for the increase.

3.5 INSPECTION

A. The WPC Manager must oversee inspections for WPC practices identified in the SWPPP:

1. Before a forecasted storm

2. After precipitation that causes site runoff

3. At 24-hour intervals during extended precipitation

4. On a predetermined schedule, a minimum of once a week

B. The WPC Manager must oversee daily inspections of:

1. Storage areas for hazardous materials and waste

2. Hazardous waste disposal and transporting activities

3. Hazardous material delivery and storage activities

4. WPC practices specified under "Construction Site Management" of these specifications

C. The WPC Manager must prepare BMP status reports that include the following:

1. Location and quantity of installed WPC practices

2. Location and quantity of disturbed soil for the active or inactive areas

D. Within 24 hours of finishing the weekly inspection, the WPC Manager must submit:

1. Copy of the completed site inspection report

2. Copy of the BMP status report

PART 4 - REPORTING REQUIREMENTS

4.1 STORM WATER ANNUAL REPORT

A. Storm Water Annual Report work includes certifications, monitoring and inspection results, and obtaining Storm Water Annual Report acceptance. The WPC Manager must prepare a Storm Water Annual Report. The report must:

1. Use an approved report format

2. Include project information including description and location

3. Include storm water monitoring information including:
   a. Summary and evaluation of sampling and analysis results including laboratory reports
   b. Analytical methods, reporting units, detections limits for analytical parameters
   c. Summary of corrective actions
   d. Identification of corrective actions or compliance activities that were not implemented
   e. Summary of violations
   f. Names of individuals performing storm water inspections and sampling
   g. Logistical information for inspections and sampling including location, date, time, and precipitation
   h. Visual observations and sample collection records

4. Include documentation on training for:
   a. Individuals responsible for NPDES permit compliance
   b. Individuals responsible for BMP installation, inspection, maintenance, and repair
   c. Individuals responsible for preparing, revising, and amending the SWPPP

4.2 NAL EXCEEDANCE REPORT

A. If the project is risk level 2 or risk level 3 and the 24 hour daily sample average exceeds a NAL, notify the District Representative and submit a NAL Exceedance Report no later than 48 hours after the conclusion of the storm event. The report must:

1. Include the following field sampling results and inspections:
    a. Analytical methods, reporting units, and detection limits
    b. Date, location, time of sampling, visual observation and measurements
    c. Quantity of precipitation of the storm event

2. Description of BMPs and corrective actions taken to manage NAL exceedance

4.3 NEL VIOLATION REPORT

A. If the project is risk level 3 and the 24-hour daily sample average exceeds the NEL, notify the District Representative and submit a NEL Violation Report within 6 hours. The report must:

1. Include the following field sampling results and inspections:
    a. Analytical methods, reporting units, and detection limits
    b. Date, location, time of sampling, visual observations and measurements
    c. Quantity of precipitation of the storm event

2. Description of BMPs and corrective actions taken to manage NEL exceedance

B. If the project is risk level 2 or risk level 3, submit all sampling results to the District Representative no later than 48 hours after the conclusion of a storm event.

END OF SECTION 311233

SECTION 32 84 00

TREE AND SHRUB REMOVAL AND TRIMMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.1A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the specific protection, fertilization, and trimming of trees that interfere with, or are affected by, execution of the Work, whether temporary or new construction.

B. Related Sections include the following:

1. Division 1 Section "Summary" for limits placed on Contractor's use of the site.
2. Division 31 Section "Site Clearing" for temporary tree protection, removal limits of trees, shrubs, and other plantings affected by new construction.
3. Division 31 Section "Earth Moving" for site excavation, backfilling, compacting and grading requirements, and soil materials.
4. Division 32 Section "Plants" for tree and shrub planting and transplanting, tree support systems, and soil materials.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Certification from a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

D. Maintenance Recommendations from a qualified arborist for care and protection of trees affected by construction during and after completing the Work.

1.4 QUALITY ASSURANCE

A. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or licensed in the jurisdiction where Project is located.

B. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance--Standard Practices," unless more stringent requirements are indicated.

C. Preconstruction Conference: Conduct conference at Project site to comply with requirements in Division 1.

1. Before starting tree protection and trimming, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, and other concerned entities. Review tree protection and trimming procedures and responsibilities. Notify participants at least three working days before convening conference. Record discussions and agreements and furnish a copy to each participant.

PART 2 - PRODUCTS

2.1 DRAINAGE FILL: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

2.2 TOPSOIL: Conform to Division 32 Section “Planting Preparation”.

2.3 FILTER FABRIC: Refer to Division 31, Section “Trenching and Backfill”, “Filter Fabric” paragraph.

2.4 FERTILIZER

A. The fertilizer shall be injected into the soil as an aqueous suspension or solution.

B. The fertilizer shall contain nitrogen, phosphorus and potassium in a 3:1:1 ratio. (Three times the amount of nitrogen as phosphorus and potassium). Suitable analysis would include 28-9-9, 18-6-6 or 12-4-4.

C. At least 75% of the nitrogen in the fertilizer shall be derived from a slow release source such as Urea form Sulfur coated Urea or IBDU.

D. The salt index of the fertilizer shall not exceed 35.

E. SAND: Refer to Division 31

F. PERLITE: Horticultural, inorganic perlite.

PART 3 - EXECUTION

3.1 PREPARATION

A. Construction fence: Install construction fence located as indicated or outside the drip line of trees to protect remaining vegetation from construction damage. Refer to Division 31, Section “Site Clearing” of this Specification.

B. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

C. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root systems.

D. Do not allow fires under or adjacent to remaining trees or other plants.

3.2 EXCAVATION

A. Install sheeting, shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within drip line of trees to remain, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees to remain, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots or utilize an air spade to expose roots.

1. Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. If encountered immediately adjacent

to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.

2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

D. Where utility trenches are required within drip line of trees, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.3 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond drip line of trees. Maintain existing grades within drip line of trees.

B. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

C. Moderate Fill: Where existing grade is more than 6 inches, but less than 12 inches, below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:

1. Carefully place drainage fill against tree trunk or restraint and extend to dripline on all sides. Depth – typical 8”.
2. Place filter fabric with edges overlapping 6 inches minimum.
3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.4 TREE PRUNING AND FERTILIZATION

A. Prune and fertilize all designated trees and shrubs.

B. Prune to compensate for root loss caused by damaging or cutting root system.

C. Pruning Standards: Prune trees according to ANSI A300 and National Arborists Association as follows, to remove dead, diseased, decayed and obviously weak branches.

1. Type of Pruning: Crown cleaning and thinning (Class II), and crown raising, where designated branches are to be removed to provide additional head room. D.

D. Cut branches with sharp pruning instruments; do not break or chop.

E. All designated trees are to be pruned and fertilized. Fertilizer rates are based on the nitrogen content of the fertilizer. Determine fertilizer rates by the crown spread technique – based on the soil surface area beneath the crown. Apply 3 lbs. of actual nitrogen per 1000 sq. ft. of soil surface beneath the crown and 3' beyond the dripline of the tree.

F. The fertilizer shall be applied using a hydraulic sprayer operating at 200 psi and an injection probe that will permit subsurface placement of the fertilizer solution. Injection holes should be two to three feet apart and 12 inches deep. Begin injection site two to three feet from the trunk and work out to three feet beyond the drip line of the branches

3.5 SOIL ENHANCEMENT

A. Soil Enhancement shall consist of drilling holes in the soil throughout the tree root zone of existing trees to remain, and backfilling with porous soil amendments to relieve the problems of poorly oxygenated soils and poor soil structure caused by soil compaction.

B. Vertical holes, 24 inches deep, shall be made in the soil of the tree root zone using a power drill having a 2 inch auger. These holes shall be spaced 3 feet apart in a grid pattern at a point starting 2 feet away from the trunk base to 10 feet beyond the dripline of the tree canopy.

C. The vertical hole shall be filled to the top with a soil mixture consisting of equal parts (1/3 each) of perlite, sand and screened topsoil. This soil mixture shall be placed in the vertical hole by use of a funnel or by hand raking, whichever is more efficient for the contractor. If the latter is the preferred method however, the contractor shall take precaution against storing the soil amendments for long periods of time (6 hour maximum) on the ground surface within the tree root zone before working it into the vertical holes that were previously made.

3.6 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to written instructions of the qualified arborist.

B. Remove and replace dead and damaged trees that the qualified arborist determines to be incapable of restoring to a normal growth pattern.

1. Provide new trees of the same size and species as those being replaced; plant and maintain as specified in Division 32 Section "Plants."

C. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augured soil and sand.

3.7 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material, displaced trees, and excess chips from Owner's property.

END OF SECTION 311300

SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Base course for concrete walks and pavements.
5. Base course for asphalt paving.
6. Excavating and backfilling for utility trenches.
7. Construction of vegetated stormwater infiltration basins.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the prepared subgrade and paving.

C. Bedding Course (Pipe Bedding): Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by District's Representative. Authorized additional excavation and replacement

material will be paid for according to Contract provisions for changes in the Work.

2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by District's Representative. Unauthorized excavation, as well as remedial work directed by District's Representative, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Not used in this project

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, base, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 QUALITY ASSURANCE

A. Preexcavation Conference: Conduct conference at Project site with the Project Engineer and Geotechnical Engineer.

B. All grading activities shall comply with the requirements of the Geotechnical Engineering Report prepared by Butano Geotechnical Engineering, dated July 2017. The Geotechnical Engineering Report shall govern all grading activities.

1.4 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

B. Do not commence earth moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soils approved by the project geotechnical engineer. See project geotechnical report for more information.

C. Unsatisfactory Soils: Soils not approved by the project geotechnical engineer.

D. Base Course: Class 2 Aggregate Base conforming to Section 26 of the Caltrans Standard Specifications

E. Engineered Fill: In general, on-site soils with an organic content of less than 3 percent by weight, free of any hazardous or deleterious materials, and meeting the gradation requirements below may be used as general engineered fill to achieve project grades, except when special material is required.

Engineered fill material should not contain rocks or lumps larger than 3 inches in greatest dimension, should not contain more than 15 percent of the material larger than 1-1/2 inches, and should contain at least 10 percent passing the No. 200 sieve. In addition to these requirements, import fill should have a low expansion potential as indicated by Plasticity index of 12 or less, or Expansion Index of less than 20.

Some of the on-site sandy soils may not meet the above minimum 10% fine grained material specification (% passing the #200 sieve). Contractor shall notify the District Representative if soils to be used for fill do not meet the fine grained material specification. These soils may be used for the berming and land-forming, but should not be used under pavements or structures unless authorized by District Representative.

All import fills should be approved by the project geotechnical engineer prior to delivery to the site. At least five (5) working days prior to importing to the site, a representative sample of the proposed import fill should be delivered to the project geotechnical laboratory for evaluation.

F. Bedding Course (Pipe Bedding): Free draining sand approved by the project geotechnical engineer.

G. Drainage Course: Free draining, clean drain rock or 3/8 inch pea gravel where vapor transmission through slabs is unfavorable. Where moisture transmission is not an issue, on site soils or clean drain rock approved by the project geotechnical engineer shall be use.

H. Backfill: Free draining sand approved by the project geotechnical engineer, unless concrete or sand-cement slurry is specified and approved by the project geotechnical engineer.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Surface vegetation and organic laden soils should be stripped to an estimated depth of 3 inches.

1. Required stripping depth should be determined in the field and approved by the District Representative.

3.2 EXCAVATION, GENERAL

A. All areas that are to support engineered fill, building foundations, concrete slabs-on-grade, or pavements should be subexcavated at least 18 inches below existing grade. Subexcavations should extend 5 feet beyond the perimeters of buildings and at least 3 feet beyond the perimeters of concrete slabs and pavements.

B. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: As indicated in the design plans.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

E. The maximum allowable length of open trench shall be 300 feet, or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is less. Within developed areas, the length of open trench may be restricted as determined by the encroachment permit from the city or the agency having jurisdiction.

3.6 SUBGRADE INSPECTION

A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by District's Representative, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by District's Representative.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by District's Representative.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Trenches under footings are not expected.

D. Trenches near footings: Utility trenches shall be deepened so that the bearing surfaces are below an imaginary plane having an inclination of 1.5:1 (horizontal to vertical). This imaginary plane should be drawn extending upward from the bottom edge of the adjacent utility trench.

E. Pipe zone backfill: Place and compact initial backfill of satisfactory soil (free draining sand) to a height of 12 inches over the pipe or conduit. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit.

1. Backfill in lifts of 8 inches of uncompacted thickness. Compact to 90 percent relative compaction.

2. In areas to be paved, backfill in lifts of 6 inches of uncompacted thickness. The upper 8 inches of backfill should be compacted to a minimum of 95 percent relative compaction.

3. Coordinate backfilling with utilities testing.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

3.11 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to between 1 and 3 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Engineered fills consisting of on-site or imported soils should be compacted to a minimum of 90 percent relative compaction. The moisture content of the material should be brought to between 1 and 3 percent above the laboratory optimum value before compaction is performed.

B. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

C. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

D. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under walkways and pavements, scarify and compact top 8 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
2. For utility trenches, refer to Section 3.9 Utility Trench Backfill above.

E. Where fill is to be placed on existing slopes with an inclination of 5:1 (horizontal to vertical) or steeper, the fill should be keyed and benched into the existing slope per Detail 1 on Sheet C7-01.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Generally, permanent cut and fill slopes in sandy soil should be constructed at inclination no steeper than 3:1 (horizontal to vertical).

C. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch
2. Walks: Plus or minus 1 inch
3. Pavements: Plus or minus 1/2 inch

D. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.14 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:

1. Shape base course to required crown elevations and cross-slope grades.
2. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. Place at least 6 inches of capillary break such as free draining, clean drain rock or 3/8 inch pea gravel. A visqueen should be placed over the capillary break material.
   1. For on-site exterior flatwork, or areas where moisture transmission through the slabs is not an issue, concrete slabs may be constructed directly on soil subgrades that have been prepared with approval from the District Representative.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by District's Representative.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off the District's property.

END OF SECTION 312000

SECTION 32 01 90

LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.01 SCOPE

A. Work in this section includes the growing and maintenance operations necessary to establish the shrubs, groundcovers, grassland, trees, and other plantings; to provide pest and disease control, and to maintain related construction elements.

1.02 SUBMITTALS

A. Soil Testing: Contractor shall collect samples of the in-place topsoil 20 days after completion of planting and submit to Waypoint Analytical Laboratory of Santa Clara, (408) 727-0330, for maintenance period fertilizer recommendation. Samples shall be one quart in size each, and shall be taken from the following areas:

- Grassland area (one sample)
- Shrub area (one sample)

Each sample shall be a representative composite taken from several locations within each area. Cost of soil test shall be paid for by the Contractor. Test results shall be submitted to the Landscape Architect.

B. Herbicide: Submit a written recommendation from a State of California appropriately licensed individual along with complete product data from proposed manufacturer, for review by Owner's representative.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Fertilizer: Used during the course of the maintenance period shall be determined by soils test required under Part 1 of this Section. For bidding purposes only, assume the use of ammonium sulfate (21-0-0) at 5 lbs. per 1000 SF, minimum of two applications.

B. Water: During the course of construction and maintenance period shall be paid for by the Contractor.

C. Herbicide: Shall be a commercially available pre-emergent herbicide material recommended for this project and these plantings by a State of California appropriately licensed individual. The licensed individual shall review all planting, including but not limited to seed, sod, groundcovers, shrubs, and trees, the types and extent of soil preparation, the irrigation systems (if any), drainage patterns, and other project characteristics to verify type, compatibility, and recommend the appropriate herbicide(s) for use. Contractor shall be responsible for all overspray, spreading, runoff, plant health, and other impacts from the use of the herbicide.

PART 3 – EXECUTION

3.01 TIME LIMITS: The maintenance period shall commence from the date of substantial completion of planting as defined in paragraph 3.07 below, and extend for a 180 calendar-day period thereafter, or until the acceptance of Final Completion.

3.02 FERTILIZER APPLICATION: Fertilizer(s) shall be applied per Waypoint Analytical Laboratory recommendations. For bidding purposes, assume initial application to be four weeks after planting and subsequent applications to be at 45-day intervals.

3.03 HERBICIDE APPLICATION: Herbicide shall not be used until all plant material has been planted a minimum of 20-days. All planting areas shall be kept weed-free by non-herbicide methods during this time period. Herbicide shall not be applied to any areas which are or have been seeded. Contractor must apply the material in conformance with the written recommendations of the State appropriately licensed individual.

3.04 BASIC REQUIREMENTS: All planting areas shall be kept weed-free at all times during the maintenance period. All pest and disease control shall be the Contractor's responsibility. All planting areas shall be kept at optimum moisture for plant growth. Settlement of soil and plants and soil erosion shall be repaired and areas replanted as required. Dying or deficient plants shall be replaced as soon as they become apparent.

3.05 OWNER'S RESPONSIBILITY: Work installed under this contract that is damaged or stolen prior to Substantial Completion shall be repaired or replaced by the Contractor without cost to the Owner. After Substantial Completion and through the maintenance period, these damages and similar factors such as extensive litter, abuse and defacement shall be the Owner's responsibility to repair or replace and shall not be a part of this contract. No planting shall be guaranteed beyond the maintenance period, except as to conformance to specified species and variety, and except as to conditions specified under "Root Systems" of Planting, specification Section 32 93 00.

3.06 MULCH REPLENISHMENT: Mulch shall be maintained at the specified thickness, and shall be replenished as necessary.

3.07 SUBSTANTIAL COMPLETION: Shall be deemed as the time all major plantings, including groundcover, are installed, and when the seed mix has germinated uniformly over 90% of the seeded area and when all other work is satisfactorily completed (with the exception of minor items to be completed as noted upon a checklist compiled by the Landscape Architect). Individual bare spots shall not exceed ten square feet within the seeded area. Maintenance period shall not commence until work is deemed substantially complete by the Landscape Architect.

3.08 FINAL REVIEW: Contractor shall request a final review of the project at least five days in advance of the proposed date. Failure to request this notice shall automatically extend the date of substantial completion. The maintenance period will continue until project is deemed complete.

END OF SECTION 32 01 90

SECTION 32 12 15
RESIN PAVING AND AGGREGATE BASE PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes (but is not necessarily limited to):

1. Resin Paving surface course
2. Resin Paving Fog Seal
3. Resin Paving Tack Coat
4. Aggregate Base for Resin Paving
5. Aggregate Base Paving

1.02 REFERENCES

A. California Code of Regulations (CCR): Title 24, Chapter 2-71, Site Development Requirements for ADA Accessibility.

B. California Department of Transportation (Caltrans), Standard Specifications

C. AASHTO Standard Specifications.

D. ASTM — American Society for Testing and Materials

1. ASTM D 698 — Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3))
2. ASTM D 1557 — Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))
3. ASTM D 1559-89 — Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.

1.03 DEFINITIONS

A. Finished Surface: The required final surface grade elevations of resin paving indicated on the Drawings.

B. RPM: Resin Paving Mixture

C. RP: Resin Paving

D. RPTC: Resin Paving Tack Coat

E. RPFS: Resin Paving Fog Seal

1.04 SUBMITTALS

A. Geotextile Fabric: product data

B. Resin Paving product data: manufacturer's specifications, one 1-quart sample of specified aggregate, photographs of specified product (and color) installed.

C. Soil Sterilant: manufacturer's product data

D. Mock-ups for each pavement type.

1. Provide mock-ups on-site for O.R. review. Mock-ups shall each be flat work 6'x6' finished pavement or surfacing samples held with 2x6 wood edging. Mock-up shall all be installed on compacted Aggregate Base if requested by O.R.

2. Mock-up for Resin Paving shall be provided well in advance of the anticipated installation date. Coordinate with manufacturer's 30-day ordering schedule. Mock-up for Resin Paving does not require installation by pavement subcontractor and can be created by General Contractor. Intent is to create an informal installation of the pavement for color and texture review only, not performance.

3. Mock-ups shall remain on site after review and approval until the project is completed. Contractor shall legally dispose of mock-up off-site at the close of the project. Approved mock-ups shall serve as quality control benchmarks for the work. Construct mock-up only after approval of mix design and finish. Coordinate location of mock-up with O.R.

4. Provide mock-up in sufficient time for pavement to cure, be reviewed, and for additional mock-up(s) to be placed and cured before placement as required to meet the project schedule.

1.05 QUALITY ASSURANCE

A. Installer: The RPM is installed in a manner similar to that for hot mix asphalt mixtures using asphalt paving equipment and tools. Installer shall be a professional paving company with appropriate equipment and personnel previously experienced in placement of asphalt pavement materials and with not less than three previous installations of the RPM product on public agency projects of at least 2,000 square feet in size.

B. Pavement Mix Production: Pavement mix production shall be under the direction of an RPM manufacturer with not less than five years' experience in the production of RPM product. RPM shall be prepared with RPM manufacturer's mixing plant dedicated to the production of RPM product and equipped with metering controls for accurate proportioning of RPM ingredients.

C. Technical Advisor: RPM manufacturer shall provide a representative on site up to a maximum of one (1) days during the placement of the RPM at no additional cost to provide the installing contractor and Project Engineer with technical support and information regarding installation of RPM.

1.06 WARRANTY

A. RPM installer shall warrant their installed resin Paving to be free of defects for a period of one year. Installer Warranty does not apply to damage by construction equipment or other traffic the Paving was not intended to service. During the Warranty period the RPM installer, at no additional charge, shall remove and replace paving that is defective, that was damaged by installer or does not meet requirements of this section.

PART 2 – PRODUCTS

2.01 RESIN PAVING

A. RPM: The RPM shall be a NaturalPAVE XL Resin Pavement™ Mixture as manufactured by Soil Stabilization Products Company, Inc., (SSPCo), Merced, CA. (209) 383- 3296 or (800) 523-9992, or equal (no known equal). Cold applied, and suitable for vehicular and pedestrian traffic and with high strength such as that exhibited by hot mix asphaltic concrete mixtures. NaturalPAVE XL Resin Pavement materials shall have a record of Marshall Stability test results where mixtures exceeded 10,000-pound stabilities when tested at 140°F (60°C) temperature, and TSRST test results where finished mixtures demonstrated all of the low temperature performance criteria down to a temperature of -18.4°F (-28°C). The pavement mixture shall display the natural coloration and texture of the aggregate material used in the mix formulation.

B. RPM shall be sampled for testing at time of delivery to RPM installer, prior to installation of the RPM material by the installer. RPM sample shall be

compacted to appropriate dimensions with specified compactive effort in laboratory Marshall Test molds while placed on top of solid metal base. Marshall Test for stability of the finished RPM mixture to be conducted in laboratory-controlled conditions after a minimum of thirty (30) days curing and two hours of heating in air bath at 140°F temperature in accordance with ASTM D 1559 test requirements by an independent pavement material testing laboratory previously experienced in testing NaturalPAVE XL Resin Pavement materials. These laboratory test specimens shall meet the following requirements:

Test Properties

Property	*Value*
Stability Minimum (lbs.):	5,000

Stability requirements listed above are specific to the finished RPM mixture as delivered to the installer and are not intended as a quality control standard for the installed pavement, which is the product of the work of the installer, the firmness of the base course, weather conditions during and after installation, adherence to traffic and irrigation water restrictions during pavement curing, and other variables affecting the performance of the constructed product.

C. Resin Paving shall be capable of supporting a 75,000-pound fire apparatus which has a loading factor of 120 pounds per square inch.

D. Color shall be “Sierra” per SSPCo. Final color and tone per MROSD review and approval based on specified Mock-up. Provide material in quantities as recommended by the manufacturer to complete the work.

E. Resin Paving section shall include Aggregate Base and geotextile fabric.

F. Aggregate Base Paving section shall include Aggregate Base and geotextile fabric.

G. RPTC: Same as NaturalPAVE XL Resin Pavement Binder Emulsion for RPM. Uniformly mix 1-part RPTC with 1-part water.

H. RPFS: Same as NaturalPAVE XL Resin Pavement Binder Emulsion for RPM. Uniformly mix 1-part RPSF with 4 parts water.

2.02 AGGREGATE BASE FOR RESIN PAVING AND AGGREGATE BASE PAVING

A. Aggregate Base

1. Aggregate base shall conform to Caltrans Class 2 (R value 78 min) aggregate base, 3/4" maximum size, as specified in Section 26 of the

Caltrans Standard Specifications.

2. Contractor may use approved aggregate base manufactured from on-site material as pavement base below Resin Paving.

3. Recycled base, either manufactured on-site or imported, may not be used for Aggregate Base Paving nor any other aggregate base surface exposed to view.

2.03 GEOTEXTILE FABRIC FOR RESIN PAVING AND AGGREGATE BASE PAVING

A. Geotextile Fabric: Structural geotextile fabric shall be Mirafi 500X or approved equivalent.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE

A. Prepare subgrade per Geotechnical Engineer's direction and compaction specification requirements, but in no case shall the subgrade for a RPM installation be compacted to less than 95 percent of the optimum density determined by Test Method ASTM D 698. Compaction testing to be provided by project owner at a frequency of not less than one test per one hundred (100) lineal feet of RPM subgrade or not less than one test per 2,000 square feet of RPM subgrade.

B. Entire sectional area of the pavement (Resin Paving and Aggregate Base Paving and associated aggregate base areas), required shoulders, and adjacent finish grades shall be compacted to 95% of maximum dry unit weight prior to excavation.

