Collector 2 Rehabilitation Project

Contract Documents and Technical Specifications

Humboldt Bay Municipal Water District

November 2021

GHD Project #: 11218863

Humboldt Bay Municipal Water District

Collector 2 Rehabilitation Project

Contract Documents and Technical Specifications

November 2021

Prepared for

Humboldt Bay Municipal Water District
828 7th Street
Eureka, California 95501

BOARD OF DIRECTORS

Sheri Woo, President
Neal Latt, Vice President
J. Bruce Rupp, Secretary-Treasurer
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Prepared by

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ADVERTISEMENT FOR BIDS

Humboldt Bay Municipal Water District
Owner

828 Seventh Street
Eureka, CA 95501
Address

Separate sealed bids will be received for the Collector 2 Rehabilitation Project.

A conditional or qualified bid will not be accepted if it modifies the Plans or Specifications or method of work.

There will not be a pre-bid meeting; however, potential bidders are encouraged to visit and familiarize themselves with the site. A site overview can be arranged by contacting Nathan Stevens at GHD Inc. by telephone at (707) 267-2204 or email at Nathan.Stevens@ghd.com.

The Humboldt Bay Municipal Water District (HBMWD, District, or Owner) is a wholesale water supplier that provides potable water to approximately 88,000 residents of Humboldt County via four Ranney collector wells. The Work consists of furnishing all labor, materials, equipment, and supervision for installing, developing, disinfecting, and testing a total of four new laterals, each 150 feet in length, in HBMWD's Collector 2. Work will also include the construction and installation of the dewatering pond and associated appurtenances as shown on the plans and as described in the specifications. The four new laterals will supplement the existing laterals in Collector 2.

Contractors shall submit a Qualifications Statement as a part of their bid. The Qualifications Statement shall include a description of Contractor's experience and qualifications for rehabilitation of radial collector wells by installing new (replacement) lateral well screens in an existing collector well structure. Bidder shall provide a narrative discussion of their expertise and experience to include, at a minimum, the following information:

a. Resumes for key personnel who are proposed to be involved in this project, including: Project Manager, Project Engineer, Project Hydrogeologist and Lateral Installation Superintendent.

b. Description and contact information (contact name, title, telephone number, and email address) for at least five projects that included installing new lateral well screens in an existing radial collector well in the previous ten years by the bidder's firm. Provide list of personnel included under item a who worked on the referenced projects.

The selection of Contractor shall be based on responsiveness, experience/responsibility, and price. The Owner reserves the right to disqualify and reject any bid from an unqualified bidder.

Bids will be received by the General Manager of the Humboldt Bay Municipal Water District at the District Office, 828 Seventh Street, Eureka, California, 95501 until 3:00 p.m. Pacific Time, January 21, 2022, and then at said office publicly opened and read aloud. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner at Humboldt Bay Municipal Water District, PO Box 95, Eureka, CA 95502-0095 and must be delivered to the District office by the above referenced time and date, regardless of postmark.

The Contract Documents are available and can be examined at the following locations:

HBMWD Website: www.hbmwd.com
Humboldt Builders Exchange, Eureka
North Coast Builders Exchange, Santa Rosa
Shasta Builders Exchange, Redding

Sacramento Builders Exchange, Sacramento

Each proposal must be submitted on the prescribed form and accompanied by a certified check or Bid Bond in an amount of not less than 10 percent of the amount bid. Successful bidders will be required to furnish both a Payment Bond and Performance Bond in the full amount of the Contract Price. In accordance with Public Contract Code Section 10263, the Contractor will be allowed to substitute securities for monies normally withheld by the Owner to insure performance under this contract.

This is a Public Works Project funded with Prop 1 and HBMWD funds. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, State of California. The general prevailing wage rates applicable to the work are set by the Director of the Department of Industrial Relations. It shall be mandatory upon the Contractor herein and upon any Subcontractors to pay not less than the said specified rates to all laborers, workers, and mechanics employed by them in the execution of the Agreement pursuant to CA Labor Code 1774. The Contractor will be required to comply with any changes in these wage rates as they are updated by the State and at no cost to the Owner.

Humboldt Bay Municipal Water District requires that all Contractors and Subcontractors working on this project keep certified payroll records in accordance with Labor Code 1776 and submit copies to the District. All Contractors and Subcontractors must also furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement).

Attention is directed to the provisions in section 1777.5 and sections 1777.6 of the Labor Code concerning the requirement to employ apprentices by the Contractor or any Subcontractor under it.

The Contractor shall comply with and shall ensure all Subcontractors comply with all laws and regulations governing the Contractor's and Subcontractors' performance on this project including, but not limited to: anti-discrimination laws, workers' compensation laws, and prevailing wage laws as set forth in CA Labor Code, Sections 1720-1861 et seq. and licensing laws. The Contractor is required to include the prevailing wage language in all subcontracts pursuant to CA Labor Code 1775(E)(b)(1). The Contractor shall post, at appropriate conspicuous points on the site of the Project, a schedule showing all the determined general prevailing wage rates.

Pursuant to Senate Bill 854, all Contractors bidding on public works projects must register with the Department of Industrial Relations. Contractors are subject to a registration and annual renewal fee. No Contractor or Subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. Accordingly, all Prime and Subcontractors contained in a bid must provide valid Department of Industrial Relations registration number(s). Failure to provide valid DIR registration numbers in the bid documents shall disqualify the bid.

Sheri Woo
President
Humboldt Bay Municipal Water District

November 30, 2021
Date

PART 1
BID REQUIREMENTS

INFORMATION FOR BIDDERS

Project: Collector 2 Rehabilitation Project

Bids will be received by Humboldt Bay Municipal Water District (herein called the "Owner"), at 828 Seventh Street, Eureka, CA 95501 until the time listed in the Advertisement for Bids, and then at said office publicly opened and read aloud.