C. Over-excavate compacted subgrade for paving section. Once compaction is approved, excavate area for Resin Paving and for Aggregate Base Paving from compacted finish and subgrade with vertical sides. Over-excavate only to the extent necessary to install Resin Paving.

D. Resin Paving section, including the Aggregate Base, shall be excavated into, not placed atop, the excavated or graded, compacted subgrade.

E. Aggregate Base Paving section, shall be excavated into, not placed atop, the excavated or graded, compacted subgrade.

F. Install paving mixture only after Owner's Representative review and approval of subgrades and aggregate base.

G. Compact shoulders on each side of path or paving area edge as noted and as directed by Owner's Representative in field.

3.02 SOIL STERILENT

A. As directed by the Project Botanist, soil sterilant shall be applied to prepared subgrade or after installation of aggregate base uniformly at the rate recommended by the manufacturer.

B. Soil Sterilant shall be applied beneath entire areas of Resin Paving and Aggregate Base Paving.

3.03 EXAMINATION

A. RPM Installer Verification of General Conditions: Examine site and verify that conditions are suitable to proceed with the RPM installation and that no defects or errors are present which would cause a defective installation of the pavement or cause latent defects in function.

B. RPM Installer Verification of Base Course: Verify that base course has been constructed according to directions and compaction specification requirements to the correct grades and slopes and that it is free of cracking or other damage that could reflect upward through the RP. Proof roll base course prior to paving with equipment of weight similar or heavier than the loaded delivery trucks and paving equipment and rollers that will operate on the base during pavement operations. Any areas of base course that rut, crack or deflect in any manner under proof rolling should be replaced full depth and retested for compaction.

C. Verify that positive drainage conditions have been established at all locations where the RPM will be installed so that the RPM installation is protected from water ponded on the pavement surface or against the edge of the pavement or pavement base course.

D. Unsuitable Conditions: Before proceeding with work, notify the Owner’s Representative in writing of unsuitable conditions and conflicts.

3.04 WEATHER LIMITATIONS

A. RPM shall not be applied when it is raining or when rain is expected. Weather forecasts should indicate no rain during application procedures and for at least 24 hours following application. The ambient temperature must be above 16 degrees C (60 degrees F) for application of RPM unless otherwise approved in writing by the RPM manufacturer. The same weather limitations apply to the application of fog seal.

3.05 EQUIPMENT FOR PLACEMENT

A. For all areas accessible by paving machine, the RPM shall be placed using a self-propelled mechanized spreading and finishing machine equipped with a screed or strike off assembly capable of being accurately regulated and adjusted to a uniform depth to provide a structural section of compacted Design Thickness upon completion of final compaction. The equipment shall be inspected and cleaned prior to use to ensure that no residue from previous hot mix asphalt or other pavement placement operations will contaminate the RPM.

B. The RPM shall be compacted by a self-propelled tandem smooth drum roller of 1 to 2 tons, capable of operation in both static and vibratory compaction modes, and a vibratory plate for areas that are inaccessible to rollers. Hand tamping equipment should be pro- vided for compaction of pavement in areas immediately adjacent to walls and other structures where asphalt rollers and vibratory plates cannot be operated without risk of damage to wall or structure. Beveled edge polypropylene lawn rollers may be used during final compaction in combination with the smooth drum roller.

1. During initial and final compaction operations the self-propelled tandem smooth drum roller should be parked, when not in use, upon a sheet of ¾" plywood that is placed on the pavement mat, rather than being left parked directly on the pavement surface.

2. Steel rollers and vibratory plate surfaces should all be inspected and cleaned of debris, grease and oil prior to use.

C. The fog seal shall be applied by pressurized equipment capable of applying the RPFS in a uniform manner at the specified application rate.

3.06 INSTALLATION OF RPM

A. Placement of RPM

1. Do not place RPM without enough time to complete placement and initial compaction during daylight hours. RPM mix delivered to the project site should be placed in a timely manner to ensure that the mix retains its moisture content as delivered. Installer is fully responsible to retain RPM in suitable condition for placement and measures should be taken to cover mix and protect it against drying in the case that temporary delays are encountered during the placement operation. Mix delivered should be protected against drying until placed and compacted, and all mix should be placed and compacted on the day of delivery.

RPM delivered to stockpile for paving of walkways inaccessible to delivery trucks will require additional measures to be taken by installer to

maintain mix moisture content as delivered. The stockpile should be placed on a clean paved surface to avoid any contamination of RPM material. The stockpiled RPM shall be fully covered immediately following delivery with a waterproof tarp secured with sandbags or other means that effectively seal the mix from air contact and desiccation. As RPM is moved from stockpile to the placement location, the stockpile should be recovered. Stockpiled RPM in the area of the stockpile being uncovered during the placement operations should be periodically remixed with the loader bucket to maintain the proper and homogeneous mix moisture content. In special circumstances where walkway-paving work is not completed the same day as RPM delivery to stockpile, the RPM should be placed no later than the following day after remixing the full RPM stockpile with the loader bucket to maintain the proper and homogeneous mix moisture content.

RPM to be retained for small scale touch up work should be obtained at the time of delivery from within the RPM material in the delivery truck or from the stockpiled RPM and stored in sealed 5-gallon plastic pails and used within five days of RPM delivery.

Regardless of method of storage or length of storage, RPM installer is fully responsible for protecting the quality of the RPM as delivered and for the installed pavement product.

2. For areas inaccessible by paving machine, the RPM may be installed by hand and must be placed in two (2) lifts of equal depth. Important: Care should be taken to place the mix by raking or spreading with shovels rather than 'dropping' the mix when shoveling from any height. The goal is to position the mix in a manner that facilitates as uniform density as possible. Spreading the mix in this manner will result in a smoother finish after compaction with less undulation in the final surface. Immediately after the first lift of one-half the total loose thickness is placed and evenly distributed, compact the lift with the roller, applying one forward pass in vibratory mode and one reverse pass in non-vibratory mode. In areas inaccessible to the roller, compact with a minimum of five passes of a vibratory plate. Install the second lift to a depth that upon final compaction meets the specified Design Thickness and the Finished Surface Smoothness requirements.

3. For areas where the finished compacted depth of the RP is 3 inches or less, place RPM via a single, continuous operation using a self-propelled mechanized spreading and finishing machine designed specifically for that purpose, equipped with a screen or strike-off assembly capable of being accurately regulated and adjusted to distribute a predetermined uniform depth.

4. If there are areas where the finished compacted depth of the RP is greater than 3 inches, install the RPM in two lifts

5. In areas where two lifts are required, the second and final lift of RPM may be placed without application of Tack Coat if surface of first lift is clean and restricted to traffic and second and final lift is placed within no more than 7 days following final compaction of the first RPM lift.

6. If tack coat is required, clean surface of first RPM or hot mix asphalt placement lift of any debris or track on and apply tack coat no more than 10 minutes ahead of RPM placement operations.

7. Apply tack coat at rate of 0.05-gallon RPTC per square yard.

8. The second and final lift should be installed to provide a compacted depth that upon final compaction meets the specified Design Thickness and the Finished Surface Smoothness requirements.

B. Compaction: Similar to procedures used during rolling and compaction of hot mix asphalt pavement, vibratory plates and rollers should be operated by skilled roller operators taking precautions to avoid damage to the freshly placed pavement mixture. When operating vibratory plates, each vibratory compaction pass should be ended at a different location on the pavement mat and turning action directed accordingly to avoid marking pavement sur- face by continued turning of vibratory plate. When operating rollers in vibratory mode, the vibrators should be shut off before coming to a stop or a change of direction. Rollers should be started and stopped slowly and smoothly, coming to a complete stop before re- versing direction. Rolling passes should not all end at the same spot. Turning or articulation during rolling operations should be modified accordingly to avoid tearing or stress cracking the pavement mat. When rolling corners or turns, reduce the rolling speed and make multiple passes with very gradual turning action, moving over no more than 3 to 4 inches per pass, until the full area of pavement has been rolled. Changes of direction, turning or articulation of the roller should only take place when rollers are moving and should be done in a very deliberate and cautious manner.

1. Initial Compaction

   a. Begin initial rolling as soon after RPM placement as RPM will bear roller without undue displacement.

   b. If RPM will not support compaction equipment, delay initial compaction until RPM achieves adequate stability to support compaction equipment but not to the point where the moisture content in the surface mat is lost which is essential to effective bonding of surface aggregates.

c. Perform initial compaction with self-propelled tandem smooth drum rollers of 1 to 2 tons capable of operation in both static and vibratory modes.

d. When working on grades 4 percent or steeper, operate equipment at slow speeds and with the drive wheel forward to the uphill direction of work progress.

e. Make three complete passes with the roller during initial compaction, forwards and backwards, while moving continuously across and overlapping each previous pass by three to five inches.

f. Test pavement surface for slope, smoothness and review surface finish after initial rolling, and correct deficiencies immediately so that finished surface will meet specified tolerances and requirements for slope, smoothness, and surface finish upon final compaction.

g. Furnish and maintain at site a clean, 10-foot long aluminum straightedge having blades of box or box-girder section with a flat bottom reinforced to ensure rigidity and accuracy available for use by the owner's representative.

2. Final Compaction

a. Begin final compaction as soon as possible once initial compaction has been completed and the specified preliminary tests of slope and smoothness completed and deficiencies, if any, are corrected.

b, Perform final compaction with self-propelled tandem smooth drum rollers and for areas inaccessible to the self-propelled tandem smooth drum rollers with the beveled edge polypropylene lawn rollers. Make not less than 5 complete rolling passes, forwards and backwards on all areas of pavement installation, while moving continuously across and overlapping each previous pass. The lawn rollers should be used to roll out any roller marks and surface irregularities left by the smooth drum roller.

c. Do not over roll the pavement installation. Once final compaction effort has produced a pavement mat that is compressed, uniformly shaped and textured, free of roller marks and surface deformities, and meeting grade and smoothness specifications, no further compaction is required. The minimum number of compaction passes to achieve these goals is specified.

d. There may be circumstances when rolling passes will be required the day following placement and compaction in order to address any roller marks and surface irregularities that remain at that time. This

would be in addition to the Initial Compaction and Final Compaction specified for the day of placement. The installer should plan for this possibility and schedule availability of roller equipment and the roller operator for the day following placement in the event that additional rolling is required.

3.07 TOLERANCES

A. In-Place Compacted Thickness Variation from Design Thickness: Maximum ¼ inch plus, 0-inch minus. The specified thickness of the finished pavement shown on the plans and specifications shall be the minimum acceptable.

B. Finished Surface Smoothness of RP surface course: Maximum ¼ - inch variation from a 10-foot long straight edge laid parallel to the pathway center lines, except at intersections, grade breaks and tie-in points to adjacent pavements and hard surfaced pedestrian walking paths.

3.08 FOG SEAL

A. Application

1. Apply fog seal to surface of completed RP surface course not earlier than 24 hours and not later than 7 days following final compaction. The installer is responsible for verifying that the newly placed pavement is adequately cured to support the fog seal distribution equipment before commencing the fog seal application.

2. Protect pavement surface against track-on of dirt and mud until fog coat application has been completed.

3. Apply fog seal at rate of 0.02 to 0.04-gallon of RPFS per square yard.

4. Apply fog seal using pressurized distribution equipment that is designed, equipped, maintained, and operated in such a manner that RPFS may be applied uniformly at variable widths.

5. Provide a verifiable application method that will reliably place the product at con- trolled rates with uniform pressure.

6. Make applications in multiple passes of the distribution equipment if necessary to avoid loss of the material from run-off.

B. Curing of Fog Seal

1. Allow fog sealed surface to dry for at least 48 hours prior to allowing

traffic on pavement. Wind, temperature, humidity, and pavement surface absorbency affect drying and curing rates.

2. Restrict access following fog seal application until pick-up on tires will not occur.

3. Requirements for curing of fog seal as described above do not supersede curing time and traffic restriction requirements for the RP installation itself.

3.09 FIELD QUALITY CONTROL

A. Resin Paving and Aggregate Base Paving

1. Contractor shall perform a flood test in the presence of the engineer and/or Owner's representative. Location of ponding greater than 1/8" in depth may impact proper drainage and shall be marked and remedied by the contractor.

3. Conforms shall form a smooth, pond-free transition between existing grades and new pavement.

4. Depressions in paving between high spots are not to exceed 1/8-inch when measured below a 10-foot long straight edged placed anywhere on surface in any direction.

5. The finished pavement shall have positive drainage without ponding.

B. RP Finished Surface Smoothness

1. Test pavement continuously following initial compaction for smoothness and correct profile by laying a 10-foot straightedge on the paving finished surface parallel to road or path centerline.

2. Surface shall not vary more than ¼-inch, except at intersections, grade breaks, and tie-in points to adjacent pavements.

3. Correct areas not meeting specified surface tolerance immediately after initial compaction.

C. RP Course Thickness Verification

2. Verification tests are to be conducted by Project Engineer for In-Place Compacted Thickness. Owner's Representative will determine locations for all tests. These tests shall be conducted immediately following final compaction. Installer will be previously notified to store appropriate quantity of touch-up mix in sealed container to provide for the required

repairs of test areas. This test will require removal of pavement and a patch repair that will be visible as a patch in the final pavement product. Any concerns of the project owner regarding the appearance and location of test patches, beyond thickness and smoothness tolerances specified, will be the responsibility of the Project Engineer. To conduct the thickness test, remove a small section of pavement to expose base course. Measure from bottom of straight edge placed across excavation to surface of base and record distance to nearest 0.01 foot. Installer should immediately proceed with pavement repair once measurements are taken.

3.10 REPLACEMENT OF DEFICIENT OR DAMAGED RP

A. Areas to Be Replaced

1. Replace full depth of RP thickness if RPM is contaminated or if paving work is defective.

B. Edges of Replaced Pavement

1. Cut edges of RP to be removed so that sides are vertical and oriented perpendicular and parallel to direction of traffic.

2. Spray edges with a tack coat of RPTC.

C. Installation

1. After applying tack coat, place RPM in areas where paving was removed in sufficient quantity that will allow finished surface to conform to elevation and tolerance requirements after final compaction.

2. Thoroughly compact RPM so that cured patch meets requirements specified herein.

3.11 PROTECTION

A. Traffic Restriction

1. Do not permit traffic on pavement surface until curing is complete. Protect pavement surface against traffic until pavement has cured sufficiently to support traffic without marring, rutting, tearing, distressing, or damaging the pavement in any way. Utilize warning signs, barricades, and protection fencing to protect pavement from traffic. All damage to the pavement by contractor construction equipment and construction truck traffic will be the responsibility of the installer to repair.

2. The general guidance in regards to traffic restriction requirements below

in Item 3 (Section 3.11.A.3) does not supersede the responsibilities of the Installer, Project Engineer and Project Owner to protect the newly installed pavement as addressed above in Item 1 (Section 3.11.A.1), and to make the final determination in regards to the status of the curing pavement layer for restoration of traffic. As further addressed in Item 3 below (Section 3.11.A.3), shaded areas will cure more slowly and may require more lengthy traffic restriction than areas receiving full sun exposure.

3. The curing rates of RP installations are greatly influenced by temperature conditions during and subsequent to installation, but many other variables come in to play such as base course moisture conditions, humidity, rainfall interruptions during the curing period, wind velocity, day length, sunlight angle, and degree of shading. Lower sun angles create increased shading and shorter day lengths further limit the amount of sun exposure, typically resulting in the need to extend traffic restrictions beyond the following temperature related guidelines. The combination of cooler weather and a high degree of shading greatly slows RP curing and may require localized traffic restriction, while RP receiving full sun exposure will no longer need to be protected. Periods of rainfall during the curing period can add extra days to the minimum number of dry weather curing days required, particularly if the base course underneath the pavement becomes saturated by water ponded against the edge of pavement by heavy rainfall or other sources of water. Additional traffic restrictions may be required until excess water evaporates out of the base course and permits the lower portion of the pavement to dry back and cure.

    a. For RP placed in temperatures of 70°F (21.1°C) or warmer, traffic should be restricted following final compaction for a minimum of 5 days of dry weather curing with temperatures of 70°F (21.1°C) or warmer.

    b. For RP placed in temperatures of 60°F (15.55°C) to 70°F (21.1°C), traffic should be restricted following final compaction for a minimum of 7 days of dry weather curing with temperatures of 60°F (15.55°C) or warmer.

B. Drainage and Irrigation Water Restriction

1. Provide drainage during construction to prevent water from collecting or standing on or adjacent to areas to be paved or areas of freshly placed pavement.

2. Installer shall notify Project Engineer and require notification of project owner, facility manager and landscape maintenance staff that landscape irrigation water is to be absolutely restricted from the pavement surface or from ponding near pavement edges during the full period of traffic

restriction as required above. Any landscape watering in the vicinity of the newly installed RP during the traffic restriction period should be conducted by hand watering and timers for automatic sprinkler and watering systems should be shut off with explanatory written notices attached.

3.12 CLEANUP

A. General

1. Surplus material remaining upon completion of paving operations shall become the property of the Contractor, to be removed from the work site and disposed of in a lawful manner.

2. Surfaces shall be left in a clean, neat, and workmanlike condition, and all construction waste, rubbish, and debris shall be removed from the work site and disposed of in a lawful manner.

END OF SECTION

SECTION 32 31 01
FENCES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Wire barrier fence, split-rail fence, and horse hitching post.

1.02 SUBMITTALS

A. Submit shop drawings showing fence construction.

B. Submit a complete schedule and catalog cuts for all new hardware, appurtenances, posts, rails, and other components.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wire Barrier Fence

1. Materials shall be as shown on drawings.

B. Split Rail Fence

1. Materials shall be as shown on drawings.

C. Horse Hitching Post

1. Materials shall be as shown on drawings.

PART 3 - EXECUTION

3.01 POST INSTALLATION

A. Do not construct fence until site grading is complete.

B. Posts shall be set to the lines shown on the drawings.

C. All posts shall be set plumb.

D. Fencing shall follow natural ground surface, but ignore minor irregularities in grade.

3.02 INSTALLATION OF RAILS AND BRACES

A. Provide as shown on drawings.

END OF SECTION

SECTION 32 91 13
LANDSCAPE SOIL PREPARATION

PART 1 - GENERAL

1.01 SCOPE

A. Furnish and install all landscape soil preparation as shown and specified including, but not necessarily limited to, the following: stripping and stockpiling of native topsoil, topsoil placement, organic amendment and fertilizer placement, and finish grading.

1.02 QUALITY CONTROL

A. Reviews: Contractor shall specifically request at least two days in advance the following reviews prior to progressing with the work:

1. Completion of rough grading
2. Verification of amendment incorporation depths
3. Finish grade

B. Certification: Written certificates stating quantity, type, and composition, weight and origin for all amendments and chemicals shall be delivered to the Landscape Architect before the material is used on the site.

C. Soil Samples: Contractor shall provide a one-quart sample of the native topsoil to Waypoint Analytical of Santa Clara, (408) 727-0330, for their testing for conformance to this specification. No material shall be delivered to the site, graded on-site, or otherwise modified until the Landscape Architect approves the material. All testing costs shall be paid by Contractor. Contractor shall allow for sufficient time for such testing prior to construction.

Contractor shall also submit a copy of this technical specification Section 32 91 13 with the soil and amendment samples. All testing costs shall be paid by Contractor. Contractor shall allow for sufficient time for such testing prior to construction.

D. Amendment Samples: Contractor shall provide a one-quart sample of each proposed amendment to Waypoint Analytical of Santa Clara, (408) 727-0330, for their testing for conformance to this specification, together with the native topsoil sample. No material shall be delivered to the site until the Landscape Architect approves the samples. Testing costs shall be paid by the Contractor.

E. Planting Areas: All areas to be planted, whether in seed, sod, container stock, flats, liners, or otherwise, are defined as planting areas in these documents.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Native Topsoil: Shall be the existing surface layer of soil on site. This layer typically will be a different color and texture than the subsoil, and may be of varying thicknesses. The Contractor shall be responsible for reviewing the area limits and depths of native topsoil on site with the Landscape Architect.

B. Import Topsoil: Shall be an homogeneous mineral soil classified as sandy loam, or fine sand. Particle size data shall be based upon standard USDA methodology. Of the material falling in the sand category, a minimum of 80% shall fall in the fine sand range .05 - 5mm. Gravel content greater than 2.0mm shall be less than 15%. Import topsoil shall not contain more silt and clay than the on-site native soil. The sum of silt plus clay shall be less than 25%, the soil shall be nonsaline as determined on the saturation extract. Salinity shall not exceed 3.0 mmhos/cm, boron shall not exceed 1.0 ppm and the sodium absorption ratio (SAR) shall not exceed 6.0. Soil reaction as determined on a saturated paste shall fall between 5.5 and 7.5. The soil shall be free of organic herbicides, or other growth-restricting chemicals.

C. Fertilizer: Shall be determined from soils analysis results. For purposes of bidding only, assume the use of 6-20-20 commercial fertilizer, 20-10-5 planting tablets by Agriform International Chemicals, Inc., and iron sulfate.

D. Organic Amendment: Shall be nitrogen-treated redwood sawdust or fir bark or BFI Super Humus Compost, conforming to:

1. BFI Super Humus Compost conforming to

a. Gradation: A minimum of 90% of the material by weight shall pass a ½" screen. Material passing the ½" screen shall meet the following criteria.

Percent Passing	Sieve Designation
85-100	9.51 mm (3/8")
50-80	2.38 mm (No. 8)
0-40	500 micron (No. 35)

b. Organic Content: Minimum 50% based on dry weight and determined by ash method. Minimum 250 lbs. organic matter per cubic yard of compost.

c. Carbon to Nitrogen Ratio: Maximum 35:1 if material is claimed to be nitrogen stabilized.

d. Soluble Salts: Soluble nutrients typically account for most of the salinity levels but sodium should account for less than 25% of the total. To avoid a leaching requirement, the addition of the compost shall result in a final ECe of the amended soil of less than 4.0 ds/m @ 25 degrees C. as determined in a saturation extract. Use the following table to determine the maximum allowable ECe (ds/m of saturation extract) of compost at desired use rate and allowable ECe increase.

e. Moisture Content: 35-60%.

f. Contaminants: The compost shall be free of contaminants such as glass, metal and visible plastic.

g. Maturity: Physical characteristics suggestive of maturity include:

Color: dark brow to black
Odor: acceptable = none, soil like, musty or moldy
unacceptable = sour, ammonia or putrid

h. Particle Characterization: identifiable wood pieces are acceptable but the balance of material should be soil-like without recognizable grass or leaves

PART 3 - EXECUTION

3.01 LIMITS AND GRADES

A. Prior to commencing soil preparation operations, Contractor shall request a review by the Landscape Architect to verify specified limits and grades of work completed to date and soil preparation work to commence. Contractor shall complete the rough grading as necessary to round the top and toe of all slopes, providing naturalized contouring to integrate newly graded areas with the natural topography. Finish grading under this section shall be completed in accordance with the grades indicated on the landscape drawings.

B. Soil shall not be worked when wet.

3.02 STRIPPING AND STOCKPILING OF EXISTING TOPSOIL

A. The native topsoil shall be stripped and stockpiled on-site in sufficient quantities to provide a six-inch layer throughout all planting areas. Topsoil to be stripped and stockpiled shall be taken from the surface layer after all organic litter and foreign debris has been removed and properly disposed.

B. Topsoil shall be stockpiled in an approved location. Stockpiles shall be a maximum of six feet tall and shall be protected at all times from erosion using approved means.

C. All debris, as well as all rocks over 1.5 inches in diameter, shall be removed from the upper 6 inches of planting areas.

3.03 TOPSOIL PLACEMENT

A. After all planting areas have been excavated, they shall be ripped to a depth of seven inches. Next, a three-inch layer of topsoil shall be uniformly distributed over these areas and thoroughly incorporated into the top six inches of subsoil by ripping, scraping, or tilling to mix the subsoil with the topsoil into a homogeneous mixture. The remaining layer of topsoil shall then be uniformly distributed in the planting areas and compacted in

place to 85% compaction. The total depth of topsoil to be placed shall be as indicated on the drawings.

B. In those planting areas where native topsoil is to be left in place, cross rip to a depth of ten inches. Then incorporate the amendments to a homogeneously blended soil depth of six inches.

3.04 ORGANIC AMENDMENT AND FERTILIZER INCORPORATION

A. Materials determined from the soils test shall be uniformly distributed throughout all irrigated planting areas and incorporated to a homogeneously blended soil depth of six inches. For bidding purposes only, assume per 1000 square feet:

6 cubic yards Organic Amendment
30 pounds Commercial Fertilizer (6-20-20)
10 pounds Iron Sulfate

(Note: Iron sulfate should be applied cautiously, avoiding contact with concrete, since permanent staining may result. Any such stained concrete shall be replaced at Contractor's expense.)

3.05 PLANT PITS

A. Plant pits shall have their sides and bottoms loosened or otherwise broken to prevent glazed or compacted surfaces, and shall be as shown on the planting detail.

3.06 BACKFILL

A. Only unamended soil shall be used beneath the root ball; cultivate bottom of plant pit to improve porosity.

B. Soil immediately below the root ball should be left undisturbed to provide support but the sides and the bottom around the side should be cultivated to improve porosity.

C. The top of the rootball should be at or slightly above final grade.

D. The top 12-inches of backfill around the sides of the rootball of trees and shrubs may consist of the above amended soil or may be prepared as follows:

1/3 by volume organic amendment/fertilizer mix per plant laboratory recommendations
2/3 by volume native or imported topsoil

E. Backfill below 12 inches required for 24-inch box or larger material should not contain the organic amendment.

3.08 FINISH GRADING

A. Contractor shall finish grade all planting areas, including all seeded areas, and shall remove all rocks and clods over 1.5 cubic inches to a depth of 6 inches below finish grade. All areas shall be smooth and uniformly graded. All erosion damage during the construction period shall be repaired by the Contractor.

B. Unless otherwise noted, all soil finish grades shall be flush with finish grade of walks, pavements, and curbs.

END OF SECTION 32 12 16

SECTION 32 13 43

PERMEABLE CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pervious permeable concrete
2. Pavement base
3. Geotextile for soil separation

1.2 ACTION SUBMITTALS

A. Bid Submittals: The following items must be submitted with the bid proposal. Proposals without the following submittals may be rejected.

1. Certificates of Qualifications for Pervious Concrete Craftsman or Installers as discussed in Quality Control Section 1.3.A.1.A.
2. Print out of NRMCA Certified Professional website database showing the Craftsman certificate holder as an employee of the qualifying company as discussed in Quality Control Section 1.3.A.1.A/B
3. List of 5 reference jobs as discussed in Quality Control Section 1.3.A.1.C

B. Pre-Installation Submittals—The following items must be submitted no less than four (4) weeks before scheduled installation date.

1. Mix Design

a. Batch weights of all constituents.
b. Portland cement type and brand.
c. Non-Portland cement pozzolan type and source.
d. Macro-fiber brand and type, if used.
e. Admixture type and brand.
f. Aggregate source(s) and gradation(s).
g. Fresh density of the pervious concrete.

1.3 QUALITY ASSURANCE

A. General—Test and inspect concrete materials and operations as work progresses as described in 1.3.B. Failure to detect defective work or material early will not prevent rejection if a defect is discovered later, nor shall it constitute final acceptance.

1. Contractor qualification

a. The Contractor shall employ no less than one National Ready Mixed Concrete Association (NRMCA) certified pervious concrete craftsman, who must be listed on the NRMCA pervious concrete database as an employee of the Contractor, who shall oversee concrete placement, ***or*** the Contractor shall employ no less than four NRMCA certified Pervious Concrete Installers, who shall be on site working as members of each placement crew during all concrete placement. Craftsman consultants “for hire” are not permitted as qualifiers.

B. Testing as required by project engineer

1. Fresh Density Test - Obtain a minimum 1 ft3 sample for acceptance tests in accordance with ASTM C172. Perform a minimum of one density test in accordance with ASTM C1688 during each day’s placement or when visual inspection indicates a change in the concrete. Fresh density shall be between +/-5 lb/ft3 of the specified fresh density.

2. Permeability Test- Permeability shall be tested using ASTM C 1701. One test for every 10,000 sq ft, minimum 3 tests, results should be averaged. Test locations should be at least 25’ from each other.

a. Must be tested on clean, level pervious pavement upon completion of the curing period but before acceptance and opening the pavement to traffic.

b. Permeability shall be at least 350 inches per hour on average as tested after curing period has ended.

3. Hardened density (optional)- If specifically required by the project engineer, after seven days curing, a minimum 3 cores should be taken from the test panels, in accordance with ASTM C 42, and measured for thickness and density in accordance with ASTM C 1754. These test results should be recorded as a reference for subsequent quality assurance and acceptance testing. Cores taken from subsequent placements should also be tested in accordance with ASTM C 1754. The resulting measured density should be within plus or minus 5% of the average density of cores from the test panel.

4. If less than four (4) inches of open graded base rock is used under the pavement the permeability rate will not be valid and the permeability rate shall not be used for criteria for acceptance of rejection of the pavement.

5. Compressive strength testing is not used for pervious concrete.

C. Testing agencies—Agencies that perform testing services on concrete materials shall meet the requirements of ASTM C1077. Agencies inspecting the Work shall meet the requirements of ASTM E329. Testing agencies performing the testing shall be accepted by Architect/Engineer before performing any Work.

1. Field tests of concrete required in 1.3.B shall be performed by an individual certified as both an NRMCA Certified Pervious Concrete Technician and an ACI Concrete Field Testing Technician—Grade 1 or equivalent.

D. Approved Mix Design - Once accepted by the Engineer, the mix design meeting the criteria specified in Section 1.2.B.1 shall become the approved mix design and shall not be modified in any way unless re-submitted and approved by the engineer. Modifications to the approved mix design not approved prior to being placed may be rejected. Admixture and water dosages may be modified as needed to maintain mix properties.

1.4 FIELD CONDITIONS

A. Protection of Existing Improvements
1. General contractor is responsible for preparing site for work – clearing area, protecting adjacent finished surfaces, materials and previously installed objects or furniture. General contractor shall provide suitable protection where required before work commences and maintain protection throughout the course of the work.
2. To whatever extent possible, do not damage or disturb existing adjacent vegetation. Installer shall not be responsible for damaged vegetation within the work area. Remove all stains from adjacent exposed surfaces of paving, structures, and grounds. Remove all waste and spillage.

B. Safety and Traffic Control:
   1. General contractor shall notify and cooperate with local authorities and other organizations having jurisdiction when construction work will interfere with existing roads and traffic.
   2. General contractor shall provide temporary barriers, signs, warning lights, flagmen, and other protections as required to assure the safety of persons and vehicles around the construction area and to organize the smooth flow of traffic.

C. Weather Limitations:
   1. Do not place pervious concrete pavement when the ambient temperature is below 45°F, is expected to fall below 32°F within 48 hours of placement, or is above 90°F, unless otherwise permitted in writing by the design professional of record. In the case of cold weather installation, surface efflorescence, as well as streaking, or tiger striping, which is a result of the curing membrane, may be significant.
   2. Do not place pervious concrete pavement when the wind, heat or humidity does not allow enough time to place, properly joint, compact, edge, finish and cure before the surface dries to the point where it will result in raveling, i.e. loss of wet metallic sheen.

1.5 ACCEPTANCE

A. Reference Panel: Acceptance of the reference panel will be based on the criteria for acceptance of pavement per Section 1.5.B

B. Acceptance of pervious concrete pavement will be based on the following criteria:

   1. Appearance: Each lot of finished pervious concrete will be inspected for appearance by the Engineer. The pervious concrete shall have a consistent surface texture, shall have no more than three (3) percent of the surface area within each panel (joint to joint) clogged/sealed with cement paste or raveled, shall be free of ridges or other surface imperfections, shall have joints that are in the specified location and are constructed per specification, and shall be free of cracks. Raveling is defined as: the contiguous dislodging of the surface layer(s) of aggregate.

   2. Smoothness: Pervious concrete pavement smoothness shall be checked with a 10-foot straight edge. Vertical measurement should be taken between the pavement's determined plane and straight edge discounting surface void and roughness irregularities. The surface of the finished pavement shall be uniform to a degree such that no variations greater than 1/2-inch over ten (10) feet are present when tested with a 10-foot straight edge and checked in a direction perpendicular or parallel to the centerline and the pavement's planed surface.

3. Grade: Pervious concrete shall be true to designed grades plus or minus ½ inch. Where abutting existing facilities such as sidewalks, walkways, curbs, driveways or other pavements, the pervious concrete shall be within ¼ inch of that surface.

4. Line: Pervious concrete margins shall be true to designed lines plus or minus ½ inch at any point.

5. Infiltration Rate: The average of all three (3) infiltration tests shall be greater than 350 inches per hour with no single test less than 100 inches per hour.

6. Pressure wash testing: Before final acceptance the Engineer, may require a pressure wash test of the pervious concrete. Pressure washing shall be provided and completed by using portable washer equipment working at a minimum of 3000 psi at 2.4 gpm. The nozzle shall be a zero degree nozzle and be held a maximum of three (3) inches off the concrete surface and moved at a slow but steady rate. The Contractor shall pressure test a min three (3) locations per lot or as determined by the Engineer. Any sections of pervious concrete that breaks up, ravels, or does not infiltrate shall be removed and replaced with acceptable pervious concrete to the nearest joints. The Engineer may reject the concrete if the pressure washing dislodges more than a few individual aggregate particles in each panel. The Contractor shall decide, after placing the pervious concrete, when to perform the quality assurance pressure wash testing for the acceptance.

PART 2 - PRODUCTS

2.1 FABRIC

A. Geotech fabric, if required for separation shall be Mirafi 140n or approved equal. If the designer determines geotech fabric is required for strength use Mirafi HP 370 or approved equal.

2.2 BASE

A. Base shall be composed of an open graded washed crushed rock maintaining a minimum of 35% void space.

B. For installations of more than 6” the section beyond 6” may be a larger size provide it meets 2.2-2.2.1.

2.3 FORMS

A. Form materials must be durable enough to resist deformation during edge compaction and maintain grade.

B. Forms shall be clean and free of debris of any kind, rust, and hardened concrete.

2.4 PERVIOUS CONCRETE

Comply with ASTM C94/C94M and the following requirements:

A. Aggregates

1. Aggregate shall have a minimum specific gravity of 2.60, a minimum rodded void content of 36% per ASTM C29, and a maximum absorption rate of 3%. Crushed aggregate or gravel shall be permitted.

2. Size of aggregate to be determined by engineer or owner based on locally available materials but in no case shall be larger than 1/2” nominal.

B. Admixtures

1. Hydration stabilizers are required for use to extended set time. Additional working time provided by Hydration stabilizers can be several hours and is determined by dosage rate as recommended by manufacturer.

2. Super absorbent polymers (SAP) are required to improve workability and curing and eliminate need for water reducers and viscosity modifiers. Use Pervious Enhancer Pro or approved equal.

3. Other admixtures may be used and must comply with ASTM C 494 and approved by the design professional of record.

C. Supplementary Cementitious Materials

1. SCMs such as fly ash, slag and silica fume are approved for use in pervious concrete. SCM mix proportions shall be included in the mix design.

2. Supplementary cementitious material shall be as specified herein:

a. Fly Ash: Fly ash shall conform to the requirements of ASTM C618, Class F or C.

b. Slag Cement: Slag cement shall meet the requirements of ASTM C989, Grade 100 or Grade 120.

c. Silica Fume: Silica fume shall meet the requirements of ASTM C1240.

D. Reinforcing Materials

1. The use of Macro-fibers in pervious concrete mixtures increases durability and is permitted when required. Micro-fibers have minimal effect.

2. No reinforcing bars, tie bars or dowels will be used in the installation of pervious concrete.

E. Pigments

Use pigments or color complying with ASTM C979 if specified in Contract Documents.

F. Water

Clean potable water shall be used per ASTM C 1692.

2.5 CURE MATERIALS

A. Moisture-Retaining Cover:: A minimum of six mil Polyethylene film ASTM C 171 shall be used to cover the fresh pervious concrete.

B. Evaporation Control Surface stabilizers and ASTM C309 compliant curing agents are allowed prior to polyethylene cover as long as they are applied in mist form and do not dilute the surface paste.

PART 3 - EXECUTION

3.1 REFERANCE PANEL

A. Place reference panels on the project site, on a subgrade and base prepared as specified, using the material and construction requirements for pavement in this Specification. Test panel requirement may be waived based on contractor experience, if approved by project engineer or owner. Notify the Engineer at least two (2) Working Days before installing pervious concrete reference panel.

B. At a location, as approved by the contracting agency, the proposed contractor shall construct a sample reference panel on-site, using the same design requirements required for the substantial portion of the project. The sample reference panel should be a minimum of 150 sqft at the same thickness as specified for the application, and should be installed using the same required tools and qualified personnel required for project installation as found in Section

1.6.1.1. The fresh concrete used in the reference panel shall be tested unit weight as per ASTM-C 1688.

C. The design professional of record shall approve a site cast sample of the specified pavement before paving begins. The following criteria for the sample shall be used:

1. The surface appearance of the sample must be approved for texture, finish and should have minimal surface sealing or raveling as described in Acceptance section 1.5.B. The finished product must a reasonable facsimile of the approved sample.

2. Permeability shall be tested using ASTM C 1701 or approved equal

a. Permeability shall be at least 350 inches per hour on average, as tested after the initial curing period.

b. If less than 4 inches of specified base rock is installed the ASTM C 1701 permeability test shall not be criteria for acceptance.

3. Rejected panels shall be removed at contractor's expense.

3.2 PRE-INSTALLATION MEETING

A. If required, a pre-paving meeting shall be scheduled at prior to the installation. The following individuals are required to attend:

1. General contractor representative

2. Pervious concrete installation representative

3. Site work contractor representative

4. Engineer

3.3 SUBGRADE PREP

A. General contractor shall ensure the subgrade is prepared in accordance with Contract Documents.

B. General contractor shall ensure that the required pavement thickness is obtained in all locations by verifying subgrade elevation.

C. General contractor shall ensure that subgrade is not over-compacted before installing the base rock material.

D. General contractor shall keep all traffic off the subgrade during construction to the maximum extent practical. Re-grade and re-compact subgrade disturbed or over-compacted by construction traffic, as needed. Compact the material added to obtain final subgrade elevation.

3.4 BASE INSTALLATION

A. Placement of all other elements of the design (i.e. conduits, drainage pipe(s), utilities, irrigation sleeves, etc.) are to be to reviewed by the General contractor and site contractor prior to placing base.

B. Geotech fabric (if required) must extend at least three inches outside of base, or per the design documents, whichever is greater unless otherwise specified by the design professional.

C. General contractor shall inspect the in-place open graded base aggregate:

1. Ensure compliance to the plans and specifications.

2. Verify the base rock is free-draining. If not, do not proceed.

3. General contractor shall ensure that the required pavement thickness is obtained in all locations by verifying base elevation.

4. Base must extend at least three inches beyond edge of slab.

3.5 SETTING FORMWORK

A. Set, align, and brace forms so that the hardened pavement meets the tolerances specified in 3.6. Install forms to allow continuous progress of work and so that forms can remain in place at least 72 hours after concrete placement. Assemble formwork to permit easy stripping and dismantling without damage to concrete.

B. The vertical face of previously placed concrete may be used as a form ensuring that the pavement is protected from damage.

C. Forms may be wood or metal.

3.6 TOLERANCES

A. Top of Forms: Not more than 3/8” inch variance in 5 feet.

B. Vertical Face on Longitudinal Axis: Not more than 3/8” inch in 5 feet.

3.7 BATCHING AND MIXING

A. Mix Proportions

1. Total cementitious material should be sufficient to result in a design void content of 17-23%.

2. The volume of aggregate, cement, water, and admixture per cubic yard calculated as a function of the unit weight as determined by ASTM C1688 Standard Test for Density and Voids Content of Freshly Mixed Pervious Concrete and must result in a yield of 27 cubic feet per cubic yard.

3. The measured unit weight per CY of the concrete per ASTM C1688 shall be +5/-5 lbs. of the design unit weight.

B. Batch and mix in compliance with ASTM C94/C94M

C. Discharge shall be completed as long as the mix is workable.

D. Hydration stabilizer can significantly increase working time. Installer should be well versed in the use of hydration stabilizer.

E. Water addition to maintain wet metallic sheen on the paste is permitted at the point of discharge. Water addition at site does not extend working time.

3.8 DELIVERY

A. Delivery of materials must be carefully scheduled to avoid trucks waiting for excessive periods of time on job. Pervious concrete that has been in the truck for excessive periods of time and is no longer workable should be rejected.

B. Standard Ready Mix Concrete trucks

1. Standard Ready Mix Concrete trucks can be used for pervious concrete mixes.

C. Volumetric trucks also known as ‘Truck Mounted Mobile Mixers’

1. Volumetric trucks can be used for delivery and mixing of pervious concrete as well.

3.9 PERVIOUS CONCRETE PLACEMENT

A. Inspection

1. Before placing concrete, inspect and complete formwork installation.

B. Prior to placement

1. Prior to placement of pervious concrete, moisten sub-base aggregate to provide a uniform dampened condition at the time concrete is placed. If initial application of water is quickly absorbed apply a second application of water just before installing pervious concrete.

C. Placement

1. Deposit concrete either directly from the transporting equipment onto the subgrade or sub-base, unless otherwise specified.

2. Do not place concrete on frozen subgrade or sub-base.

3. Finish the pavement to the elevations and thickness specified in Contract Documents and meet the requirements of 3.6.

D. Finishing

1. Compact fresh concrete to stay within the requirement tolerances.

2. Compact pervious concrete to a dense, pervious surface.

3. Tools

a. Spinning “Roller” screed – A spinning/motorized roller screed is the preferable method of strike off and initial compaction.

b. Hand Operated Straight Edge -- A hand operated straight edge may be used to place the pervious concrete where the spinning roller screed is not feasible.

c. Cross roller or motorized float pan should be used to provide secondary compaction and improve surface flatness and texture.

d. Finishing Tools – Hand floats and other tools typical to concrete finishing may be used but only if they do not seal the surface.

e. Asphalt rollers, truss screeds or plate compactors – shall not be used.

3.10 JOINTING

A. Joint placement in pervious concrete is more restrictive than traditional concrete. Joint placement is at the discretion of the installer unless noted in the design documents in which case the designer or engineer shall consult with installer on joint location.

B. When joint placement is not indicated on the Project Drawings, installer shall submit drawings describing proposed jointing. Do not proceed with Work until the joint placement is accepted by the Architect/ Engineer.

C. Spacing between contraction joints shall not exceed 20 feet. The larger horizontal dimension of the slab panel, shall not exceed 150% of the smaller dimension.

D. Tool contraction joints to the specified depth and width in fresh concrete immediately after the concrete is compacted.
   1. Contraction joint depth shall be a minimum of one fifth the pavement thickness.

E. Saw cut concrete joints may be placed after concrete has hardened sufficiently to prevent aggregate from being dislodged. If saw cuts are performed before the curing period has ended, the slabs must be kept sufficiently wet when it is uncovered and immediately recovered.

3.11 CONCRETE CURING

A. Proper moisture level is indicated by cement paste with a wet metallic sheen. Loss of surface moisture, as indicated by a loss of wet metallic sheen, results in raveling. Begin the curing as soon as possible after discharge of material and before excessive loss of surface moisture occurs.
   1. Polyethylene Moisture-Retaining Cover:
      a. Completely cover the pavement surface with a minimum 6 mil thick polyethylene sheet. Cut sheeting to a minimum of a full placement width plus 12” on both sides.
      b. Cover all exposed edges of pavement with polyethylene sheet. Overlap sheet edges by at least 12”.
      c. Secure curing cover material in such a manner as to ensure curing sheet will remain securely in place throughout the duration of the curing period.
      d. Evaporation Control: Water, surface stabilizers and ASTM C309 compliant curing agents are allowed as long as they are applied in mist form and do not excessively dilute the surface paste.

B. Cure pavement for a minimum of 7 uninterrupted days, unless otherwise specified. Mixes with 20% or more SEMs shall be cured a minimum of 10 days.

C. All curing times are based on temperatures at or above 55°F during the curing time. Each day temperatures are lower than 55°F does not count as a curing day. The added time required is to be determined by the design professional of record.

3.12 CONCRETE PROTECTION

A. Pavement Protection during Construction
   1. General contractor must inform all trades who use the pavement for staging, storage or other reasons; especially landscapers, not to dump materials such as dirt, debris, or bark directly on the pervious concrete.
   2. General contractor shall protect the pavement surface from abrasion, discoloration, or sediments until completion of any construction or landscaping activity that may expose the pavement to hazards.
   3. General contractor shall be responsible to clean, repair and touch-up, or replace when directed, pavement which has been soiled, discolored, or damaged by other trades outside the installer's control prior to substantial completion.

3.13 CLEANING

A. Pressure washing or vacuuming or a combination of both may be used as required. Pressure washers are approved for use after 14 days.

3.14 MAINTENANCE/CLEANING

A. After completion of installation General Contractor is responsible for protecting and cleaning.

B. Owner is responsible for all maintenance after project work acceptance.

C. The contractor must supply the owner with a copy of a Pervious Concrete Maintenance Manual.

3.15 OPENING TO TRAFFIC

A. The pavement must have cured for at minimum 7 uninterrupted days before light vehicle traffic is permitted, 28 days cure for heavy vehicles. The Architect/Engineer must accept the pavement before being opened up to traffic.

END OF SECTION 32 13 43

SECTION 32 17 13

PARKING BUMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes wheel stops.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PARKING BUMPERS

A. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.

1. Mounting Hardware: Galvanized-steel spike or dowel, 1/2-inch diameter, 10-inch minimum length.

2. Color: Standard Concrete

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install wheel stops according to manufacturer's written instructions unless otherwise indicated.

B. Securely anchor wheel stops to pavement with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer.

END OF SECTION 321713

SECTION 32 17 23

PAVEMENT MARKINGS AND MARKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes painted markings and markers applied to asphalt and concrete pavement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide painted markings by the following:

1. Aexcel Inc.
2. Benjamin Moore & Co.
3. Color Wheel Paints & Coatings.
4. Columbia Paint & Coatings.
5. Conco Paints.
6. Coronado Paint; Division of INSL-X Products Corporation.
7. Diamond Vogel Paints.
8. Dunn-Edwards Corporation.
9. Ennis Traffic Safety Solutions, Inc.
10. Frazee Paint.
11. General Paint.
12. Kwal Paint.
13. M.A.B. Paints.
14. McCormick Paints.

15. Miller Paint.
16. Parker Paint Mfg. Co. Inc.
17. PPG Industries.
18. Pratt & Lambert.
19. Rodda Paint Co.
20. Rohm and Haas Company; a subsidiary of The Dow Chemical Company.
21. Scott Paint Company.
22. Sherwin-Williams Company (The).
23. Approved Equivalent

2.2 PAVEMENT-MARKING PAINT

A. Pavement-Marking Paint: MPI #32, alkyd traffic-marking paint.

1. Color: As indicated.

B. Pavement-Marking Paint: MPI #97, latex traffic-marking paint.

1. Color: As indicated.

C. Glass Beads: AASHTO M 247, Type 1 made of 100 percent recycled glass.

2.3 PAVEMENT MARKERS

A. Pavement markers shall be the type and color shown on the Drawings and conform to the shape, dimensions and tolerances shown on the Drawings.

B. The exterior surface of the shell shall be smooth and contain one or two reflective faces of the color specified.

C. The base of the marker shall be flat (the deviation from a flat surface shall not exceed 0.05-inch), rough textured and free from gloss or substances which may reduce its bond to the adhesive.

D. Pavement markers shall conform to the following specifications:

1. Bond strength: minimum 500 psi.
2. Compressive strength: minimum 2000 lbs.
3. Abrasion resistance: marker must meet the respective specific intensity minimum requirements after abrasion.
4. Water soak resistance: no delamination of the body or lens system of the marker nor loss of reflectance.
5. Reflectance:

	Specific Intensity		
	Clear	Yellow	Red
0˚ Incidence Angle, minimum	3.0	1.5	0.75
20˚ Incidence Angle, minimum	1.2	0.60	0.30
After one year field evaluation	0.30	0.15	0.08

E. Adhesives: rapid set type epoxy adhesive or hot melt bituminous adhesive shall be used. Filler material used in bituminous adhesive shall be Type PC, Grade III, calcium carbonate conforming to the requirements in ASTM Designation: D1199, and shall conform to the following fineness:

1. 100% passing Sieve No. 100
2. 95% passing Sieve No. 200
3. 75% passing Sieve No. 325

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with District's Representative.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils. Apply paint so that it cannot run beneath the stencil.
2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

3.2 PAVEMENT MARERS

A. Pavement markers shall be cemented to the pavement with hot melt bituminous adhesive or rapid set type epoxy adhesive in conformance with the manufacturer's instructions.

B. In areas of new construction where the markers are protected from all traffic, including the Contractor's vehicles, set type epoxy adhesive may be used. The protection from traffic shall be for at least 3 hours after marker placement when the pavement surface temperature is 55˚ F or above, at least 24 hours when the temperature is between 40˚ F and 55˚ F, and at least 48 hours when the temperature is 40˚ F or below.

C. Reflective markers shall be placed in such a manner that the reflective face of the marker is perpendicular to the roadway centerline.

D. Pavement markers shall not be placed on new asphalt concrete surfacing or seal coat until the surfacing or seal coat has been opened to public traffic for a period not less than 7 days when hot melt bituminous adhesive is used, and not less than 14 days when epoxy adhesive is used.

E. The portion of the roadway surface to which the marker is to be bonded shall be free of dirt, curing compound, grease, oil, moisture, loose or unsound layers, paint and any other material which would adversely affect the bond of the adhesive.

END OF SECTION 321723

SECTION 32 31 00

VEHICULAR GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes two types of vehicular gates that ae to be installed as part of the roadwork and lot grading with this project.

1.2 PREINSTALLTION MEETINGS

A. Preinstallation conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product data for each type of product.

B. Samples for each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers are subject to compliance with requirements.

2.2 DOUBLE ELAF STEEL TUBE ACCESS GATE

A. Double leaf steel tube access gates shall meet the following requirements:

1. Minimum clear width of 23’-10”

2. Gate shall be primed with rust inhibitive paint.

3. Gate shall be finished with Olympic Oxford Brown weather resistant outdoor paint.

2.3 AUTOMATIC GATE SYSTEM

A. INSTALLATION REQUIREMENTS
1. Two (2) gate operators shall be installed, one for each side of the entrance gate.

2. Gate operators shall be installed on posts and be connected via a Master / Second cable allowing the operators to open and close at the same time.

3. Master / Second cable shall be installed inside of a saw cut across the driveway.

4. Install batteries and associated containment; batteries compatible with power feed and sufficient to power gate operators.

5. Trench as needed to house conduit and wires connecting the power source to the gate operators and backup batteries.

6. Install auto-exit loops approximately 50’ up the roadway from the gates.
7. Install infrared photo beam across gate opening or edge sensors on all gate leafs, device shall fulfill UL325 requirements for automatic gates.
8. Install (1) one keypad approximately 15’ from the gate post and include all required wiring, undergrounding, and conduit.
9. Install multi-code wireless receiver system to allow for remote access, opening of the gate system.
10. Install (1) Knox Fire Department access switch, mounted on post (can be same post as keypad).
11. Install (1) Intermatic EI600 seven day programmable hold open timer.
12. Install locking security cage around gate operator
13. Fill saw cut areas in roadway used to install sensor loops, wires, and backer rods.
14. Provide operational testing.
15. Furnish guarantee statement

B. PERFORMANCE CRITERIA
1. Automation of both leaves of a double gate at the entry/exit for an existing parking lot.
2. Installation of a electric wiring and batteries, which will power both gate operators.
3. Installation of a 7-day programmable timer that will open and close the gates at programmed times 7 days a week every day of the year.
4. Provision of a Knox access switch for fire department access.
5. Installation of an access keypad for District access/egress purposes.
6. Installation of a multi-code wireless receiver system which will allow for remote access and opening of the gate system. System must be compatible with existing LiftMaster District remotes. Remotes must be individually programmable to allow for access to only certain gates.
7. Installation of a vehicle safety detection system that will prevent openings/closures of the gates when a vehicle is present on outside or inside of gate swing area and allow vehicles/motorcycles to depart when pulling up to the closed gate from the inside.
8. Gate must open automatically if there is a loss of power.
9. Gate must stop if it hits an obstruction.
10. Gate must have override to open or close the gate by keypad operation. The override must be able to be set in an open or a closed position.
11. Gate should not be able to be pushed open when in a closed position.
12. All equipment must be installed and armored to provide protection from potential vandalism.

2.4 RELOCTED EXISTING GATES

A. Two existing gates located on the northern end of the site will be salvaged and reinstalled t the south end of the proposed parking lot (See plans).
1. Installation of the salvaged gates shall meet the hanging post footing depth and diameters shown on Detail 1 of Sheet C5.1 of the plans.
2. Gates shall be installed with posts plumb and vertical.
3. Gates shall be sanded down and then primed with rust inhibitive paint.
4. Gate shall then be painted with Olympic Oxford Brown weather resistant outdoor paint.

PART 3 – EXECUTION

3.1 INSTALLATION

A. The gates shall be installed in accordance with the manufacturer's requirements and as specified on the plans.

END OF SECTION 32 31 00

SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING AND CULVERTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe, Culverts, and fittings.
2. Cleanouts.
3. Catch basins.
4. Pipe outlets.
5. Culverts.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 033000 Cast-in-Place Concrete

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between piping, and proximate structures.

B. Field quality-control reports.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by District or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify District's Representative no fewer than two days in advance of proposed interruption of service.

2. Do not proceed with interruption of service without District's written permission.

PART 2 - PRODUCTS

2.1 HDPE CULVERT PIPE AND FITTINGS

A. HDPE Culvert Piping:

1. Pipe: All HDPE Culverts per ASTM F2648 shall be dual-walled with smooth interior and structural strength to support H-25 live loads with 12" minimum cover.

2. Joints and Gaskets shall be bell and spigot with rubber gasket per ASTM F477.

3. All joints and gaskets shall be of a compatible material, dimension, and manufacturer. All joints and gaskets shall form a water-tight seal. Joints and Gaskets shall be tested prior to any fill being placed over the pipes. Testing shall be overseen by the District's Representative.

2.2 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints.

1. Silt-tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.

2. Soil-tight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.

B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints.

1. Silt-tight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2. Soil-tight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

2.3 PVC PIPE AND FITTINGS

A. PVC Corrugated Piping:

1. Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.

2. Fittings: ASTM F 949, PVC molded or fabricated, socket type.

3. Gaskets: ASTM F 477, elastomeric seals.

4. Description: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections, rated for 250-psig minimum working pressure and for offset and expansion indicated.

2.4 INSERT A TEE

The penetration into the existing 60” diameter culvert shall be designed to connect a 30” diameter HDPE N-12 pipe to a 60” CMP. The fitting shall be designed to be soil tight and shall have a hub adaptor, stainless steel securing clamp and screws, and a rubber sleeve to minimize leakage.

2.5 UNDER SIDEWALK DRAINPIPE

The under sidewalk drain pipe shall be either a cast iron rectangular pipe such as an Alhambra Foundry Company A470 rectangular cast iron pipe intended for use under a sidewalk or approved equivalent. The flow area must be capable of conveying the required flow volume and flow rates.

2.6 CLEANOUTS

A. Plastic Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.7 CONCRETE

A. Concrete shall conform to Section 033000 Cast-in-place concrete

B. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cementitious Material: ASTM C 150, Type I.

2. Normal Weight Aggregate: ASTM C 33

3. Water: ASTM 94/C 94M Potable.

2.8 CATCH BASINS

A. Standard Precast Concrete Catch Basins:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.

3. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.

4. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

5. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.

6. Grade Rings/Vertical Extensions: Include two or three reinforced-concrete extensions, of 6- to 9-inch total thickness, that match the dimensions of the frame and grate.

7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.

1. Size: 24 by 36 inches minimum unless otherwise indicated.

2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.9 PIPE OUTLETS

A. Energy Dissipaters: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. A-1, 3-ton average weight armor stone, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

D. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.

2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.

3. Install piping with 18-inch minimum cover.

4. Install PVC piping according to ASTM D 2321 and ASTM F 1668.

5. Install piping such that it is not exposed to daylight or visible to the public.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.

2. Join PVC corrugated sewer piping according to ASTM D 2321 for elastomeric-seal joints.

3. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CATCH BASIN INSTALLATION

A. Set frames and grates to elevations indicated.

3.5 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct rock and/or broken stone, as indicated.

B. Install outlets that spill onto grade, anchored with concrete, where indicated.

C. Construct energy dissipaters at outlets, as indicated.

3.6 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to Section 033000 “Cast-In-Place Concrete”.

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use warning tape or detectable warning tape over ferrous piping.

2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.

2. Defects requiring correction include the following:
   a. Alignment: Less than full diameter of inside of pipe is visible between structures.
   b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
   c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
   d. Infiltration: Water leakage into piping.
   e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.

2. Test completed piping systems according to requirements of authorities having jurisdiction.

3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

4. Submit separate report for each test.

5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
   a. Exception: Piping with soil tight joints unless required by authorities having jurisdiction.
   b. Option: Test plastic piping according to ASTM F 1417.
   c. Option: Test concrete piping according to ASTM C 924.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 334100

Technical Specifications

For

Bear Creek Redwoods
Phase One Road and Trail Improvements

Prepared for

Midpeninsula Regional Open Space District

100% Submittal
3-6-18

FOR USE IN CONNECTION WITH
STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, CURRENT EDITION

Bear Creek Redwoods – Phase One Road and Trail Improvements
Technical Specifications
100% Submittal

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SECTION 015000
TEMPORARY FACILITIES AND CONTROLS
(a.k.a. Mobilization & Demobilization)

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of the construction facilities and temporary controls, including mobilization and demobilization, as specified, as shown on the Drawings, or as otherwise directed by the Engineer.

B. Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, safety and security precautions, equipment, supplies, and incidentals to the site; for the establishment of all offices, traffic control, temporary fencing, restrooms and other facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site.

C. Demobilization shall consist of work and operations necessary to disband all mobilized items and cleanup the site. The removal of all temporary crossings, ramps, access ways, roads, signs, and fencing; dewatering facilities; and temporary facilities or works, and the restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization.

D. All work shall comply with the approved Storm Water Pollution Prevention Plan.

2. PRODUCTS

2.1 TEMPORARY CHAIN LINK FENCING

A. Unless otherwise indicated, type of temporary chain link fencing shall be Contractor's option. The following types are acceptable:

1. New materials or previously used salvaged chain link fencing in good condition.
2. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with base plates, or inserting in precast concrete blocks.
3. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.

2.2 GATES

A. Provide personnel and vehicle gates of the quantity and size required for functional access to site.

B. Fabricate of same material as used for fencing.

C. Vehicle gates: minimum width of 20 feet to allow access for emergency vehicles. Capable of manual operation by one person.

3. EXECUTION

3.1 CONTRACTOR’S PLANT AND EQUIPMENT

A. Security. Contractor shall, at all times, be responsible for security of their plant and equipment. Owner shall not be responsible for missing or damaged equipment, tools, or personal belongings.

B. Construction Power and Communication Facilities. Contractor shall be responsible for providing sufficient electrical power and communication facilities to construct the work.

C. Storage Facilities.

1. Provide storage facilities for the protection of materials and supplies from weather, and shall keep the facilities clean and in proper order at all times.
2. Provide a storage area for lubricants, oils, and hazardous materials with sufficient means to contain spills. Facilities, handling, and any required cleanup will comply with all current local, state, and federal standards. Petroleum products stored on the site shall be secured from vandalism.

D. Sanitary Facilities. Maintain adequate toilet facilities at or near the work site.

E. Solid Waste Handling. Provide sufficient solid waste handling facilities to maintain site in a clean, orderly condition.

F. Water. Water is available near Gate BC01. The water facilities will be described at the prebid meeting.

3.2 MOBILIZATION AND DEMOBILIZATION

A. General. Perform mobilization and demobilization activities in accordance with the Drawings, and as specified.

3.3 PROJECT SIGNS

A. General. Erect project, safety and hard hat signs at each work site within five (5) days after commencement of work at that site.

3.4 EXCAVATION

A. The Contractor, and any subcontractor, is required to notify U.S.A. forty-eight hours in advance of performing excavation work, by calling the toll free number (800) 642-2444.

3.5 PROTECTIVE BARRIERS

A. Protective barriers shall be erected around sensitive areas as designated on the Drawings or as directed by the Engineer. Barriers shall be constructed using bright orange plastic safety fencing (type ESA), per Section 015626, Temporary Fence – Type ESA.

B. Temporary fencing shall be maintained during construction. Except as directed by the Engineer, barriers shall be removed after completion of work.

C. Tree Protection shall be erected around trees where standard ESA at the dripline is not feasible, as designated on the Drawings or directed by the Engineer.

3.6 BULLETIN BOARD

A. Provide a bulletin board at the project site, or in a location approved by the Engineer. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and other items required to be posted.

3.7 CHAIN LINK FENCING

A. Chain link posts:

1. Space as 10 foot on center, maximum.
2. Drive posts, set in holes and backfill, or anchor in precast concrete blocks.
3. For soft and unstable ground conditions, cast concrete plug around post.
4. Posts over pavement: Use steel post plates or precast concrete blocks.
5. Gate posts: Use bracing or concrete footings to provide rigidity for accommodating size of gate.

B. Fabric: Securely attach to posts.

C. Gates: Install with required hardware.

D. Maintain fencing in good condition. If damaged, immediately repair.

E. Removal:

1. When Temporary Fence is no longer required, as determined by the Engineer, it shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the State Specifications, except when reused as provided in this section.
2. Holes caused by the removal of Temporary Fence shall be backfilled in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the State Specifications.

3.8 STAGING AREAS

A. General. Staging areas at the project site are provided for the Contractor's use and are shown on the Drawings. By making these areas available to the Contractor, the Engineer, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, subcontractors, or any individual or organization connected with the project.

B. Alternative Staging Areas. Alternative sites must be acceptable to District, and the Contractor must make all arrangements for their use at the Contractor's expense, and in accordance with all local, State and Federal regulations.

C. Additional Storage Areas. Should the Contractor require space in addition to that available on-site, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site, and shall provide the Engineer a copy of the letter of authorization for storage from the Owner.

3.9 DUST CONTROL

A. The Contractor shall be responsible for the control of dust within the limits of the project at all times. The Contractor shall take whatever steps are necessary to eliminate the nuisance of blowing dust. Responsibility for any damage to property, crops, or orchards from dust caused by the Contractor's operations shall be borne by the Contractor.

B. Dust Control. Periodically, water or otherwise treat access roads and haul roads, as required to suppress dust. Cover or control water content of earthen materials being hauled, as required to control dust emissions. Cover or otherwise stabilize soil stockpiles to prevent erosion by wind.

C. Cleanup. The Contractor shall keep all streets, roadways, and easements, as well as all ground adjacent to the project site, clean and free of dust, mud and debris resulting from the Contractor's operations. Daily cleanup throughout the project shall be required as the Contractor progresses with the work. Spillage of earth, gravel, concrete, asphalt, or other

materials resulting from hauling operations along or across any public street or private driveway or access road shall be removed immediately by the Contractor.

3.10 HAZARDOUS MATERIALS CONTROL AND SPILL PREVENTION PLAN

A. General. Before starting work on the project, the Contractor shall submit for acceptance by the Engineer a Hazardous Materials Controls and Spill Prevention Plan. The Plan shall include provisions for preventing hazardous materials from contaminating soil or entering water courses and shall establish a Spill Prevention and Countermeasure Plan.

B. Facilities. Provide staging and storage areas for equipment, as required to contain contaminants away from water courses. Provide a contained, locked storage facility for fuels, lubricants, construction chemicals and other hazardous materials and supplies stored at site. Provide a lined pit for concrete washdown, located where spills or overflow cannot enter nearby watercourses or storm drains. The pit shall be located a minimum of 75 feet from any flowing watercourse.

C. Equipment Maintenance. Clean and maintain equipment to prevent any leakage of fuel and lubricants. Establish a designated equipment refueling area. All fueling and maintenance of vehicles and other equipment and staging area shall occur at least 75 feet from any riparian habitat or water body.

D. Spills Countermeasures. Isolate work areas during in-water construction activities by using oil containment booms. Maintain a supply of oil booms, sorbent pads and other supplies to contain and clean spills. Contain and cleanup any hazardous material spills immediately and notify Engineer.

3.11 CONSTRUCTION SITE HOUSEKEEPING

A. Remove rubbish, trash, and debris from site on a regular basis. Transport and dispose of all rubbish and debris in accordance with all local regulations. Maintain staging area in an orderly manner. Regularly clean mud and debris, resulting from work at the site, from roadways; per SWRCB General Permit governing pollution from construction activities, sweeping and washing construction site sediment tracked onto roadways into roadside ditches is a violation. Cleanup and dispose of all concrete debris and washings when concrete work is complete.

3.12 PROTECTION OF EXISTING IMPROVEMENTS

A. Existing facilities, utilities, and property shall be protected from damage resulting from the Contractor's operations. Roadways and other improved surfaces shall be protected from damage by vehicles with tracks or lugs. Any damage resulting from the Contractor's operations shall be repaired by the Contractor to the condition which existed prior to the damage, and to the satisfaction of the Engineer, at no additional cost to the Owner.

3.13 RESTORATION OF STRUCTURES AND SURFACES

A. Structures, Equipment, and Pipework. The Contractor shall remove such existing structures, equipment, and pipework as may be necessary for the performance of the work, and shall rebuild, or replace, the items thus removed in as good a condition as found. Contractor shall repair any existing structures that were damaged as a result of the Work.

B. Roads and Streets. Roadways used by the Contractor for hauling materials, equipment, supplies, etc., shall be cleaned and repaired if the condition of the roadway is damaged, or otherwise affected, due to the Contractor's operations.

C. Curbs, Gutters, Driveways, and Sidewalks. All curbs, gutters, driveways, sidewalks, and similar structures that are broken, or damaged, by the installation of the work shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of materials with the same finish, and in not less than the same dimensions as to original work. Repairs shall be made by removing and replacing the entire portions between joints or scores, and not merely refinishing any damaged part. All restoration work shall match the appearance of the existing improvements, as nearly as possible.

D. Cultivated Areas and Other Surface Improvements. All cultivated and natural areas, either agricultural or lawns, and other surface improvements which are damaged by actions of the Contractor, shall be restored, including roadside drainage ditches, as nearly as possible, to their original conditions.

3.14 STORAGE OF MATERIALS AND EQUIPMENT

A. Materials and equipment shall be stored so as to ensure the preservation of their quality and fitness for the work. Stores of equipment and materials shall be located so as to facilitate inspection. The Contractor shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment, supplied by the Contractor, until completion and final acceptance of the Work by the Owner.

3.15 TRAFFIC CONTROL

A. General. The Contractor shall be responsible for public safety and traffic control at all times.

B. The Contractor shall furnish, install, and maintain temporary construction warning signs, flaggers, barricades, and other devices necessary to safeguard the general public and the work, and to provide for the safe and proper routing of all vehicular and pedestrian traffic within and through the limits of the project during the performance of the work.

C. Traffic Control Plan. The Contractor will provide a traffic control plan to the Engineer for review and approval prior to project construction including: access points to Bear Creek Road, staging areas, dump sites, operating hours, project duration, scheduling and phasing, and total number of construction vehicles and their respective haul routes, per project phase.

D. All work shall comply with the Caltrans Manual on Uniform Traffic Control Devices (current edition), available on the internet at:

E. http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2010/Part6.pdf

F. Contractor to prepare and submit to the District for approval, a written traffic control plan. The plan shall be submitted at least two weeks prior to construction. It shall be the sole responsibility of the Contractor to coordinate with the County of Santa Clara and obtain necessary approvals.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Work under this section will be measured for payment on a lump sum basis.

4.2 PAYMENT

A. The lump sum contract price for Construction Facilities and Temporary Controls, also known as Mobilization and Demobilization**,** will include full compensation for the furnishing of all labor,

materials, tools, equipment, administrative costs, and incidentals for mobilization; demobilization; and temporary facilities and controls.

B. Payment will be made under:

Pay Item	Pay Unit
Mobilization & Demobilization	Lump Sum

END OF SECTION

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SECTION 015626
TEMPORARY FENCE – TYPE ESA

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SECTION 015626
TEMPORARY FENCE – TYPE ESA

1. GENERAL

1.1 DESCRIPTION

A. Work under this section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, and remove Temporary Fence – Type ESA , as shown on the Drawings, as specified, or as otherwise directed by the Engineer.

1.2 RELATED SECTIONS

1. Section 015000, Mobilization
2. Section 311100, Clearing and Grubbing
3. Section 312316, Stripping and Excavation

1.3 REFERENCES

A. State of California, Department of Transportation (CALTRANS) State Standard Specifications, current edition

1.4 SUBMITTALS

A. Submit to the Engineer, for review, the following:

1. Manufacturer's data for proposed fencing fabric.
2. Manufacturer's data or descriptive literature for proposed fence posts.

2. PRODUCTS

2.1 MATERIALS

A. High Visibility Fabric. High visibility fabric shall be machine produced, orange colored mesh manufactured from polypropylene or polyethylene. High visibility fabric may be made of recycled materials. Materials shall not contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. High visibility fabric shall be fully stabilized ultraviolet resistant and a minimum of four feet in width with a maximum mesh opening of 2" x 2". High visibility fabric shall be furnished in one continuous width and shall not be spliced to conform to the specified width dimension.

B. Posts. Posts for temporary fence (Type ESA) shall be of one of the following:

1. Wood posts shall be fir or pine, shall have a minimum cross section of 2" x 2", and a minimum length of 5.25 feet. The end of the post to be embedded in the soil shall be pointed. Wood posts shall not be treated with wood preservative.
2. Steel posts shall have a "U," "T," "L," or other cross sectional shape that resists failure from lateral loads. Steel posts shall have a minimum weight of 0.75 pounds per linear foot and a minimum length of 5.25 feet. One end of the steel post shall be pointed and the other end shall have a high visibility colored top.

C. Fasteners. Fasteners for attaching high visibility fabric to the posts shall be as follows:

1. The high visibility fabric shall be attached to wooden posts with commercial quality nails or staples, or as recommended by the manufacturer or supplier.
2. Tie wire or locking plastic fasteners shall be used for attaching the high visibility fabric to steel posts. Maximum spacing of tie wire or fasteners shall be 24 inches along the length of the steel post.

D. Used materials may be installed provided the used materials conform to these Specifications.

3. EXECUTION

3.1 INSTALLATION

A. All fence construction activities shall be conducted from the work side of the ESA as shown on the Drawings or as flagged in the field by the Engineer.

B. Posts shall be embedded in the soil a minimum of 16 inches. Post spacing shall be eight feet maximum from center to center and shall at all times support the fence in a vertical position.

C. Temporary fence (Type ESA) shall be constructed prior to clearing and grubbing work, shall enclose the foliage canopy (drip line) of protected plants, and shall not encroach upon visible roots of the plants.

D. Temporary fence (Type ESA) shall be located so that it is clearly visible, as determined by the Engineer.

3.2 MAINTENANCE

A. Temporary fence (Type ESA) that is damaged during the progress of the work shall be repaired or replaced by the Contractor the same day the damage occurs.

3.3 REMOVAL

A. When Type ESA fence is no longer required, as determined by the Engineer, it shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the State Specifications, except when reused as provided in this section.

B. Holes caused by the removal of temporary fence (Type ESA) shall be backfilled in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the State Specifications.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary Fence – Type ESA will be measured by the linear foot of Temporary Fence – Type ESA installed at the locations indicated on the Drawings, as specified, or as directed by the Engineer.

B. Temporary Fence that the Contractor installs for the implementation of the SWPPP, in addition to that shown on the Drawings or Directed by the Engineer, shall not be separately measured for payment.

4.2 PAYMENT

A. Temporary Fence – Type ESA will be paid for at the contract price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to install, maintain throughout the construction, and to remove Temporary Fence – Type ESA after site stabilization.

B. Temporary Fence-Type ESA that the Contractor installs for the implementation of the SWPPP, in addition to that shown on the Drawings, shall be paid for under Storm Water Pollution Prevention Plan Implementation, Section 015723.

C. Payment shall be made under:

Pay Item	**Pay Unit**
Temporary Fence – Type ESA	Linear Foot

END OF SECTION

SECTION 015713
TEMPORARY EROSION CONTROL AND BMP'S

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SECTION 015713
TEMPORARY EROSION CONTROL AND BMP'S

1. GENERAL

1.1 DESCRIPTION

A. This work shall consist of temporary erosion control and water or air quality control measures, devices, and BMPs that may be shown on the Drawings, and as specified in the Contract Documents, Project Permit(s), Project SWPPP, Standard Specifications, these Technical Specifications, or as directed by the Engineer during the life of the contract. Temporary erosion control measures and other BMP's will also be required at staging/storage areas utilized during project construction. Said work is intended to provide prevention, control, and abatement of water and air pollution within the limits of the project and to minimize damage to the work, adjacent properties, streams or other bodies of water.

B. Attention is directed to the "Storm Water Pollution Prevention Plan". As part of the SWPPP certification and submittal process, the Contractor shall submit two (2) copies of any proposed revisions to the applicable Project Plan sheets for Temporary Erosion Control and the Dewatering and/or Diversion operations. Do not start work until the SWPPP, applicable plan sheets, schedules and methods of operation for temporary pollution control are reviewed and accepted by the Engineer and RWQCB. The project must satisfy the requirements of all permit(s) issued for the project. During the course of project construction, cooperate with the Engineer, the District and other regulatory officials and take immediate action as directed to protect water bodies and sensitive areas, and provide for erosion or other pollution control.

C. Installation and maintenance of temporary erosion control measures, devices and BMPs shall conform to the requirements as shown on the Drawings stated within this section, the SWPPP, and regulatory requirements.

1.2 RELATED SECTIONS

1. Section 015626, Temporary Fence – Type ESA
2. Section 015713.02, Silt Fence
3. Section 015713.01, Fiber Roll
4. Section 312319, Dewatering
5. Section 015000, Mobilization
6. Section 015723, SWPPP Implementation

1.3 SUBMITTALS

A. Not Used

2. PRODUCTS

2.1 NOT USED

3. EXECUTION

3.1 GENERAL

A. Install temporary soil stabilization materials for water pollution control in all disturbed work areas that are considered inactive (i.e. excess of 14 days) or before forecast storm events. Should any temporary erosion control of this nature be required elsewhere as directed by the Engineer and/or regulatory agencies, install them within 48 hours of notification. Where applicable and upon acceptance of the Engineer, furnish and apply/install temporary mulch, temporary hydraulic mulch, temporary erosion control blankets, or temporary covers in conformance with the Standard Specifications and these Technical Specifications. Materials and construction methods shall comply with the Standard Specifications and these Technical Specifications.

B. During project construction, the contractor shall be responsible for implementing appropriate and necessary erosion control measures to minimize storm water runoff from the construction site, pursuant to applicable regulations and permits. The following strategies to ensure that storm water pollution is prevented shall be employed:

1. Minimize erosion and sedimentation during construction.
2. Eliminate pollution of storm runoff by chemicals and materials used in the construction process.
3. All temporary erosion and sediment controls shall be in place prior to the commencement of construction as well as at the end of each work day if 30% or greater chance of rail. At a minimum, silt fences, or equivalent apparatus, shall be installed at the perimeter of the construction site to prevent construction related runoff and/or sediment from entering into the watercourses.
4. The Contractor (and Permitee) shall monitor weather forecasts and take appropriate precautions in advance of storm events.

C. Following grading, exposed bare slopes and soil should be planted or covered as soon as possible with erosion resistant vegetation or erosion control fabric installed in accordance with the manufacturerer's Specifications.

D. Newly exposed soils outside of the road running surface greater than 50 square feet (sf) and with less than 80% ground coverage of natural vegetation shall be treated in order to reduce the potential for short-term sheet and rill erosion.

1. Seed and mulch freshly graded / disturbed areas.
2. Use native grass seed mix (provided by District).
3. Spread seed mix by hand after all grading has been completed, before spreading straw or mulch on the site.

4. Seed mix should be spread at a rate of 60 lbs/acre. Lightly rake seed into soil and cover with 2 inches of straw.
5. Seed may not be applied until late September or early October to promote successful germination.

E. Straw Mulch:

1. The straw mulch is to be applied after seeding.
2. Use only certified weed-free straw; often it is rice straw. Documentation of purchase must be provided prior to spreading on site.
3. Spread straw 2" thick with 90% ground coverage or better.

F. Native Mulch and Slash

1. Where feasible and available, native mulch or slash shall be used instead of straw much.
2. Native vegetation cleared at work sites shall be stockpiled and re-applied on the disturbed ground surface as directed by the ENGINEER or District.
3. Spread slash shall be lopped or tractor crushed to promote good contact with the soil surface.

G. Erosion Control Blanket:

1. Exposed slopes greater than 2H:1V and where exposed shall be covered with approved erosion control blanket (Tensar Rollmax C125BN or equivalent) in accordance with the manufacturer's recommendations and as directed by the ENGINEER.

H. Fiber Roll:

1. Install fiber rolls parallel to the contour where bare slopes exceed 15 feet in length in downslope direction and as directed by the ENGINEER.

I. Unnecessary grading and disturbance of soil shall be avoided.

J. The contractor shall have tools, equipment, and materials to install the erosion control measures depicted on the Drawings, at the job site before beginning that operation.

K. Throughout project construction, the contractor is responsible for maintaining all slopes to prevent erosion during or after a rainfall event.

L. Disturbance of the site should be kept to a minimum to prevent erosion. Unnecessary grading and disturbing of soil shall be avoided.

M. During the winter grading period (after October 15th and prior to April 15th), the erosion control measures shown here shall be in place at all times in areas where soils are stockpiled, areas that have been disturbed by grading or are downslope from those areas. During the remainder of the year (after April 15th and prior to October 15th), these erosion control measures shall be put in place whenever the start of any rain causes overland flow across or along the disturbed surface, or when the National Weather Service forecast calls for a greater than 30% chance of rain, a flash flood warning, or a flash flood watch, and when directed by the ENGINEER, ENGINEER or

Owner. The Contractor (and Permitee) shall monitor weather forecasts and take appropriate precautions in advance of storm or events.

N. Erosion control Best Management Practices (BMP's), including straw bale barriers, silt fences, fiber rolls (wattles), gravel bag sediment barriers and/or other means shall be employed to prevent turbid runoff from discharging into ponds or creeks.

O. Earthmoving equipment shall be inspected prior to leaving the site and, if necessary, cleaned to prevent sediment transport off-site.

P. The site shall be inspected no more than 4 days after the first rain. If the inspection reveals that areas need to be repaired because the seed has not taken or erosion has taken place, these areas shall be re-seeded and/or repaired. The permitee is responsible to retain a civil ENGINEER or an authorized individual for inspection and modification of the erosion control devices, as necessary during the rainy season.

Q. After construction, inspect and clean the drainage systems as needed and at least once a year prior to the rainy season. Perform period inspections during the winter season and remove any debris that is blocking operation of the drainage system. Look for debris or soil that is blocking runoff flow or plugging inlets and remove. Check energy dissipaters for evidence of blockage at the adjacent storm drain pipe outlet and unplug as needed. Check the ground surface in the vicinity of the energy dissipaters for evidence of erosion and repair as needed.

R. Stockpiles. Maintain a temporary cover on all stockpiles at all times and install and maintain appropriate BMPs (sediment logs, filter fence, check dams, etc.) around the perimeter at the base of stockpile to control the potential runoff of any loose sediments and pollutants. Whenever a temporary cover is removed to perform other work, replace and secure the temporary cover within one (1) hour of stopping work.

3.2 MAINTENANCE

A. Maintain all temporary erosion control measures, devices, and/or BMPs placed in the work for the duration of the project. Maintenance includes all Manufacturer recommendations, and includes but is not limited to the following:

1. Immediately repair upon discovery damage to any temporary erosion control devices and/or BMPs during the course of the project at the Contractor’s expense.
2. Inspect temporary erosion control devices and/or BMPs routinely, immediately after each rainfall event, and at least daily during prolonged rainfall events. Make required repairs immediately.
3. Inspect construction limit and tree protection fencing daily and repair, secure, and/or replace as necessary to maintain and preserve its intended purpose.
4. Routinely inspect all signage as required for the project and repair or replace upon discovery of damage, vandalism, and/or missing parts.
5. Should the filter fence fabric decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, replace fabric promptly.

6. Should a sediment log decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, replace sediment log promptly.
7. Replace single or group of gravel bag(s) when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out.
8. Routinely inspect stakes and/or rope used to secure a sediment log in place and repair as necessary if found to be loose or ineffective.
9. Repair or replace damaged temporary gravel bag berm (or other measures which require gravel bags per the Project Drawings, Project Permits, these Technical Specifications and the SWPPP) on the same day when the damage occurs or is discovered.
10. Remove sediment deposits and other debris when they reach approximately one-half the height of the sediment barrier (or as recommended by the Manufacturer) and dispose of in a manner acceptable to the Engineer, and in conformance with the SWPPP.
11. Maintain temporary gravel bag berm (or other measures which require gravel bags per the Project Drawings, Project Permits, these Technical Specifications and the SWPPP) to provide a sediment holding capacity of approximately one-third the height of the gravel bag berm above the ground. When sediment exceeds this height or when directed by the Engineer, remove and dispose of sediment in a manner acceptable to the Engineer, and in conformance with the SWPPP.
12. Remove and dispose of sediment deposits remaining in place after the temporary erosion control measure and/or BMPs is no longer required in a manner acceptable to the Engineer, and in conformance with the SWPPP.

3.3 DUST CONTROL

A. General. Before starting work on the project, submit a Dust Suppression Plan for acceptance by the Engineer. The Contractor shall be responsible for the control of dust within the limits of the project at all times. Take whatever steps are necessary to eliminate the nuisance of blowing dust. Responsibility for any damage to property, crops, or orchards from dust caused by the Contractor's operations shall be borne by the Contractor.

B. Dust Control. Periodically, water or otherwise treat access roads and haul roads, as required to suppress dust. Cover or control water content of earthen materials being hauled, as required to control dust emissions. Cover or otherwise stabilize soil stockpiles to prevent erosion by wind.

C. Cleanup. Keep all streets, roadways, and easements, as well as all ground adjacent to the project site, clean and free of dust, mud and debris resulting from the Contractor's operations. Daily cleanup throughout the project shall be required as the Contractor progresses with the work. Immediately remove spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public street or private driveway or access road.

3.4 HAZARDOUS MATERIALS CONTROL AND SPILL PREVENTION PLAN

A. General. Before starting work on the project, submit for acceptance by the Engineer a Hazardous Materials Controls and Spill Prevention Plan. The Plan shall include provisions for preventing hazardous materials from contaminating soil or entering water courses and shall establish a Spill Prevention and Countermeasure Plan.

B. Facilities. Provide staging and storage areas for equipment, as required to contain contaminants away from water courses. Provide a contained, locked storage facility for fuels, lubricants, construction chemicals and other hazardous materials and supplies stored at site. Provide a lined pit for concrete washdown, located where spills or overflow cannot enter nearby watercourses or storm drains. The pit shall be located a minimum of 75 feet from any flowing watercourse.

C. Equipment Maintenance. Clean and maintain equipment to prevent any leakage of fuel and lubricants. Establish a designated equipment refueling area. All fueling and maintenance of vehicles and other equipment and staging area shall occur at least 75 feet from any riparian habitat or water body.

D. Spills Countermeasures. Isolate work areas during in-water construction activities by using oil containment booms. Maintain a supply of oil booms, sorbent pads and other supplies to contain and clean spills. Contain and cleanup any hazardous material spills immediately and notify Engineer.

3.5 CONSTRUCTION SITE HOUSEKEEPING

A. Remove rubbish, trash, and debris from site on a regular basis. Transport and dispose of all rubbish and debris in accordance with all local regulations. Maintain staging area in an orderly manner. Regularly clean mud and debris, resulting from work at the site, from roadways; per SWRCB General Permit governing pollution from construction activities, sweeping and washing construction site sediment tracked onto roadways into roadside ditches is a violation. Cleanup and dispose of all concrete debris and washings when concrete work is complete.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary Erosion Control and BMP's will not be separately measured for payment. All Costs in connection with Temporary Erosion Control and BMP's shall be considered incidental to the lump sum contract price paid for SWPPP Implementation, under Section 015723.

4.2 PAYMENT

A. Section not used.

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SECTION 015713.01
FIBER ROLL

1. GENERAL

1.1 DESCRIPTION

A. Work under this Section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, remove and dispose of Fiber Roll, as shown on the Drawings, as specified in the Storm Water Pollution Prevention Plan, as specified herein, or as otherwise directed by the Engineer.

B. Fiber Roll shall be furnished, installed, and maintained at the locations shown on the Drawings, as specified, and as indicated on the approved Storm Water Pollution Prevention Plan. Fiber Roll shall be installed on excavation and embankment slopes and other disturbed soil areas, active or non-active.

C. Related Sections

1. Section 015000, Mobilization
2. Section 015723, Stormwater Pollution Prevention Plan Development and Implementation
3. Section 312316, Stripping and Excavation
4. Section 313519.16, Slope Protection Fabric

1.2 SUBMITTALS

A. Submit to the Engineer, for review, the following manufacturer's data and Certification's:

1. A certificate stating the name of the Fiber Roll manufacturer, product name, style compositions of filaments or yarns and other pertinent information to fully describe the geotextile, along with the manufacturer's certification of compliance with the material specifications contained herein.

2. PRODUCTS

2.1 MATERIALS

A. Fiber Roll materials may generally be either of the two types indicated below, unless coir rolls are specifically specified on the Drawings. Where coir rolls are indicated on the drawings, straw rolls will not be allowed as a substitute.

B. Coir Roll. Coir Roll shall be:

1. A pre-manufactured roll made from coconut fiber encapsulated within a biodegradable jute, sisal, or coir fiber netting. The use of plastic/photodegradable netting shall not be allowed. The netting shall have a minimum durability of 2 years after installation. The netting shall be secured tightly at each end of the roll. Rolls shall be between eight inches and 12 inches in diameter. Rolls between eight inches and ten inches in diameter shall have a minimum weight of one pound per linear foot and a minimum length of 20 feet. Rolls between ten inches and 12 inches in diameter shall have a minimum weight of three pounds per linear foot and a minimum length of 10 feet.

C. Straw Roll. Straw Roll shall be:

1. A pre-manufactured roll made from 100% weed free rice straw and wrapped in a 100% biodegradable tubular 7 oz. Plain Burlap liner. The burlap is Medium Weight Natural Burlap with a 9 X 8 Warp & Fill, and a minimum weight of 7 oz. per square yard. Plastic netting will not be accepted as an alternate.
2. 9-inch rolls shall have a mimimum weight of approximately 1.6 pounds per foot.
3. 12-inch rolls shall have a mimimum weight of approximately 3.8 pounds per foot.

D. Stakes. Wood stakes shall be a minimum of 2" x 4" x 24" (ripped diagonally) for Type 1 installation or a minimum of 1" x 2" x 24" in size for Type 2 installation. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots and other defects which would render them unfit for the purpose intended. Metal stakes shall not be used.

E. Rope. Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 1/4 inch.

3. EXECUTION

3.1 INSTALLATION

A. Fiber Roll shall be installed as follows:

B. Type 1: Furrows shall be constructed to a depth between three inches and four inches, and to a sufficient width to hold the Fiber Roll. Soil excavated from the trench shall be placed on the uphill or flow side of the roll to prevent water from undercutting the roll. Stakes shall be driven through the center of the roll (perpendicular to the finished grade) at 36 inches apart along the length of the Fiber Roll and stopped at 12 inches from each end of the rolls. Stakes shall be driven to between two and three inches above the top of the roll.

C. Type 2: Rope and notched stakes shall be used to restrain the Fiber Rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the Fiber Roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the Fiber Roll tightly to the slope. Furrows will not be required.

D. Fiber Roll shall be placed 10 feet apart along the slope for slope inclination (horizontal:vertical) of 2:1 and steeper, 15 feet apart along the slope for slope inclination between 2:1 and 4:1, 20 feet apart along the slope for slope inclination between 4:1 and 10:1, and a maximum of 50 feet apart along the slope for slope inclination of 10:1 and flatter.

E. The bedding area for the Fiber Roll shall be cleared of obstructions including rocks, clods, and debris greater than one inch in diameter before installation.

F. Fiber Roll shall be installed approximately parallel to the slope contour and the terminus of rows shall be angled up-slope at 45 degrees for a distance of three feet. Where fiber rolls meet, provide an overlap of two feet, with adjacent rolls tightly abutting each other.

G. Fiber Roll shall be installed prior to seeding where used without slope protection fabric.

H. Fiber roll shall be installed over fabric (after seeding) where slope protection fabric is specified.

3.2 MAINTENANCE

A. The Contractor shall inspect all Fiber Roll immediately after each rainfall, and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the Contractor.

B. The Contractor shall also make a daily review of the location of Fiber Roll in areas where construction activities have altered the natural contour and drainage runoff to ensure that the Fiber Rolls are properly located for effectiveness. Where deficiencies exist as determined by the Engineer, additional Fiber Rolls shall be installed as directed by the Engineer.

C. Damaged or otherwise ineffective Fiber Roll shall be repaired or replaced promptly. Fiber Roll shall be maintained to disperse concentrated water runoff and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping Fiber Roll shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected. Fiber Roll shall be repaired or replaced within 24 hours of identifying the deficiency.

3.3 REMOVAL

A. Fiber Rolls shown on the Drawings shall remain in place after project completion, unless otherwise specified, and be allowed to naturally degrade.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Coir Roll will be measured by the linear foot of Coir Roll installed at the locations indicated on the Drawings, as specified, or as directed by the Engineer.

B. Straw Roll will be measured by the linear foot of Straw Roll installed at the locations indicated on the Drawings, as specified, or as directed by the Engineer

C. Fiber Roll that the Contractor installs for the implementation of the SWPPP, in addition to that shown on the Drawings, shall not be separately measured for payment.

4.2 PAYMENT

A. Fiber Roll will be paid for at the contract price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to install, maintain throughout the construction, and, where specified, to remove Fiber Roll after site stabilization.

B. Fiber Roll that the Contractor installs for the implementation of the SWPPP, in addition to that shown on the Drawings, shall be paid for under Storm Water Pollution Prevention Plan Implementation, Section 015723.

C. Fiber Rolls required or used on a short term basis that are not permanently staked in place or are anticipated to be moved on a daily or routine basis (such as areas immediately adjacent to trench excavations, temporary stockpiles, active areas for soil processing/screening operations, spill containment devices, etc.) shall be considered as included in prices paid for the various contract items of work involved, and no additional compensation will be allowed.

D. Payment shall be made under:

Pay Item	Pay Unit
Coir Roll	Linear Foot
Straw Roll	Linear Foot

END OF SECTION

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SECTION 015723
STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IMPLEMENTATION

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of implementation of the approved Storm Water Pollution Prevention Plan (SWPPP), as specified in the SWPPP, as specified in this Section, and in compliance with the requirements of the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction and Land Disturbance Activities, Water Quality Order No. 2009-0009-DWQ, General Permit No. CAS000002, adopted September 2, 2009, and associated amendments (hereafter Construction General Permit (CGP).

B. The project is currently specified as a Risk Level 1, based on a completion date of earlier than October 23rd. Attention is directed to Attachments C and D of the CGP, which identify monitoring and reporting requirements for Risk Levels 1 and 2. Risk Level 2 projects are required to meet the reporting and monitoring requirements of Risk Level 1 projects (Attachment C) in addition to those requirements for Risk Level 2 Projects (Attachment D).

C. The Contractor shall be responsible for penalties assessed on the Contractor or the Owner as a result of the Contractor's failure to comply with the provisions in the Construction General Permit or with the applicable provisions of the Federal, State, and local regulations and requirements. Penalties as used in this section shall include fines, penalties, and damages, whether proposed, assessed, or levied against the Owner or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

D. The Contractor shall perform the role of Qualified SWPPP Practitioner (QSP), as outlined in the SWPPP.

E. The Owner or their designated representative will perform the role of Qualified SWPPP Developer (QSD). Where referenced in this Section, the words “Engineer” and “QSD” are synonymous.

F. Nothing in the terms of the Contract nor in these Technical Specifications shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.

G. All areas of exposed earth created by the Contractor, beyond what is shown on the Drawings, and referred to in the Technical Specifications or the SWPPP, shall also be subject to the provisions of this Section, except that the Contractor shall be fully responsible for all additional costs and liabilities associated with SWPPP Implementation in these areas.

H. The SWPPP will be periodically amended by the QSD to reflect current site conditions. The Owner will not be liable to the Contractor for Contractor's failure to accept all or any portion of an amended or revised SWPPP program, nor for any delays to the Work due to the Contractor's failure to implement the amended SWPPP.

I. The measures outlined in the SWPPP reflect the minimum requirements of the CGP. The Contractor is responsible to perform all additional work, beyond what is shown on the Drawings or the approved SWPPP at the time the contract is awarded, as necessary to meet changing or unforeseen site conditions and to comply with the CGP, at no additional cost to the Owner.

1.2 RELATED SECTIONS

1. Section 015000, Mobilization
2. Section 015713, Temporary Erosion Control and BMPs
3. Section 312319, Dewatering
4. Section 0157130.2, Silt Fence
5. Section 015713.01, Fiber Roll
6. Section 015626, Temporary Fence – Type ESA
7. Section 329000, Planting
8. Section 329200, Seeding

1.3 REFERENCES

A. State Water Resources Control Board (SWRCB) Order No. R2-2009-0009-DWQ, NPDES General Permit No. CAS000002, Storm Water Discharges Associated With Construction and Land Disturbance Activities, September 2, 2009, and associated amendments, hereafter Construction General Permit (CGP).

B. The California Stormwater Quality Association (CASQA) "Stormwater Best Management Practice Handbook Portal: Construction" including Appendix B, "Storm Water Pollution Prevention Plan Outline" and Appendix D, "Field Monitoring and Analysis Guidance" and addenda thereto issued up to, and including, the date of advertisement of the Project, hereafter referred to respectively as the "Manuals." Copies of the Manuals and the National Pollutant Discharge Elimination System (NPDES) permits may be obtained by accessing the CASQA's Internet Web Site portal at:

http://www.cabmphandbooks.com/

C. Approved Project Storm Water Pollution Prevention Plan (SWPPP).

1.4 SUBMITTALS

A. The Engineer's review and approval of Contractor's submittals shall not waive any contract requirements and shall not relieve the Contractor from complying with the CGP, the SWPPP, or Federal, State and local laws, regulations, and requirements.

B. Submit to the Engineer, for review, Manufacturer's product information for materials proposed for use on site for implementation of the SWPPP.

C. The **Owner's Representative** will submit permit registration documents (PRDs) necessary for coverage under the Construction General Permit (CGP), including but not limited to: the Notice of Intent (NOI), the SWPPP, appropriate fees, and other documents required by the CGP.

D. Prior to start of work, the Contractor shall submit for approval the names and qualifications of qualified staff designated by the Contractor to implement the SWPPP, defined by the CGP as follows:

1. Qualified SWPPP Practitioner (QSP): The Contractor's QSP shall have obtained the required registrations/certifications listed in Section VII of the CGP and successfully completed the SWRCB sponsored or approved QSP training course and QSP exam.

2. If the QSP is no longer employed by the Contractor or is no longer associated with the Work, the Contractor shall notify the Owner's Representative within 24 hours, designate a replacement within 48 hours, and update the Storm Water Multi-Application & Reporting System (SMARTS) within 72 hours. The replacement QSP shall have the required QSP registrations/certifications listed herein.

E. Submit to the Engineer, completed authorization form with name of proposed Data Submitters, to obtain approval by the Owner's Representative, acting as the legally responsible party (LRP), to upload data electronically into SMARTS. The quarterly inspection reports, Annual Reports, and all sampling results shall be uploaded onto SMARTS by the QSP or designated Data Submitter, following Owner Representative's review and approval.

F. QSP shall prepare an Annual Report summarizing corrective actions, lab reports, sampling and analyses, and any corrective actions not implemented as per Section XVI of the Construction General Permit covering each yearly period in accordance with the permit conditions. QSP shall upload the Annual Report to SMARTS by August 15th, or within one week of final site stabilization, and shall immediately notify the QSD and LRP of upload. LRP or their designated representative shall review and provide comments within one week of upload to SMARTS. QSP shall address comments and revise report as necessary, prior to August 27th, to allow LRP's final review and acceptance prior to Sept. 1st deadline.

G. The SWPPP shall contain a detailed schedule of anticipated construction activities. The QSP shall update the schedule monthly or as directed by the Engineer, and shall submit updates to the QSD for incorporation into the amended SWPPP.

H. The SWPPP shall be amended by the QSD in accordance with the Construction General Permit, such as whenever there is a proposed field modification which may affect the site drainage patterns or potential discharge of pollutants to surface waters, groundwater, or a separate municipal storm sewer system. The changes shall be recorded by amending the SWPPP in accordance with the regulatory provisions for SWPPP amendment. The SWPPP shall also be amended to incorporate new measures whenever existing measures are deemed ineffective by the QSP, the QSD or regulatory agency inspectors. SWPPP amendments shall be performed and submitted to SMARTS by the QSD. The Contractor's designated QSP shall submit written notification of field modifications to the QSD for his use in amending the SWPPP, within 48 hours of their implementation.

I. If directed by the Engineer or requested in writing by the Contractor and approved by the Engineer, changes to the pollution control measures specified in the SWPPP will be allowed, provided they comply

with the CGP. The Contractor's designated QSP shall submit written documentation of these changes to the QSD for amendments to the SWPPP, within 48 hours of their implementation.

J. The QSP shall perform all sampling and analyses required by the CGP and the SWPPP. QSP shall sample runoff regardless of whether the total rainfall exceeds the CGP qualifying storm event, but only needs to report the readings taken during a qualifying storm. Sampling and testing of water quality (discharges) shall be performed in accordance with sampling and analysis requirements of the CGP. In the event of exceedance, QSP shall immediately notify the QSD, and initiate corrective action. Documentation of such an event shall be submitted to QSD in writing within 24 hours.

K. For potential violations of the NPDES permits, Contractor shall notify the Owner's Representative and initiate corrective action, documenting activity as required by law.

L. The Contractor shall keep a copy of the approved SWPPP at the job site. The SWPPP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Engineer.

M. Contractor shall notify the QSD of any RWQCB inspections within 24 hours of the inspection. The Contractor shall submit written notification to the QSD of any findings by the RWQCB, including verbal warnings.

N. Contractor shall provide all information required to complete the SWPPP within 15 calendar days of when the contract is approved or prior to the issuance of the notice to proceed (whichever is sooner). This information shall include, but not be limited to, the following:

1. List of subcontractors and material suppliers, SWPPP Section 103.2
2. Construction schedule, SWPPP Section 105.1
3. Project Work/Business hours, SWPPP Section 107.4
4. List of sampling equipment (field meters), SWPPP Section 107.6.3
5. Laboratory information, SWPPP Section 107.6.5
6. Identify Data Submitters, SWPPP Appendix B

O. After project initiation, as per the scheduling or deadlines outlined in the SWPPP, the Contractor shall submit to the Owner's Representative all data, reports, and other information required to fulfill the requirements of the SWPPP, which will include but not be limited to, the following:

1. Verification that rain gauge has been installed, Section 107.2.2
2. CSMP Weather Reports, Attachment 1
3. Contractor personnel training for inspectors, and samplers, Section 103.3
4. Rain Event Action Plan (prior to predicted storm event), Section 106.2
5. NAL Exceedance notification to QSD and Approved Signatory and submit to SMARTS within 10 days of conclusion of storm event, Section 107.7.7
6. NAL Exceedance report (if required by Regional Board), Section 107.7.7
7. Non Compliance Report (if required), Section 109.3
8. Annual Report

P. Upon request, the Contractor shall provide copies of all inspection reports for the project to the Owner's Representative within 24 hours of such request.

1.5 QUALITY ASSURANCE

A. Comply with all applicable permits, laws, and the approved SWPPP.

2. PRODUCTS – Not Used

3. EXECUTION

3.1 GENERAL

A. Contractor shall not begin site disturbing activities until the SWPPP has been approved for use, uploaded to SMARTS and a Waste Discharge Identification (WDID) Number received.

B. Implementation of SWPPP measures shall be the first order of business upon site mobilization.

C. The Contractor shall exercise every reasonable precaution to protect the watercourses within the Project area from pollution, including fuels, garbage, oils, chemicals, and other harmful materials, and shall conduct and schedule the operations so as to avoid introduction of these materials into the watercourses, in accordance with the CGP. Contractor shall coordinate water pollution control work with all other Work done on the Contract.

D. The Contractor's designated QSP shall be:

1. Responsible for implementation, repair, upgrades, or maintenance of pollution control measures.
2. Responsible for sampling, monitoring, reporting, and record keeping, as outlined in the SWPPP.
3. Responsible for preparation of Rain Event Action Plans (REAPs)
4. Responsible for turbidity and PH testing..
5. The primary contact for pollution control work.
6. Have authority to mobilize crews to make immediate repairs to pollution control measures.

E. If the QSD or QSP identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately (within 72 hours of identification). The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the QSD in writing, but not later than the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the Project shall be in noncompliance. Attention is directed to the Contract Documents for possible noncompliance penalties.

F. The Contractor shall be responsible for notifying QSD, and conducting emergency response and cleanup in the event contaminated water reaches onsite catch basins, offsite catch basins, ditches, or creeks. All response measures shall be documented, and shall be inspected for effectiveness and maintained in good working order. Ineffective measures shall be repaired or replaced immediately at Contractor's cost and schedule expense.

G. The weather forecast for the appropriate project's zip code shall be monitored and used by the Contractor on a daily basis. If there is any chance of rain forecast within 48 hours, the forecast shall be printed out and

kept with the SWPPP. If the chance of precipitation is predicted to be greater than 50 percent, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation, and monitoring shall increase, as required by law and outlined in the Construction General Permit. For Risk Level II and III locations within the project, a Rainfall Event Action Plan (REAP) shall be prepared as required by the SWPPP. The REAP shall be provided to the QSD within 72 hours of completion.

H. The National Weather Service weather forecast is found at:

http://www.wrh.noaa.gov/mtr/

I. The Contractor shall maintain a rain gage at the site at all times during construction. Rain gage readings shall be recorded daily and provided to the State Representative within 72 hours whenever the daily rainfall total is greater than 0.25 inches per day or whenever the rainfall is a part of a qualifying storm event as defined by the CGP.

J. The Owner will not be responsible for delays caused by the Contractor's failure to conform to the approved SWPPP, this Section, or the CGP. The Owner's Representative may order the suspension of construction operations which create or have the potential to create water pollution, at the sole expense of the Contractor.

K. The Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the State Specifications.

3.2 BEST MANAGEMENT PRACTICES (BMP'S)

A. Contractor shall furnish sufficient personnel, materials and adequate equipment to perform the water pollution control maintenance work immediately and to work continuously until its completion. Water pollution control maintenance work shall consist of maintaining and replacing temporary water pollution control measures throughout the duration of the Contract until permanent stabilization measures are accepted by the Owner. Maintenance work and SWPPP shall be considered as integral functional practices to implement water pollution control.

B. If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Owner's Representative may direct the Contractor to revise its operations and its SWPPP program. Such directions will be in writing and will specify the items of Work for which the Contractor's water pollution control measures are inadequate. No further Work shall be performed on said items until the water pollution control measures are adequate.

C. Contractor shall be responsible throughout the duration of the Project for installing, constructing, inspecting, maintaining, removing and disposing of the water pollution control practices included in the SWPPP, the Drawings, the Technical Specifications, and any amendments thereto. Unless otherwise directed by the Engineer, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of Work ordered in conformance with the Contract Provisions.

Requirements for installation, inspection, maintenance, removal, and disposal of water pollution control practices are specified in the Drawings, the SWPPP, the Manuals, and herein.

D. Implementation of pollution control measures (BMPs) shall conform to the Drawings, the SWPPP, the CGP conditions, and these Specifications.

E. Implementation of water pollution control practices may vary by season. The SWPPP, this Section, and the Manuals shall be followed for control practice selection of year round, rainy season and non-rainy season water pollution control practices.

F. Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 14 days. Non-active areas shall be protected as required within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.

G. Contractor may be directed to apply permanent erosion control in small or multiple units as disturbed soil areas are deemed substantially complete by the QSD.

H. Temporary and permanent BMP's shown on the Drawings represent a mandatory minimum level of treatment. Contractor shall be responsible for these BMP's in addition to all others required by the SWPPP, the CGP or as directed by the Engineer.

3.3 MAINTENANCE, INSPECTION AND REPAIR

A. For all project Risk Levels, the QSP, or a approved substitute designated and trained by the QSP (QSP-substitute) shall inspect the site before a forecast storm (within 48 hours prior to a forecast storm), during the storm (at required intervals during extended rains), and after a storm (not later than 48 hours after rain event). Inspections shall be documented as specified in the SWPPP. Inspection forms shall be provided to the Owner's Representative within 72 hours of a request from the State Representative.

B. Stormwater inspections shall be performed at all active areas and all areas with installed BMPs as required by permit and the SWPPP, and on a minimum weekly basis, year-round by the QSP or individual trained by the QSP. More frequent monitoring is required for rain events.

C. Non-Stormwater inspections shall be performed quarterly by the QSP or QSP-substitute (quarterly inspection time periods are January-March, April-June, July-September, and October-December).

D. The QSP or QSP-substitute shall conduct all inspections, sampling and analyses, as required by the CGP and the SWPPP, at all active areas and all areas with installed BMPs.

E. If the Contractor or the Owner's Representative identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately (within 72 hours of identification). The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the Owner's Representative in writing, but not later than the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the Project shall be in noncompliance.

F. Contractor shall provide Water Pollution Control training as required by the CGP. Documentation of training shall be provided to the Owner's Representative within one week of the training.

G. The QSP shall inspect the pollution control measures to identify their effectiveness and implement repairs as required by the SWRCB.

H. Contractor shall furnish sufficient personnel, materials and adequate equipment to perform the water pollution control maintenance work immediately and to work continuously until its completion. Water pollution control maintenance work shall consist of maintaining and replacing temporary water pollution control measures throughout the duration of the Contract until permanent measures are accepted by the Owner's Representative. Maintenance work and SWPPP shall be considered as integral functional practices to implement water pollution control. Failure to fully comply with the requirements of the Construction General Permit shall subject the Contractor to all fines, damages and job delays incurred due to failure to implement and properly update the SWPPP.

I. If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Owner's Representative may direct the Contractor to revise its operations and its SWPPP program. Such directions will be in writing and will specify the items of Work for which the Contractor's water pollution control measures are inadequate. No further Work shall be performed on said items until the water pollution control measures are adequate and, if also required, a revised SWPPP program has been accepted.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. SWPPP Implementation is a lump sum pay item.

4.2 PAYMENT

A. SWPPP Implementation will be paid for at the contract lump sum price for SWPPP Implementation, which will be considered payment in full for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work necessary to implement and maintain SWPPP measures and controls, including, sampling, analysis, reporting, and maintenance and removal of the measures through the end of the rainy season following completion of construction activities and submittal of the Notice of Termination (NOT).

B. During each estimated period the Contractor fails to conform to the provisions in this section, or fails to implement the control measures (BMPs) shown on the Drawings or specified elsewhere in these Specifications as items of work, the Owner will withhold 25 percent of the payment for that phase of the SWPPP implementation.

C. Withholds for failure to perform SWPPP work will be in addition to all other withholds provided for in the contract. The Owner will return performance-failure withholds in the progress payment following the correction of noncompliance.

D. Include Item 074019 "Prepare Storm Water Pollution Prevention Plan."

E. Separate payment will not be made for implementation of BMPs in areas outside the project area and not specifically provided for in the SWPPP or in these Specifications.

Pay Item	Pay Unit
SWPPP Implementation	Lump Sum

END OF SECTION

SECTION 024100
DEMOLITION

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SECTION 024100
DEMOLITION AND REUSE OF MATERIALS

1. GENERAL

1.1 DESCRIPTION

A. Perform all demolition and disposal work as shown on the Drawings, as specified herein, or as otherwise directed by the Engineer.

B. Related Sections

1. Section 015000, Mobilization
2. Section 311100, Clearing and Grubbing

2. PRODUCTS - Not Used

3. EXECUTION

3.1 GENERAL

A. Before beginning any work, carefully inspect the work and examine the Drawings and Specifications to determine the extent of the work to be performed. In the company of the Engineer, visit the site and verify the extent of the demolition and other work to be performed.

B. Contact all appropriate utilities and agencies to coordinate and verify all abandonments and relocations.

C. Provide a minimum of 48 hours of notice to any residences affected by a planned utility disruption.

D. Use of explosives will not be permitted.

E. Prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

F. Comply with all local regulations regarding dust generation, hauling and disposal.

G. Materials projecting above-ground shall be cut off at a minimum of one foot below finished grade. Backfill and compact all holes caused by removal of materials. Areas of site not detailed on the Drawings shall be filled and graded to drain, generally matching existing conditions.

H. Rock removed from the site may be re-used if it meets the materials specifications of the work item for which it is proposed.

3.2 PROTECTION OF EXISTING WORK

A. Take all necessary precautions to ensure against damage to existing work to remain in place, or to be salvaged. Any damage to such work shall be repaired or replaced as directed by the Engineer.

B. Construct and maintain shoring, bracing, and supports, as required. Ensure that structural elements are not overloaded and increase structural supports, or add new supports, as may be required as a result of any cutting, removal, or demolition work performed.

C. Existing signs and mailboxes shall be temporarily relocated and replaced at completion of work, at locations to be approved by the Engineer.

3.3 UTILITY DISCONNECTS

A. Coordinate utility disconnections with responsible utilities as designated on the Drawings.

3.4 DEMOLITION

A. General. Extent of removal of existing facilities shall be as shown on the Drawings. Materials not identified as being salvaged by Owner shall be removed and disposed.

B. Hazardous Materials. Comply with all local rules, regulations, ordinances, and statues for handling and disposal of hazardous materials encountered.

C. Utilities. Remove all abandoned above and below ground utilities, of six inch diameter or greater, as shown on the drawings or as directed by the Engineer.

D. Demolition. Demolish all specified structures in accordance with all local regulations. Completely remove footings, foundation, and above-ground construction as shown on the Drawings. Demolition includes all out buildings, walkways, retaining walls, patios and associated structures, porches, any hard landscaping, utilities (and associated structures), posts, piping, conduits, access driveways, culverts, and other similar permanent improvements specified on the Drawings.

3.5 SELECTIVE DEMOLITION

A. Pavement, Concrete and Masonry. Where portions of pavement, concrete or masonry facilities and foundations are to be selectively demolished, areas to be removed shall first be sawcut in neat and square lines for the full depth of the section. Pavement removal shall extend beyond limits of planned activities to extent required to maintain integrity of adjacent surfaces. If the straight edge or other immediate adjacent area of the saw cut concrete and/or asphalt pavement section is damaged prior to replacement of the structural section and surfacing, it shall be the Contractor's responsibility to re-cut any damaged, broken, or uneven portion prior to paving at his own expense. Under no circumstance shall the Contractor be allowed to pave against a joint with a broken, jagged, or uneven line.

B. Fences, Walls and Gates. Preserve access control where fencing, walls and gates are removed during construction. Repair damage caused by work under this contract to the satisfaction of the Engineer.

3.6 DEBRIS REMOVAL

A. Remove all trash, rubble and debris generated by demolition activities from the site on a regular basis

3.7 DISPOSITION OF MATERIALS

A. Salvaged Materials. Salvage of materials for reuse by the Owner shall include removal of the material, equipment, etc., from its present location and transporting, bundling, protecting, cleaning, and storing it in a designated location on the work site, as approved by the Engineer. Items which are specified to be reused, and are damaged during removal or storage, shall be repaired to the Engineer's satisfaction or replaced with new matching materials, at no cost to the Owner.

B. Wasted Materials. Title to all debris to be wasted and demolished materials is vested to the Contractor upon receipt of the Notice-to-Proceed. Contractor shall assume responsibility for any loss or damage to such property after the Notice-to-Proceed. Condition of such material is not guaranteed and the Contractor shall assume all liability for reuse of any such material.

C. Disposal. All materials removed under this section which are not salvaged by the facility owner for reuse or otherwise recycled, shall be disposed of off-site at appropriate disposal areas approved in advance by the Owner. The material shall be removed from the job site before completion of the contract. Material shall not be sold on the site. All loading, hauling, dumping, and disposal fees are the responsibility of the Contractor.

D. Hauling. Debris shall be removed and transported by approved haul routes in a manner as to prevent spillage on streets or adjacent areas.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Demolition work will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for demolition. All costs in connection with this work shall be considered incidental to the contract price for the associated work. No additional payment shall be made therefore.

END OF SECTION

SECTION 311100
CLEARING AND GRUBBING

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SECTION 311100
CLEARING AND GRUBBING

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all labor, equipment, and materials necessary to perform the clearing and grubbing, the removal or disposal of all cleared and grubbed materials, and the filling of all grubbing holes, as specified, as shown on the Drawings, or as directed by the Engineer.

B. Related Sections

1. Section 015000, Mobilization
2. Section 312316, Stripping and Excavation
3. Section 312323, Engineered Fill
4. Section 024100, Demolition and Reuse of Materials

1.2 REFERENCES

A. State of California, Department of Transportation (CALTRANS) State Standard Specifications, current edition.

2. PRODUCTS - Not Used

3. EXECUTION

3.1 CLEARING

A. General. All work shall comply with Section 16, Clearing and Grubbing of the Standard Specifications.

B. All trees, stumps, down timber, snags, brush, vegetation, old piling, stone, concrete rubble, abandoned structures, and similar debris shall be cleared within the limits of the construction extents, unless otherwise shown on the Drawings or directed by the Engineer.

C. In areas where grubbing is not required, the clearing operations shall consist of the complete removal of all obstructions above the ground surface.

D. Contractor shall flag all vegetation to be removed for approval by District Representative prior to its removal. Once the flagging is completed, District Representative will walk the vegetation removal areas and approve them prior to Contractor initiating clearing and grubbing activities.

E. Downed plant materials shall be removed from tree protection zones and protected natural resource areas by hand or with equipment located outside fencing. Contractor shall extract debris by lifting the material out, not skidding it across the soil surface.

F. Trees. Where trees are approved by the District's representative for removal, trees shall be felled in such a manner as to avoid damage to trees left standing, to the existing structures and installations, as well as with due regard for the safety of employees and

others. Stumps shall be removed to minimum depth of 4 feet, or to a point where remaining roots are less than 1.5 inches in diameter, whichever depth is greater. Trees located beyond the limits for clearing and grubbing that are not marked for removal, shall be protected from damage, as indicated on the Drawings and as specified.

G. Vegetation. Vegetation to be removed shall consist of all heavy growth of brush and woody vegetation, unless shown otherwise on the Drawings or directed by the Engineer.

H. Debris Removal. Abandoned foundations, rip rap, drainage materials, debris, and other unsuitable material and any other debris designated for removal on the Drawings shall be removed and disposed of in accordance with this section. Buried unsuitable debris encountered during excavations shall be removed and disposed of in accordance with Section 312316, Stripping and Excavation.

3.2 GRUBBING

A. General. Grubbing shall consist of the removal of all stumps, roots, buried logs, old piling, old paving, concrete, abandoned utilities, timbers, fencing, and other objectionable matter encountered.

B. Limits. Except as noted on the Drawings or otherwise specified by the Engineer, the entire area within the designated limits of work shall be thoroughly cleared and grubbed.

C. Filling of Holes. All holes caused by grubbing operations, except in borrow areas, shall be excavated with 3 to 1 (horizontal to vertical) side slopes in conformance with Section 312316, Stripping and Excavation. The excavation shall then be backfilled with compacted embankment material in conformance with Section 312323, Engineered Fill.

3.3 DISPOSAL OF DEBRIS

A. Cleared and Grubbed Materials. Except as hereinafter specified or otherwise indicated on the Drawings, all logs, brush, strippings, slash, and other organic debris which are the products of the clearing and grubbing operations shall be disposed of on site at locations to be approved by the Engineer. All garbage, concrete, piping, or other non-organic materials shall be disposed off site by the Contractor at locations to be arranged and paid for by the Contractor.

B. Clean woody plant material products of the clearing and grubbing operations not designated for salvage may be chipped and disposed of on site at the location shown on the Drawings, or as specified by the Engineer, subject to approval of the Owner.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Clearing and Grubbing will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for the work covered under this section.

B. Full compensation for all costs in connection with Clearing and Grubbing shall be included in the contract price for related work.

C. Excavation, removal and disposal of buried debris, not encountered during grubbing operations, will be paid for in accordance with Section 02222, Excavation – Unsuitable Debris.

END OF SECTION

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SECTION 312316
STRIPPING AND EXCAVATION

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SECTION 312316
STRIPPING AND EXCAVATION

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all labor, equipment, materials, and performing all operations necessary to complete Stripping and Excavation, as specified, as shown on the Drawings, or as directed by the Engineer. Work includes, but is not limited to the following:

1. Stripping for removal of vegetation and surface organics.
2. Excavation for removal of unsuitable material.
3. Channel Excavation
4. Trench excavation
5. Road Surfacing or recontouring
6. Reverse Grade Dips, Knicks, and Knockouts.
7. Topsoil salvage, storage and replacement
8. Construction Staking
9. Other miscellaneous excavation incidental to the construction of the improvements.

B. Over-excavation for placement of RSP is not included within this section, but is considered incidental to the work for which it is required.

C. Related Sections

1. Section 311100, Clearing and Grubbing
2. Section 312323, Engineered Fill

1.2 REFERENCES

A. State of California, Department of Transportation (CALTRANS) State Standard Specifications (current edition).

B. Surveys. All construction staking shall be performed by the Contractor, in accordance with Section 017123.16, Construction Surveying. The Owner shall provide control points at the locations shown on the Drawings. Control points disturbed by the Contractor shall be replaced by the Contractor, at his sole expense

1.3 QUALITY ASSURANCE

A. Comply with all applicable permits and regulations.

B. Contractor shall provide necessary construction staking and references points, as required to meet the specified tolerances for the work.

2. PRODUCTS

A. **MATERIALS - SECTION NOT USED.**

3. EXECUTION

3.1 GENERAL

A. The Contractor shall protect existing utilities in performing any excavation work.

B. The Contractor shall comply with all permit conditions in performing any excavation work.

C. Contractor shall perform an independent earthwork estimate for the purpose of preparing bid prices for earthwork. Quantities indicated on the Drawings are approximate estimates provided only for permitting purposes and are not suitable for bidding purposes.

D. The bid price shall include costs for any necessary export and proper disposal of excess or unsuitable earth materials off-site, at locations to be arranged and paid for by the Contractor.

E. Slope height, inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state or federal safety regulations, i.e. OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 Subpart P, or successor regulations.

3.2 ROAD DRAINAGE FEATURES

A. Reverse grade dips, knicks, knockouts, and waterbars shall be constructed as specified on Drawings, or as directed by the Engineer.

B. Rolling dips may be constructed using approved onsite or imported engineered fill. Moisture condition the fill as required to achieve specified compaction.

3.3 ROAD SHAPING

A. General. The road prism shall be reshaped to drain to ditches, dips and culverts and conform to the typical sections shown on the Drawings, or as directed by the Engineer. Generally, this work will consist of ripping and or blading the surface to remove high points and ruts or rills and then compacting prior to placement of aggregate base.

B. Road shaping includes removal and local disposal of debris accumulations at the toe of cut slopes or on road shoulders that would otherwise encroach into the road section or inboard shoulder. Final grades shall be subject to the approval of the Engineer.

C. Where Road Shaping requires additional effort, such as excavation and offhaul of material to change the profile grade, this work has been identified on the drawings in association with “Map Points” that have detailed plans or identified on overview maps and quantified in tabular format as “Reshape Road” to allow separate measurement for payment.

3.4 STRIPPING

A. Stripping. Strip surfaces of road prism, excavations and fill foundations of heavy growth of crops, grass, weeds and other vegetation as specified in Section 311100, Clearing and Grubbing. Greater depths of stripping may be necessary in selected areas to remove vegetation, as determined by the Engineer.

B. Unless otherwise specified, the stripped materials shall be dispersed on-site, at locations to be identified by the Engineer.

3.5 EXCAVATION

A. General. Excavations shall extend into firm, undisturbed native soils. Excavation shall consist of removal of material for embankment foundation preparation, mass excavation and finish grading of the channel and slope improvements, and other miscellaneous excavations to the lines and grades shown on the Drawings, or as directed by the Engineer. In the event that organic materials, yielding sub-grade (pumping) or other deleterious materials are encountered during foundation excavations, they shall be removed as directed by the Engineer.

B. Cut slopes in rock may be inclined at a 0.75:1 (H:V) slope for heights up to 8 feet. Natural slopes exposing soil may be temporarily cut no steeper than 1:1 or flatter for heights of 6 feet as directed by ENGINEER. Steeper inclinations may be acceptable based on site review by ENGINEER and/or geotechnical ENGINEER.

C. Grading should include provisions to intercept surface water from flowing toward new cut/fill grading.

D. Where cuts expose seepage then provisions must be made for its control and discharge in a way so as not to cause erosion. Notify the Engineer immediately where seepage or signs of seepage are identified in cut slops.

E. Control of Water. Water control shall be performed in accordance with project permit conditions, the approved SWPPP, and Dewatering, Section 312319 of these

Specifications. When water is encountered, either ground water or surface runoff, the Contractor shall furnish, install, maintain, and operate all necessary machinery and equipment required to keep the excavation reasonably free from water, as approved by the Engineer, until the placement of concrete or backfill material has been completed, inspected, and approved, and all danger of flotation and other damage is removed. Water pumped from the excavation shall be disposed of in such manner as will not cause injury to public or private property, or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer. Water shall be controlled until work is complete.

F. Excess Excavation. Care shall be exercised by the Contractor not to excavate below the grades shown on the Drawings, except as specified herein, and as directed by the Engineer. All excavations in excess of the grades shown on the Drawings which are not directed by the Engineer shall be backfilled with compacted embankment at the Contractor's expense, per Section 312323, Engineered Fill.

G. Temporary Excavations. With exposure and drying, on-site soils may experience progressive sloughing if excavated near vertical and left un-shored during construction. Engineer suggests that the soils on-site should be considered Type C when applying OSHA regulations.

H. Tolerances. The excavation tolerance shall typically be +0.1 feet to -0.2 feet from the grades shown on the Drawings, except within the low flow channel, where excavation tolerance shall be +0.1 feet to -0.1 feet from the elevations shown on the Drawings.

3.6 DELETERIOUS SPOILS

A. Separate clean excavated soils from deleterious soils and stumps and vegetation.

B. Deleterious soils including topsoil, fat clay soils, organic rich soils, decayed woody debris rich soils, and other material, as identified by the ENGINEER, shall be disposed at an approved stable location as directed by the ENGINEER or District representative.

C. Areas to receive fill shall be cleared of vegetation and ripped to a depth of 6 inches.

D. Spoils shall be placed a maximum of 3 feet deep with an embankment face inclined no steeper than 3:1 (35%) unless otherwise directed or specified.

E. The contractor shall be responsible for conforming to existing surrounding conditions with smooth transition in grading, and shall avoid any abrupt apparent changes in grades or cross slopes, low spots or hazardous conditions.

F. Spoils shall not be placed in locations with the potential to interrupt or receive concentrated flow.

G. Apply erosion control measures at spoils locations, as specified or as directed by the Engineer.

3.7 UNCLASSIFIED EXCAVATION.

A. Unclassified Excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, which is not otherwise classified and paid for under Excavation of Unsuitables or Rock Excavation described below. Unclassified Excavation includes excavation required to reach finished grade. Over-excavation for the placement of materials (e.g. ROCK SLOPE PROTECTION) or the removal of unsuitables, as described below under Excavation of Unsuitables, is not included in Unclassified Excavation.

3.8 EXCAVATION OF UNSUITABLES.

A. Excavation of Unsuitables. Areas of unsuitable in-place soils, as determined by the Engineer, may also be encountered. Material shall not be classified as unsuitable solely based on moisture content. Material within the limits of Excavation, as described above under Unclassified Excavation, or within the limits of over-excavation for the placement of materials (e.g. Engineered Streambed Material, Weir Boulders, Log Structures) shall not be classified as unsuitable. The Contractor shall anticipate having to over-excavate areas of unsuitables as directed by the Engineer and dispose of materials. The actual locations of these excavations will be determined in the field by the Engineer. The side slopes of the excavations shall be no steeper than 1 to 1 (horizontal to vertical). The over-excavations shall be backfilled with embankment materials in accordance with Section 312323, Engineered Fill.

B. Disposition of Unsuitable Materials. The excavated materials that are considered unsuitable based solely on moisture content shall be processed as necessary to meet specification requirements for suitability and used as embankment material. Materials which are unsuitable based on organic content will be ordered wasted and shall be disposed of off-site in accordance to Section 7-1.13, “Disposal of Material Outside the Highway Right of Way”, of the State Standard Specifications.

3.9 ROCK EXCAVATION

A. Rock Excavation. Rock excavation consists of the removal of hard igneous, metamorphic, and/or sedimentary rock in solid beds or masses in original or stratified position which can be removed only by continuous drilling, blasting or the use of pneumatic tools, and all boulders of 5 cubic yards in volume or larger. Material which can be loosened with a pick, frozen materials, soft laminated shale and hardpan, which for convenience or

economy is loosened by drilling, blasting, wedging or the use of pneumatic tools, removal of concrete pavement and retaining walls, shall not be classified as rock excavation. When rock is encountered within the limits of the excavation, immediately notify the Owner and Engineer and do not proceed further until instructions are received and measurements made for the purpose of establishing the volume of rock excavation. Contractor shall note that blasting is not approved for this project. The need for specialized rock excavating equipment should be anticipated if rock is encountered.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Stripping. Stripping will not be separately measured for payment.

B. Unclassified Excavation. Unclassified Excavation shown on the drawings will be considered incidental to the work required to complete the associated lump sum pay item and will not be separately measured for payment. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the cubic yard.

C. Excavation - Unsuitable Materials. Excavation to remove materials that are designated by the Engineer as unsuitable for reuse will be measured by the cubic yard from the stripped foundation. Measurement will be based on surveyed cross sections before and after the excavation.

D. Rock Excavation. Rock Excavation will be measured by the cubic yard of rock excavation, as determined by cross sections surveyed before and after the work.

E. Reshape Road. Reshape Road will be measured by the linear foot of road specified to receive Reshape Road, as shown in tabular format on site overview pages. Measurements shall be made along the centerline of the road. Reshape Road that is included in map points shall not be separately measured for payment.

F. Other Miscellaneous Excavations. All other excavations will not be measured for payment.

G. Surveys: Construction staking will not be separately measured for payment.

4.2 PAYMENT

A. Unclassified Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete

Unclassified Excavation, as specified, including mass excavation and finish grading of channel banks and floodplains, to the lines and grades shown on the Drawings.

B. Excavation - Unsuitable Materials, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the excavation as specified, including dewatering, all handling of materials, and disposal of unsuitable materials.

C. Rock Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the Rock Excavation as specified, including dewatering, all handling of materials, and disposal of unsuitable materials.

D. Reshape Road. Reshape Road will be paid for at the contract unit price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the reshape road as specified, including all handling of materials, and disposal of unsuitable materials.

E. No separate payment will be made for other miscellaneous grading incidental to the work. All costs in connection with this work will be considered incidental to the cost of construction of associated improvement.

F. Surveys: No separate payment will be made for surveys or construction staking. All costs in connection with this work will be considered incidental to the contract price per cubic yard for Excavation.

G. Mixing and offhaul of suitable materials for reuse or shall be paid for under Engineered Fill, Section 02226.

H. Payment will be made under:

Pay Item	Pay Unit
Unclassified Excavation	Cubic Yard
Excavation – Unsuitable Materials	Cubic Yard
Rock Excavation	Cubic Yard
Reshape Road	Linear Foot

END OF SECTION

SECTION 312319
DEWATERING

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SECTION 312319
DEWATERING

1. GENERAL

1.1 DESCRIPTION

A. Furnish all labor, materials, equipment, and incidentals necessary to design, construct, operate, maintain, and remove all cofferdams, flumes shoring, diversions, filtration systems and/or other measures, including pumping, to dewater the construction site and to divert streamflow and other surface waters through or around the project area 24 hours a day during the entire field construction period, as shown on the Drawings, as specified, or as directed by the Engineer.

B. Dewatering details on the Drawings (if provided) are schematic. The design and implementation of the Dewatering Plan is solely the responsibility of the Contractor. Contractor shall make their own independent evaluation of water sources (surface and groundwater) in preparing their Dewatering Plan.

C. Dewatering shall comply with all project permit conditions, applicable laws and local ordinances.

1.2 RELATED SECTIONS

1. Section 015713.01, Fiber Roll
2. Section 354237, Rock Slope Protection
3. Section 015713, Temporary Erosion Control and BMP's
4. Section 015723, Stormwater Pollution Prevention Plan Implementation

1.3 SUBMITTALS

A. The Contractor shall submit the following for review and approval of the Engineer:

1. A Dewatering Plan listing materials, method of work, equipment to be used, methods for disposal of pumped water, provisions to prevent scour and erosion, and the proposed schedule shall be submitted to the Engineer. Approval of the Engineer shall be required before the Contractor proceeds with water control measures.
2. Product data for:

    a) pumps
    b) silt control filter fabric
    c) washed rock
    d) impervious liners
    e) cofferdam material
    f) other materials used in dewatering

1.4 QUALITY ASSURANCE

A. Comply with all applicable permits and regulations .

B. Comply with scheduling requirements set forth in the project Storm Water Pollution Prevention Plan.

C. Comply with approved Hazardous Materials Control and Spill Prevention Plan, in accordance with Section 015000 paragraph 3.11.

D. Notify Engineer 48 hours in advance of installation of temporary cofferdam(s) or diversion.

E. Notify Engineer 48 hours in advance of removal of temporary cofferdam(s) or diversion.

2. PRODUCTS

2.1 MATERIALS

A. General. The Contractor shall be responsible for sizing and design of temporary cofferdams, well points, pumps, drains, pipes and other diversion and dewatering facilities. Comply with Drawings and regulatory requirements.

B. Imported Rock. Use only clean washed rock. Other materials, if used, shall be removed from site when dewatering work is complete.

C. Dewatering Facilities. Provide and operate dewatering facilities of suitable size and capacity. The use of equipment shall be consistent with the manufacturer's recommendations.

D. Silt Fence. Comply with Section 015713.02, Silt Fence.

3. EXECUTION

3.1 GENERAL

A. Contractor is solely responsible for the design, construction, and maintenance and monitoring of the diversion and dewatering facilities. Comply with the Drawings, Specifications, and applicable permit conditions.

3.2 SEDIMENT CONTROL

A. General. Comply with Section 401 Water Quality Certification and/or approved SWPPP in accordance with Section 015723, SWPPP Implementation.

B. Materials. Earthen materials shall not be used within the flowing channel, with the exception of clean, washed rock.

C. Cofferdam Construction. During construction of the cofferdam, install silt barrier(s) along the water side of the installation, as necessary to minimize mobilization and entrainment of disturbed soils within the active flowing channel, to a level in accordance with the permit conditions.

D. Discharge of diverted flow. Unless otherwise specified, a diversion must discharge into the same natural drainage way in which its headworks are located. Where feasible, discharge to

existing pools or onto bedrock or otherwise erosion resistant surfaces. Construct energy dissipators at diversion outlets, where necessary to prevent scour at point of discharge.

E. Discharge of Seepage/Groundwater. Discharge water from the dewatered construction site either by gravity or pumping in a manner to prevent excessive turbidity from entering the receiving waters and to prevent scour and erosion outside of the construction site. Pumped water should be pre-filtered with sand/gravel pack around sumps for subsurface flows and a silt fence or hay bales around pumps for surface flow.

F. Discharge pumped water into adjacent gravel bars, isolated local depressions, or temporary sediment basins, as shown on the Storm Water Pollution Prevention Plan. Where discharging water into the river will create excessive turbidity, route water through a sediment interceptor or other facilities to remove sediment from water.

G. Isolation of Construction Area. Place silt fences, hay bale barriers, or cofferdams between construction area and flowing river channel, at all locations, in accordance with the approved Storm Water Pollution Prevention Plan.

3.3 HAZARDOUS MATERIAL CONTROL

A. General. Comply with the approved Hazardous Materials Control and Spill Prevention Plan (HMC&SPP) in accordance with Construction Facilities and Temporary Controls, Section 01500.

B. Equipment and Lubricants. Steam-clean all equipment prior to its use. Inspect all equipment for cleanliness and fluid leaks prior to use and monitor during its use. Maintain equipment as required. Equipment refueling shall only take place in a designated, contained area.

C. Isolation of Construction Area. Prior to performing work within flowing water, outside of cofferdams, install oil containment booms downstream of the work area. Maintain booms until completion of the work within the channel is complete.

D. Spills. Maintain a supply of oil spill booms, sorbent pads, and other supplies to contain and clean spills. Comply with approved HMC&SPP should spills occur.

3.4 COFFERDAMS

A. General. The Contractor is solely responsible for the design, construction, maintenance, and monitoring of cofferdams, dikes and other isolation facilities. Cofferdams with an exposed height greater than 10 feet shall be designed by a Professional Engineer registered in the State of California, based on available soil data.

B. Configuration. Cofferdam alignments, as shown on the Drawings, reflect the maximum allowable encroachment into the channel. Construct cofferdam alignments as shown or the Drawings, unless otherwise approved by Engineer. Provide cofferdams high enough to account for water surface fluctuations.

C. Secondary Dikes/Seepage Control. Secondary dikes within the isolated construction area can be used to control seepage and groundwater around excavations, provided all dike materials are removed from the exposed channel upon completion, prior to re-watering the work area.

3.5 FLOW BYPASS

A. Capacity. Bypass water around construction site using a cofferdam and bypass pipe as shown on the Drawings or equivalent facility, as approved by the Engineer. The bypass system shall be capable of passing the flows present at the time construction begins, with a minimum of 12 inches of freeboard (measured vertically from water surface to lowest point on dam). Bypass pipes shall have a minimum diameter of 8 inches to minimize the likelihood of clogging by debris.

B. Storm Events. During the designated period for instream work, the Contractor shall be solely responsible for the integrity of the dewatering system. If rain is predicted, the Contractor shall perform flood fighting activities as directed by the Engineer and regulatory agencies.

C. The diversion system may require adjustment to accommodate the sequence of work. No additional compensation shall be provided for any adjustments, revisions, or reinstallations of diversion elements.

D. The diversion shall result in conditions that allow the required compaction to be achieved and shall prevent sediment-laden water that exceeds the effluent discharge limits from entering the drainage ways.

E. Unless otherwise specified, a diversion must discharge into the same natural drainage way in which its headworks are located.

3.6 DEWATERING

A. General. Remove water from construction area using pumping, well points, drains, or other approved methods. Discharge of water shall comply with 3.3.D. Construction water shall be segregated from seepage water and routed through sediment interceptors or other facilities to remove contaminants and sediment. Excavated slopes in the saturated soils may need to be retained, tied back, or otherwise stabilized.

B. Well Points. Well points shall be designed to preclude the loss of fine soil by sand/gravel packing or other suitable means.

C. Pumping Facilities. All pump intakes shall be screened to prevent the entrainment of fish, in accordance with project permit conditions. Pumps and discharge piping shall be suitable for the type of service provided and shall be a sufficient size and capacity to satisfactorily dewater work areas. Engines shall be muffled to avoid excess noise and pump intakes shall be fitted with screens as required.

D. Power Supply. Consider the availability and reliability of power sources for dewatering operation in dewatering system design and make provisions for temporary or backup power supply as deemed necessary. Where the primary diversion is operated by pumping, provide a backup system with automatic controls capable of starting the backup upon failure of the primary system.

E. Groundwater. Dewatering shall maintain water surfaces below the base of temporary excavations or trenches, to allow for visual inspection of the work, if requested by the Engineer.

Lower groundwater tables within excavations for structures to a minimum of two (2) feet below foundations or as otherwise required to establish a firm, stable foundation. Control groundwater within excavation until completion of backfill operations.

3.7 WATER LEVELS DURING THE CONSTRUCTION PERIOD

A. The Contractor shall be responsible for making an independent evaluation of site conditions. The Contractor's dewatering plan shall address all potential sources of surface and groundwater, including but not limited to streamflow (natural or managed), backwatering of the channel from downstream blockages, domestic water lines, storm drain outfalls, irrigation tailwater, industrial discharges, seepage, and direct rainfall.

3.8 CLEANUP

A. Thoroughly clean up area to remove debris and contaminated materials. Remove fine sediments and restore disturbed area prior to removal of the dewatering facilities. Clean and round river run gravels or cobbles, if used in cofferdam construction, may be spread in the creek channel in lieu of removal, provided grading will not interfere with facility operation.

3.9 REMOVAL OF DEWATERING FACILITIES

A. Prior to removal of the dewatering facilities, complete the following activities:

1. Complete required tests and inspections.
2. Thoroughly cleanup work site.
3. Perform final walkthrough with Engineer.

B. Prior to removal of cofferdams and diversion, equalize the water surface levels on both sides of the dams.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Dewatering will not be separately measured for payment.

4.2 PAYMENT

A. Dewatering will be considered incidental to the related work items that require diversion or dewatering, the contract price for which price will include payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the dewatering operations, as specified, including temporary cofferdams, pumping, silt control, filter fabric, sediment control, erosion control, removal of muck, disposal of materials, and removal of dewatering facilities.

Pay Item	Pay Unit
Dewatering	Lump Sum

END OF SECTION

SECTION 312323
ENGINEERED FILL

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SECTION 312323
ENGINEERED FILL

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all plant, labor, and materials, and performing all operations necessary for the construction of Engineered fills (unless separately designated elsewhere), including surveying, salvage of topsoil, subgrade preparation, furnishing, loading, and on-site and off-site hauling of materials, processing, screening placement and compaction of Engineered Fill materials, construction of ramps, and other incidental earthwork as may be necessary to complete the Engineered Fills, as shown on the Drawings, as specified, or as otherwise directed by the Engineer.

B. All grading shall comply with Section 19 of the Standard Specifications. It shall be the responsibility of the Contractor to visit the site and make his own interpretations with regard to materials, methods and equipment necessary to perform the work required for this project.

C. Temporary erosion control and BMP's shall be installed and approved by the Engineer prior to beginning Engineered Fill Construction.

D. The Contractor is responsible to locate, identify, and protect all existing utilities from damage.

1.2 RELATED SECTIONS

1. Section 312316, Stripping and Excavation
2. Section 311100, Clearing and Grubbing

1.3 REFERENCES

A. American Society for Testing of Materials (ASTM) Standards:

D1556	Test Method for Density of Soil in Place by the Sand Cone Method
D1557	Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Moistures Using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop
D2974	Test Method for the Organic Content of Soils
D2922	Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
D3017	Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shall Depth)
D4318	Test Method for the Liquid Limit and Plastic Limit of Soils
D422C	Particle-Size Analysis of Soils

B. State of California, Department of Transportation (CALTRANS) State Standard Specifications, current edition.

C. Surveys. All construction staking shall be performed by the Contractor. Survey control points are shown on the Drawings, where available.

2. PRODUCTS

2.1 MATERIALS

A. Engineered Fill Materials. To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent engineered fill. The suitability of materials for specific purposes will be subject to the approval of the Engineer, in conformance with these specifications. Materials used for engineered fill shall conform to the quality and gradation requirements as follows:

1. less than 3% organic material;
2. shall contain no rock or clods greater than 6 inches in diameter;
3. no more than 15 percent larger than 2 ½ inches;
4. The material should be predominantly granular
5. Plasticity index of less than 15
6. Liquid limit less than 35
7. Not more than 15 percent passing the #200 sieve
8. Shall contain no sod, brush, roots, or other perishable or unsuitable material, and
9. Shall be approved by the Engineer prior to use.

B. Surplus Materials. All surplus or unsuitable excavated materials will be designated as waste and shall be disposed in accordance with Section 312316, Stripping and Excavation.

C. Imported Engineered Fill. Importing of Engineered Fill material, if necessary or required to meet the grades and elevations shown on the plans, shall be considered included in the Contractor's bid for the various items of work involved and no additional compensation will be made therefore. Should such imported material be required, the Contractor shall notify the Engineer of the borrow site location at least 72 hours in advance, and provide an adequate sample size so the Engineer can verify the suitability of the material. All imported materials shall be proposed by the Contractor in writing in accordance with the submittal requirements of these Special Provisions and the Standard Specifications. The Contractor shall perform and/or submit all material testing reports and other data as necessary to provide the Engineer with established laboratory values for optimum moisture and maximum dry density, for any imported material requiring density testing. Any proposed engineered fill that deviates from the criteria stated herein, shall have written acceptance from the Engineer and geotechnical engineer prior to import or placement in the work.

D. If a disagreement between the Contractor and the Engineer occurs over the suitability of materials, the Contractor shall perform laboratory testing to demonstrate compliance with the specifications. The failure of the Contractor to perform the testing shall not relieve the Contractor from the obligation to provide suitable materials.

3. EXECUTION

3.1 ENGINEERED FILL CONSTRUCTION

A. General. Compacted Engineered Fill in Engineered Fills shall be placed in the dry and compacted as specified herein.

B. Subgrade Preparation. Following Clearing and Grubbing, the subgrade surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill and loosened to a minimum depth of 4 inches. The moisture content of the loosened material shall be controlled as specified for the Engineered Fill, and the surface materials of the subgrade shall be compacted and bonded with the first layer of Engineered Fill.

C. In areas to receive compacted fill it may likely be necessary to over-excavate the subgrade soil an average of 2 feet below buried native grade to remove additional unsuitable earth materials. Limits of over-excavation to be determined in field by the Engineer.

D. Keying of Fill Slopes. Fills situated on slopes greater than 20% in gradient shall be keyed and benched into firm native material, unless otherwise directed by project Engineer. All keys and benches shall be adequately drained as directed by project Engineer.

E. Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the Engineered Fill can be compacted against them to ensure a good bond between the fill and the abutments. Subgrade and abutment surfaces shall not be steeper than 1 horizontal to 1 vertical. The sites of the borrow area shall be stripped to sufficient depth to remove all vegetation, roots, brush, sod and other objectionable material. Clearing and disposal methods shall be in accordance with applicable state and county laws with due regards to the safety of persons and property. Fill shall not be placed until the required excavation and subgrade preparation has been completed.

F. Fill shall not be placed on or in standing water, nor upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill. If grading is performed in a wet condition, compaction may be difficult. Pumping may bring water to the surface. If such conditions are encountered soils shall not be used until reconditioned to conform to Specifications outlined here and as approved by project ENGINEER.

G. If soft, wet, or pumping subgrade soils are present, the required minimum level of compaction for the initial fill lift may be adjusted to eighty-five percent (85%) of the soil's maximum dry density as determined in accordance with ASTM D 1557, subject to approval of the Engineer. The intent of the reduction is to limit the amount of construction traffic that could lead to further deterioration and destabilization of the exposed subgrade and to build a more stable pad upon which to place subsequent fill lifts.

H. Horizontal Layer Construction. The compacted Engineered Fill shall be constructed to a sufficient section so as to achieve the required compaction throughout the finished section. Materials to be compacted shall be placed or spread in layers not more than eight (8) inches in loose thickness prior to compaction. Materials excavated to form keyways or over-excavations, and suitable for use as Engineered Fill, shall be blended uniformly with other excavated soils or disposed of. All fill placed on slopes steeper than 5 horizontal to 1 vertical shall be keyed and benched as specified in Section 19 of the Standard Specifications. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the

fill to a depth of not less than 2 inches before the next layer is placed. Fill placed around structures will be brought up at approximately uniform height on all sides of the structure.

I. Compaction. When, in the opinion of the Engineer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified to a depth of 6 inches before the succeeding layer is placed thereon. The degree of compaction required is expressed as a percentage of the maximum dry density, based on laboratory test procedure, ASTM D 1557. The Engineered Fill shall generally be compacted to a minimum of 85% of the maximum dry density, unless otherwise specified herein or directed by the Engineer. The upper 6 inches of subgrade and aggregate roadbed sections shall be moisture conditioned and compacted to at least 90 percent relative compaction.

J. Construction equipment shall be operated over each layer of fill to ensure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction. Heavy compaction equipment shall not be operated within 2 feet of any structure. Fill adjacent to structures, pipe, conduits, and anti-seep collars shall be compacted to a density equivalent to that of the surrounding fill by means of hand tampers or plate vibrators. Hand directed tampers or compactors shall be used on areas not accessible to heavy compaction equipment, fills compacted in this manner shall be placed in layers not greater than 4 inches in thickness before compaction, and shall meet the same density requirement as for the adjacent area. All compaction testing shall be performed by the Owner, unless otherwise noted. The cost of re-testing of areas that have failed to meet specified compaction requirements shall be borne by the Contractor.

K. At the discretion of the Engineer, the top 12 inches of fill, within areas specified to receive revegetation treatments, may be compacted to between 80% and 85% of the maximum dry density, to facilitate plant establishment. Prior to seeding, the surface shall be prepared as specified in Section 329200, Seeding.

L. Compaction of backfill adjacent to structures shall not be started until after the expiration of the following minimum time interval after placement of the concrete:

1. Counterforts, vertical or near-vertical	
2. walls with earth loading on one side only	14 days
3. Walls and counterforts, backfilled on both	
4. sides simultaneously	7 days
5. Anti-seep, collars, conduits,	
6. and cantilever outlet bents	3 days

M. Moisture Control. The moisture content required is expressed as a percentage, based on laboratory test procedure ASTM D 1557. The moisture shall be uniformly distributed throughout the layer prior to compaction and shall be at least 1% above the optimum moisture content. If the material is not within the required moisture content, the Contractor will be required to moisture condition the soil. The moisture conditioning of fill materials shall be performed prior to placement in the section. The final minor moisture conditioning may be made on the fill, as required. Harrowing, or other approved methods will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of fill shall be accurately controlled in amount and distribution so that free water will not appear on

the surface during or subsequent to rolling. If the material is too wet for proper compaction or soft and yielding sub-grade is experienced (pumping), the Contractor will be required to aerate the material to a moisture content within the desired limits prior to compaction. If the top surface of the preceding layer of compacted fill or a subgrade or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond, it shall either be removed or scarified and moistened to an acceptable moisture content prior to placement of the next layer of fill.

N. Dressing. Engineered Fill slopes shall be dressed by over-building and cutting back to the required grade. The Contractor may compact the shoulder of each lift during the placement of fill materials to assist in the subsequent dressing of the slopes.

3.2 CROSS SECTIONS AND ZONING OF MATERIALS

A. Standard Engineered Fill Sections. The dimensions, slopes, and zoning of materials shall conform to the sections shown on the Drawings and specified herein.

B. Zoning of Materials. Unless otherwise specified, the Engineered Fill materials shall be homogeneous. The Engineered Fill shall be free of pockets, lenses, streaks, layers, etc. of different materials.

3.3 FINISH

A. The finished grades shall transition naturally into adjacent existing grades to provide a functional and naturalistic finished surface. Due to the complex nature of the project and the desired aesthetic and functional features, not all details can be accurately represented on the Drawings. As a result, the Contractor may be directed by the Engineer to make minor adjustments to finish grades to best achieve these results. These adjustments may include smoothing or rounding conforms, or changing slope angles or daylight points as necessary to conform to the variable geometry inherent in natural topography. Compensation for this work shall be considered as included in the price paid for the various contract items of work involved, and no additional compensation will be allowed.

B. After the placement of the engineered fills and spoils, the sides and top shall be dressed by final passage of compaction equipment or by dragging to give a smooth surface. The surface area shall be graded to provide surface drainage to flow to desired locations.

3.4 ROADS AND RAMPS

A. Maintain Access. At locations where access roads to existing facilities are destroyed because of the work required under this contract, the Contractor shall provide temporary roads, if directed by the Engineer, to give access to fields and buildings during the construction period. Such facilities shall be removed to the extent required by the Engineer.

B. Temporary Haul Roads. Temporary haul roads shall be constructed as required to transport materials from borrow source or excavation to Engineered Fill site. Temporary ramps to be constructed for the Contractors convenience need not comply with these foundation preparation and Engineered Fill construction requirements. Unless otherwise directed by the Engineer, temporary ramps shall be removed prior to completion of the work.

3.5 GRADE TOLERANCES

A. Engineered Fill:

1. General. Engineered Fills shall be constructed to the net grade and cross section shown on the Drawings.
2. Grade Tolerances. At all points a tolerance of 0.2 (two-tenths) foot above, and 0.1(zero) foot below the prescribed grade will be permitted in the final dressing, provided that any excess material is so distributed that the crown of the Engineered Fill drains in the desired direction and that there are no abrupt humps or depressions in surfaces. However, this tolerance above grade may be modified at locations where, in the opinion of the Engineer, such modifications will not impair the design or appearance of the project.

3.6 SLIDES

A. In the event of the sliding of any part of the Engineered Fill during its construction, or during the one year period after acceptance, the Contractor shall, upon written order of the Engineer, cut out and remove the slide and then rebuild that portion of the Engineered Fill.

3.7 SPECIAL MEASURES

A. Measures and construction methods shall be incorporated as needed and practical that enhances fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food, and den trees.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Engineered Fill. Engineered Fill placed to the Dimensions shown on the drawings will be considered incidental to the work required to complete the associated lump sum pay item and will not be separately measured for payment.

B. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the cubic yard.

4.2 PAYMENT

A. Engineered Fill, measured as specified above will be paid for at the contract unit price, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to construct compacted Engineered Fills as specified, including hauling of excavated materials from the source.

B. No payment will be made for the Engineered Fill foundation preparation, shrinkage of material or materials placed above the net grades and slopes as allowance for shrinkage.

C. No separate payment will be made for incidental grading beyond the projected toe of the Engineered Fill cross section. The cost for this work shall be included in contract unit price for compacted Engineered Fill.

D. No payment will be made for construction or removal of temporary roads or ramps.

E. No additional payment will be made for costs associated with stabilizing unstable

materials. The cost for this work shall be included in contract Lump Sum price for compacted Engineered Fill.

F. Payment will be made under:

Pay Item	Pay Unit
Engineered Fill	Cubic Yard

END OF SECTION

SECTION 321540
AGGREGATE BASE

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SECTION 321540
AGGREGATE BASE

1. GENERAL

1.1 Description

A. The work covered by this section consists of furnishing all plant, labor, and material and performing all operations necessary for placing lime treated aggregate base as specified, as shown on the Drawings, or as otherwise directed by the Engineer. The work includes all necessary stripping, clearing and gubbing, shaping and compacting of roadbed and finished rock surface, watering, or other incidentals required to complete the work.

B. Related Sections

1. ***Stripping and Excavation***, Section 312316

2. ***Engineered Fill Construction***, Section 312323

3. ***Asphalt Concrete***, Section 321216

1.2 References

A. State of California, Department of Transportation (CALTRANS)
State Standard Specifications, current edition

California Test	Method of Test for:
202	Sieve Analysis of Fine and Coarse Aggregates
214	Soundness of Aggregates by Use of Sodium Sulfate
216	Relative Compaction of Untreated and Treated Soils and Aggregates
231	Relative Compaction of Untreated and Treated Soils and Aggregates by the Area Concept Utilizing Nuclear Gages

1.3 Submittals

A. Submit to the Engineer, for review, the following:

1. Source of aggregates.

2. Test results, performed within the last six (6) months, showing that the aggregates conform to all the material requirements specified herein.

3. Certified weights of aggregate base rock delivered to the site.

4. Manufacturer's data sheet for Geosynthetic Fabric.

1.4 Project Conditions

A. Aggregate shall be placed when the atmospheric temperature is above 35 degrees Fahrenheit. Areas of completed base course that are damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

2. PRODUCTS

2.1 Materials

A. Aggregate Base Course shall be Lime Treated Class 2 Aggregate Base, 1-1/2 inch maximum, conforming to Caltrans Standard Specifications. "Stevens Creek Quarry" typically provides a product meeting this specification.

B. Stabilization Fabric. Stabilization Fabric, where specified, shall be as shown on the Drawings.

3. EXECUTION

3.1 Placing, Compacting, and Finishing

A. Preparation of Subgrade. Prior to constructing the aggregate base course, the sub-grade shall be cleaned of all foreign substances. The sub-grade then shall be shaped as indicated on the Drawings, as specified, or as directed by the Engineer. Preparation of road subgrade includes clearing all loose material accumulated at the toe of cut slopes and extending outboard to the break point at the road shoulder, as necessary to ensure proper drainage is achieved and maintained. After rough shaping, the subgrade shall be scarified to a minimum depth of 6 inches, moisture conditioned, and compacted to a minimum of ninety-five percent (90%) relative compaction, based upon California Test Methods 216 or 231. Subgrade preparation and compaction shall extend a minimum of 12" beyond the proposed limits of the aggregate base. Ruts or soft, yielding spots shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting.

B. Grade Control. During construction, the lines and grades including crown and cross slope indicated for the aggregate base course shall be maintained by means of line and grade stakes placed by the Contractor.

C. Geosynthetic "Stabilzation Fabric".Where geosynthetic stabilzation fabric is specified to be placed below the aggregate base, comply with Section 26-1.03C, "Placing Geosynthetic Materials", of the Standard Specifiications. If geosynthetic fabric is shown, compact AB with either (1) a smooth-wheeled roller or (2) a rubber-tired roller. Do not use vibratory devices during compaction.

D. Placing. The mixed material shall be placed on the prepared subgrade in layers of uniform thickness with a suitable spreader. No layer shall exceed 6 inches or be less than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Such adjustments in placing procedures or equipment shall be made as

may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable base course.

E. Compaction. The layer of aggregate base course, including shoulders, shall be compacted to a minimum of ninety percent (90%) relative compaction, based upon California Test Methods 216 or 231. Water content shall be maintained during the compaction procedure such that the water content is within plus or minus two percent (2%) of optimum water content. In all places not accessible to the rollers, the aggregate base course material shall be compacted with mechanical tampers.

F. Finishing. The surface of aggregate base course shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. In no case shall thin layers of material be added to the top layer of base course to meet grade. If the elevation of top layer of base course is one inch or more below the grade, the top layer of base shall be scarified to a depth of at least three inches, new material shall be added, and the layer shall be blended and recompacted to bring to grade. Adjustments in rolling and finishing procedures shall be made as may be directed to obtain grades, to minimize segregation and degradation of aggregate base coarse material, to adjust the water content, and to insure an acceptable aggregate base course. Material found unacceptable shall be removed and replaced, with acceptable material.

3.2 Field Quality Control

A. Smoothness. The surface of the aggregate base course shall not deviate more than one inch when tested with a ten-foot straightedge applied parallel with and at right angles to the centerline of the area covered. Deviations exceeding 1 inch shall be corrected as directed.

B. Thickness. The completed thickness of the aggregate base course shall be within one half inch of the thickness indicated on the Drawings. The thickness of the aggregate base course will be measured at intervals providing at least one measurement for at least each 150 linear feet of aggregate base course. The depth measurement will be made by test holes at least three inches in diameter. Where the measured thickness of the aggregate base course is more than one half inch deficient, such areas shall be corrected by excavating and placing with additional material

C. Compaction. All compaction testing will be performed by the District. Where tests indicate the base course does not meet specified relative compaction, the material represented by the test shall be reworked and recompacted to the specified relative compaction. Reworked areas will be retested until they meet the specified relative compaction. The costs of all retests will be deducted from monies due or to become due the Contractor.

4. MEASUREMENT AND PAYMENT

4.1 Measurement

A. Lime Treated Aggregate Base will be measured for payment by the square foot, to the nearest 1.0 square foot. Quantities of aggregate base to be paid for by the square foot will be calculated on the basis of the dimensions shown on the Drawings, adjusted by the amount of any change ordered by the Engineer.

B. Lime Treated Aggregate Base for repair of roadways outside of specified construction footprint that are damaged by construction activities will be repaired by Contractor at their own expense and not be separately measured for payment.

C. Where Lime Treated Aggregate Base is used for "subgrade stabilization", this work will be measured by the linear foot of "subgrade stabilization", measured along the centerline of the road, as shown on the Drawings, and adjusted by the amount of any change ordered by the Engineer. Work shall include overexcavation and offhaul of native materials above finished subgrade, as well as ripping and recompaction of subgrade.

4.2 Payment

A. Lime Treated Aggregate Base will be paid for at the contract price per square foot, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in constructing aggregate base, including subgrade preparation and subgrade compaction, as shown on the Drawings, and as specified, and as directed by the Engineer.

B. Payment will be made under:

Pay Item	Pay Unit
Lime Treated Aggregate Base	SF
Subgrade Stabilization	LF

END OF SECTION

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SECTION 334000
STORM DRAINAGE FACILITIES

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SECTION 334000
STORM DRAINAGE FACILITIES

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of furnishing and installing the subsurface and surface storm drainage facilities as shown on the Drawings, as specified herein, or as otherwise directed by the Engineer. Work includes, but is not limited to the following:

1. Culverts
2. Slope Drains or Downspouts
3. Headwalls
4. Drop Inlets
5. Trenching and backfill for Drainage Facilities

B. Furnish and install all storm drain pipes, headwalls, inlets, grates, cleanout boxes, inlet protection and outlet energy dissipaters, and perform associated structural excavation, backfill, and compaction.

C. Related Sections

1. Section 312319, Dewatering
2. Section 312316, Stripping and Excavation
3. Section 312323, Engineered Fill
4. Section 354237, Rock Slope Protection
5. Section 320523, Cast in Place Concrete

1.2 REFERENCES

A. State of California Department of Transportation (CALTRANS) Standard Specifications

1.3 SUBMITTALS

A. Submit to the Engineer, for review the following:

1. Proposed gradation and quarry source for all imported backfill or bedding materials.
2. Shop drawings showing dimensions, materials, reinforcement, penetrations, frame and grate, etc. of the proposed drop inlets or headwalls.
3. HDPE Pipe. Manufacturer's catalog data and installation instructions for pipe materials, including angles, fittings, and anchorage assemblies. A Certificate of Compliance(s) for each type of plastic pipe furnished and proposed for installation. The certificate shall also certify that the plastic pipe and joints comply with the requirements of the specifications, and shall include the resin material cell classification, unit weight of pipe, average pipe stiffness, joint property requirements, and date of manufacture. Submit the manufacturer's certification or copy of plant audits and test results from the National Transportation Product Evaluation Program (NTPEP) for the current cycle of

testing for each pipe diameter furnished and its conformance with AASHTO minimum requirements.

2. PRODUCTS

A. Comply with the Drawings and Section 61 of the State Standard Specifications.

B. Pipe. Pipe shall be dual-walled high-density polyethylene (HDPE) pipe with a smooth (non-corrugated) interior surface, and shall have a Manning's roughness coefficient of 0.012, conforming to the notes and details on the Drawings. ADS N12 WT pipe conforms to this specification.

C. Concrete. Comply with the notes on the Drawings.

D. Headwalls. Comply with the notes and details on the Drawings.

E. Backfill. Backfill shall comply with the notes and details on the Drawings.

F. Concrete Drop Inlet. Comply with the notes and details provided on the Drawings and the pipe manufacturer's specifications for water tight connection to box.

3. EXECUTION

3.1 GENERAL

A. The drainage materials shall be installed in accordance with the manufacturer's recommendations, as shown on the Drawings, as specified herein, and in conformance with the provisions in Section 64, "Plastic Pipe" of the Standard Specifications.

B. Culvert trenches must be properly shored and braced during construction or laid back at an appropriate angle to prevent sloughing and caving at sidewalls. The final project Drawings and Specifications should direct the attention of the contractor to all CAL OSHA and local safety requirements and codes dealing with excavations and trenches.

3.2 ENERGY DISSIPATORS

A. Rock Swales, energy dissipators, and rocked inlet protection shall be installed as shown on the Drawings, and in accordance with Section 354237, Rock Slope Protection.

3.3 PLASTIC PIPE.

A. Conform to the provisions in Sections 64, "Plastic Pipe" and Section 61, "Culvert and Drainage Pipe Joints" of the Standard Specifications.

B. Plastic pipe, fittings, gaskets, and other components shall be stored in a way that protects materials from the weather, heat sources, and corrosive liquids, in addition to protection from direct sunlight by storing in containers and/or covering with tarpaulins or other suitable materials. To minimize the potential for pipe shrinkage after installation, the temperature of pipe to be laid must not be more than five (5) degrees Fahrenheit higher than the ambient temperature of the trench. Should the Contractor not provide adequate cover of the pipe or install during changes in temperature the

Engineer will not accept the pipe and the Contractor will be required to replace the pipe which is deemed unacceptable by the Engineer. The Contractor will bare all costs associated with the replacement and no additional compensation will be allowed for.

C. Pipes shall be laid to the lines and grade shown on the Plans with the sections properly jointed, following generally accepted practices, the Manufacturer's recommendations, the Standard Specifications, these Special Provisions, and as directed by the Engineer. Care shall be taken not to damage pipe sections, joints, or gaskets during assembly. Contractor shall make use of pipe lubricant, installation stub, etc. and follow manufacture recommendations to ensure all pipe sections are pushed "home." A "come-along" or other similar method should be used; construction equipment such as an excavator bucket, etc. must not have direct contact with the plastic pipe end sections unless an installation stub and large timber or other suitable cushioning medium is utilized. Excavation and backfill shall conform to Section 19-3, "Structure Excavation and Backfill", of the Standard Specifications. The Contractor shall clean the interior of the pipeline as work progresses and the pipeline shall be clear and free of debris and sediment before acceptance by the Engineer.

D. The trench shall be excavated to the depth and width as necessary to allow for proper installation of the pipe and compaction of backfill material to the lines and grades as shown on the Project Plans and applicable details. The bottom of the trench shall be graded and prepared so as to provide a firm and uniform bearing for the pipe along its entire length. Where the trench bottom or immediate adjacent side walls are unsuitable (i.e. clay, peat, soft muck/refuse or bedrock/unyielding material unable to provide long-term pipe support), the Contractor shall excavate to a depth required by the Engineer and replace with suitable material as specified or directed by the Engineer. In addition and at the discretion of the Engineer, a geotextile material may be required to stabilize the bottom of the trench. In-situ trench foundation shall be no less than 90% standard proctor (95% where asphalt or concrete paving is proposed); any materials placed to stabilize trench bottom foundation shall be no less than 90% standard proctor. Suitable bedding material shall be as noted on the Drawings. Minimum bedding thickness shall be as noted on the Drawings. Suitable material for the initial backfill or pipe embedment (up to minimum 12 inches above top of pipe) including the haunch area and pipe zone shall be Class I or II in accordance with ASTM D2321. The final backfill section shall be structure backfill, aggregate base, or accepted native soils, as shown on the Plan details, and in conformance with Section 19-3, "Structure Excavation and Backfill", of the Standard Specifications. Any trench backfill shall be placed in uniform lifts (not to exceed 8 inches) and shall be compacted to a relative compaction of 90 percent, or 95% where asphalt or concrete paving is proposed. Where conditions (i.e. space constraints, poor trench wall soil qualities, etc.) are cause for the Contractor's inability to achieve the backfill compaction requirements, flowable fill or controlled low strength material (CLSM) shall not be placed in the work without prior acceptance of the Engineer.

E. In situations where the plastic pipe is placed under asphalt concrete paving or other concrete surface improvement and the cover over the pipe, from top of pipe to top to finished grade is 18-inches or less, then structural backfill shall be slurry cement backfill.

F. Allowable joint deflection or longitudinal bending is dependent on pipe size and/or joint design, and shall not exceed the pipe manufacturer's published limits. No deflection in pipe shall be allowed without prior written acceptance by the Engineer.

G. Where pipes are installed in manholes, drainage inlets, junction boxes or other structures, the connection shall be at least equal to that of the pipe joint performance requirements. Performance of the pipe, fittings, and connections is highly dependent on proper installation procedures. Installation shall be in conformance with all manufacture recommendations, the Project Plans and applicable details, the Standard Specifications, these Special Provisions, and as directed by the Engineer. The costs for these connections (including all materials, adapters, gaskets, seals, band clamps, couplings, grout, concrete collars, etc.) shall be included in the associated bid item of work and no additional compensation will be allowed for. There will be no separate payment for the connections required for a complete construction of the project.

H. Where pipes are to connect to existing pipes, proper couplings and methods shall be utilized to connect the plastic pipe to the existing pipe (including differing sizes and material), and the connection shall be at least equal to that of the pipe joint performance requirements. The connection shall be in conformance with all manufacturer recommendations, these Special Provisions, the Standard Specifications, and as directed by the Engineer. The costs for these couplings (including all materials, gaskets, seals, grout, concrete collars, etc.) shall be included in the associated bid item of work and no additional compensation will be allowed for. There will be no separate payment for the couplings required for a complete construction of the project.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Drainage Facilities will not be independently measured for payment. All work within this section shall be considered incidental to the Lump Sum contract price paid for related work.

B. Where Storm Drainage Facilities are shown on detailed site plans or identified as "Map Points", the lump sum price for the related Map Point, as shown on the Bid Form, shall cover all related work, including but not limited to paving, grading, storm drainage improvements, dewatering, rock slope protection, ditches, sub drains, and subgrade stabilization.

4.2 PAYMENT

A. No separate payment will be made for Storm Drainage Facilities.

END OF SECTION

SECTION 354237
ROCK SLOPE PROTECTION

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SECTION 354237
ROCK SLOPE PROTECTION

1. GENERAL

1.1 DESCRIPTION

A. Work within this section shall include furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing, Rock Slope Protection (RSP), Rock Slope Buttresses, Rock Energy Dissipaters, Rock Inlet Protection, backing layers, backfill and geotextile fabric where shown on the Drawings, specified herein, or as otherwise directed by the Engineer. Stone protection, rock slope protection, and riprap are interchangeable in these Specifications and Drawings.

B. All loading, transport, temporary stockpiling, processing and mixing of stone materials to achieve designated gradations, washing, on-site hauling, excavation, preparation of sub-grade, placement, embedment, backfill, grading, compaction, finish grading, clean-up, and off-haul and disposal of excess materials needed to install all Rock Slope Protection work, where incorporated in the work, shall be considered as included in the applicable bid item unit price, and no additional compensation will be allowed.

C. The location, alignment, angles, elevations, grades, slopes, dimensions, etc. of the proposed treatments, and structures as described in this section are shown on the Project Plans to provide a basis for construction and bidding purposes. The Engineer is expected to make minor revisions and provide direction in the field to fit any varying field conditions. The Contractor shall include all costs for working under the direction of the Engineer in his/her bid for this work, as no additional compensation will be allow therefore.

D. The Contractor is hereby notified that the Engineer may direct the Contractor to place additional stone materials (not shown on the Plans) at select locations within the project work treatment areas to fit existing conditions at the time of construction. Any such additional stone materials and placement shall be considered as included in the unit prices paid for the designated stone materials as described elsewhere in these Technical Specifications and no additional compensation shall be allowed for.

E. Related sections:

1. Section 334000, Storm Drainage Facilities
2. Section 312319, Dewatering
3. Section 312316, Stripping and Excavation

1.2 SUBMITTALS

A. Submit to the Engineer, for review, the following:

1. Manufacturer's product data and installation instructions for specified geotextile fabrics.

2. Certified weights of the rock delivered to the site.
3. Certificate(s) and other material testing data as necessary to validate the source of the Rock Materials and their conformance with the Standard Specifications and these Technical Specifications. Include all applicable test results for grading, specific gravity, resistance to degradation, absorption, durability index, and soundness (as described elsewhere in these Technical Specifications).
4. A representative 5 cubic yard sample of each of the proposed Rock Materials specified herein shall be delivered to the site for inspection and approval of the Engineer, ten days prior to delivery of the remainder of material to the project site. The Engineer reserves to the right to reject said materials.
5. Sampling and Testing Assistance. Any difference of opinion between the Engineer and the Contractor shall be resolved by dumping and checking the gradation of the two random truck loads of rock. Mechanical equipment, a sorting site and labor needed to assist in checking gradation shall be provided by the Contractor at no additional cost to the Client.

1.3 QUALITY ASSURANCE

A. Tolerances. Place rock to a vertical tolerance of minus 2 to plus 3 inches.

B. Subgrade Preparation. Prior to placement of rock, Engineer shall verify subgrade preparation, and placement of fabric for rock. Where backing is shown on the Drawings, Engineer shall verify subgrade preparation and backing placement prior to placement of outer rock course.

2. PRODUCTS

2.1 MATERIALS

A. Salvaged Rock Material. Native rock found on site may be salvaged for reuse, subject to compliance with the material requirements for the intended use, and subject to the approval by the Engineer. The Engineer may require the Contractor to provide testing (e.g. gradation curve, hardness, etc.) to ensure that materials are suitable for reuse. Salvaged creek bed material shall be placed on a hardened surface or other suitable material (i.e. steel plate, pavement, filter fabric) in order to protect the said material from contamination or mixing with other soils, earthen material and debris. The Engineer may, at his sole discretion, waive certain testing requirements to facilitate the Contractor's use of locally salvaged materials.

B. Rock materials and gradation shall conform to Section 72-2.02 Materials of the State Standard Specifications. Stones shall be sound, durable, hard, resistant to abrasion and free from laminations, weak cleavage planes, and the undesirable effects of weathering. It shall be of such character that it will not readily disintegrate from the action of air, water, or the typical conditions experienced during handling and placing. All aggregate material shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse, and adherent coatings.

C. Rock size classes not designated below shall be as shown on the Drawings, or as directed by the Engineer. All stone, rock, aggregate materials, and soils imported to the site shall be from a certified “Weed Free” source approved by the District.

D. RSP. Comply with Section 72 of the State Standard Specifications for the rock classes indicated on the Drawings. RSP shall be sub-rounded to angular.

E. Rock Slope Protection Fabric. Rock slope protection fabric shall conform to the notes on the Drawings.

3. EXECUTION

3.1 GENERAL

A. All rock materials shall be placed in such a manner as to smoothly conform to adjacent graded areas. Smaller rock shall be chinked into the margins of larger rock placements, as necessary to conform to earthwork and prevent migration of fines from adjacent graded areas into the rock matrix.

3.2 ROCK SLOPE PROTECTION FABRIC

A. Place a layer of geotextile fabric below the first rock layer, where shown on the Drawings. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. Prepare surface to receive the geotextile to a relatively smooth condition, free of obstructions, depressions, debris, and soft or low density pockets of material. Place geotextile with the long dimension parallel to flow and laid smooth and free of tension, stress, folds, wrinkles, or creases. Place the strips to provide a minimum width of 18 inches of overlap for each joint. Remove the temporary pins as rock is placed to relieve tensile stress. Any geotextile fabric that is damaged during its installation shall be replaced by the Contractor at no cost to Owner.

3.3 ROCK SLOPE PROTECTION

A. Install Rock Slope Protection in accordance with Section 72 of the State Standard Specifications Method A, as modified below, and to the lines and the minimum dimensions shown on the Drawings. Where specified, place Backing per Method B and spread so as not to damage the bottom layer of the geotextile fabric. Place rock so as to minimize the number of voids. Rock shall be placed in lifts with a thickness not exceeding the D100 of the specified stone. Each lift shall be backfilled to half its depth with native granular soils, prior to placement of the subsequent lift. Backfill shall be placed in a manner that does not interfere with direct rock to rock contact of successive lifts. Backfill shall be placed to match the finished surface of the RSP and water-jetted to fill all voids, as directed by the Engineer.

3.4 ENERGY DISSIPATORS

A. The specified geometry and volume of rock shown on the Drawings at Rock Energy Dissipators is approximate. Final dimensions and rock volume may be adjusted in the field, at the direction of the Engineer, to suit field conditions.

B. Rock will not be allowed to be "dumped". Following Engineer's approval of fabric underlayment (if shown on the Drawings), the rock shall be placed as directed by the Engineer for a natural appearance, which may require hand placement of rock. The Contractor shall take all necessary measures to protect fabric, or blanket from damage (if such material is damaged the product shall be repaired per the manufacturer's recommendations, and as directed by the Engineer). All rock is to be placed to minimize the potential for movement when flow is induced into the channel and this will be accomplished by interlocking the angular nature of the rock with itself, and by placing larger stones first, with direct stone to stone contact, and then chinking the voids with the smaller materials.

C. The energy dissipator geometry shall conform to the finished grades of the slopes on all sides. Local surface irregularities of the rock rip-rap shall not vary from the planned slopes by more than four inches (4-in) measured at right angles to the slope.

3.5 ROCK LINED CHANNEL OR ROCKED ROAD SHOULDER

A. Rock will not be allowed to be "dumped". Following Engineer's approval of fabric underlayment (if shown on the Drawings), the rock shall be placed as directed by the Engineer such that rocks are tightly abutting one another, which may require hand placement of rock. The Contractor shall take all necessary measures to protect fabric, or blanket from damage (if such material is damaged the product shall be repaired per the manufacturer's recommendations, and as directed by the Engineer). All rock is to be placed to minimize the potential for movement when flow is induced into the channel and this will be accomplished by interlocking the angular nature of the rock with itself, , with direct stone to stone contact, and then chinking the voids with the smaller materials. The geometry shall conform to the finished grades of the slopes and road surface on all sides. Local surface irregularities of the rock rip-rap shall not vary from the planned slopes by more than four inches (3-in).

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Rock Slope protection (RSP), Rocked Buttresses, Rock Energy Dissipators (RED's), Rock Inlet Protection at stream crossing or ditch relief culverts, and Rocked Shoulders or Ditches shown or noted on the Drawings shall not be independently measured for payment. The cost of this work shall be included in the lump sum price for the related work.

B. Where additional rock slope protection (not shown on the Drawings) is placed at the request of the Engineer to form slope protection, energy dissipators, or inlet protection,

this Rock Slope Protection will be measured by the cubic yard, independent of Class of rock, calculated to the nearest cubic yard.

C. Where additional rock lined ditch or rocked shoulder (not shown on the Drawings) is placed at the request of the Engineer, this work will be measured by the linear foot of constructed rock lined ditch or rocked shoulder, installed in accordance with the notes and details on the Drawings and approved by the Engineer.

D. Volumetric measurements will be determined from the dimensions as shown on the Drawings or the dimensions constructed as directed by the Engineer. Materials placed in excess of these dimensions will not be included the measurement for payment. Surface areas will be measured to the horizontal limits parallel to the ground surface.

E. Excavation and backfill for rock slope protection will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for Rock Slope protection (RSP), Rocked Buttresses, Rock Energy Dissipators (RED), Rock Inlet Protection, and Rocked Shoulders or Ditches shown on the Drawings. All costs in connection with this work will be considered incidental to the lump sum contract price for the associated work or "Map Point".

B. Additional Rock Slope Protection, rock energy dissipators, or rocked inlet protection, measured as specified above, will be paid for at the contract price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the riprap placement, including subgrade preparation, geotextile fabric, processing work, backfill of voids, excavation and fill.

C. Additional Rock lined ditch or rocked shoulder that is not shown on the Drawings, but that is constructed at the request of the Engineer, measured as specified above, will be paid for at the contract price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the construction of the rocked shoulder or rock lined ditch, including subgrade preparation, geotextile fabric, processing work, backfill of voids, excavation and fill.

D. No separate payment will be made for excavation and backfill incidental to slope protection work. All costs in connection with this work will be considered incidental to the cost of construction of the associated slope protection work.

E. Payment for rock not shown on the Drawings, but placed at the request of the Engineer, will be made under:

Pay Item		Pay Unit
Rock Slope Protection	(light class)	CY
RSP (1/4 Ton)		CY
RSP (1/2 Ton)		CY

RSP (1 Ton)	CY
Rock Lined Ditch	LF
Rocked Shoulder	LF

END OF SECTION