Each bid must be submitted in a sealed envelope and addressed to Humboldt Bay Municipal Water District, 828 Seventh Street, Eureka, CA 95501. Each sealed envelope containing a bid must be plainly marked on the outside as BID FOR: COLLECTOR 2 REHABILITATION PROJECT, and the envelope shall bear on the outside the name of the bidder, their address, Contractor's license number, and DIR registration number. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Owner at Humboldt Bay Municipal Water District, PO Box 95, Eureka, CA 95502-0095.

Bids received by the Owner after the time specified for bid opening will not be considered. The Bidder is solely responsible for timely delivery of their bid.

There will not be a pre-bid meeting; however, potential bidders are encouraged to visit and familiarize themselves with the site. A site overview can be arranged by contacting Nathan Stevens at GHD Inc. by telephone at (707) 267-2204 or email at Nathan.Stevens@ghd.com.

All bids must be made on the required bid form. All blank spaces for bid prices must be filled in, in ink or typewritten, and the bid form must be fully completed and executed when submitted. Bids will be rejected if filled out in pencil. Only one copy of the bid form is required.

The Owner may waive any informalities or minor defects or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No Bidder may withdraw a bid within three (3) months after the actual date of the opening thereof. Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder.

Bidders must satisfy themselves of the accuracy of the estimated quantities in the bid schedule by examination of the site and a review of the Plans and Specifications, including addenda. After bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of Work or of the nature of the Work to be done.

The Contract Documents contain the provisions required for the construction of the project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from fulfilling any of the conditions of the Contract.

Each bid must be accompanied by a bid bond payable to the Owner for ten percent of the total amount of the bid. As soon as the bid prices have been compared, the Owner will return the bonds of all except the three lowest responsible bidders. When the Agreement is executed, the bonds of the two remaining unsuccessful bidders will be returned. The bid bond of the successful Bidder(s) will be retained until the payment bond and performance bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a bid bond.

A performance bond and a payment bond, each in the amount of 100 percent of the contract price, with a corporate surety approved by the Owner, will be required for the faithful performance of the Contract.

Attorneys-in-fact who sign bid bonds or payment bonds and performance bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party to whom the Contract is awarded will be required to execute the Agreement and obtain the performance bond, payment bond, and required insurance certificates within twenty-one (21) calendar days from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement and bond forms. In case of failure of the Bidder to execute the Agreement, the performance bond and the payment bond, the Owner may consider the Bidder in default, in which case the bid bond accompanying the proposal shall become the property of the Owner.

The Owner, within twenty-one (21) calendar days of receipt of an acceptable performance bond, payment bond and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may submit a written notice to withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

The Notice to Proceed shall be issued within twenty-one (21) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and Contractor.

If the Notice to Proceed has not been issued within the twenty-one (21) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Owner may make such investigations as they deem necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.

A conditional or qualified bid will not be accepted if it modifies the Plans or Specifications or method of Work. The intent is to award the entire job (all Schedules thereunder) to such Contractor or Contractors that will result in the lowest overall total cost to the Owner, provided that the Contractor is responsive to the bid requirements and is deemed qualified to perform the work.

Award(s) will be made to the lowest, responsive, qualified Bidder(s).

All applicable laws, ordinances, rules, and regulations of all Federal, State, and local authorities having jurisdiction over construction of the project shall apply to the Contract throughout.

The Bidder shall supply the names, addresses, and valid DIR registration numbers of major subcontractors, material suppliers, and/or fabricators (greater than 10% of total contract amount) with the bid.

The Contract Documents under which it is proposed to execute the Work consist of the Plans and all material bound herewith. These Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed Work. Any person contemplating the submission of a Bid shall have thoroughly examined all of the various parts of these Documents, and should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder shall request of the Engineer, in writing at least six (6) working days prior to bid opening, an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing, in the form of addenda to the Documents and will be furnished to all Bidders receiving a set of the Documents, issued no later than 72 hours prior to bid opening, who shall submit or indicate receipt of all addenda with their proposals. The Owner will not be responsible for any other explanation or interpretations of said Documents.

Questions regarding the Plans and Specifications shall be submitted by email to Engineer: Nathan Stevens at GHD Inc., at Nathan.Stevens@ghd.com. Replies to such inquiries will be in the form of

addenda or clarifications that will be sent to all plan holders. Requests for clarification regarding various portions may be made by phone to Nathan Stevens at GHD Inc., 707-267-2204.

Electronic copies of Contract Plans and Specifications may be obtained from the Engineer as specified in the Advertisement for Bids.

The Contract Documents are assembled, arranged, and titled generally in conformance with the 48-division format suggested by the Construction Specifications Institute (CSI). Minor variations to the CSI format may be used herein to suit Owner requirements or to better adapt the Documents to particular types of projects.

Portions of these Contract Documents may contain standard preprinted material. The Bidder's attention is called to the General Conditions of the Contract, which may modify and add to the preprinted material contained herein. Sentences in the Contract Documents which are phrased in mandatory language, but which include no explicit reference to the party who has responsibility for performing the mandated duty, shall be interpreted as imposing responsibility for performance of the duty described on the Contractor. For example, a directive that “the site shall be kept clean” would impose the duty of keeping the site clean on the Contractor.

Each proposal must be submitted on the prescribed form and be accompanied by a certified check or Bid Bond in an amount of not less than 10 percent of the amount bid. Successful bidders will be required to furnish both a Payment Bond and Performance Bond in the full amount of the Contract Price. In accordance with Public Contract Code Section 10263, the Contractor will be allowed to substitute securities for monies normally withheld by the owner to insure performance under this contract.

Where the Bid Proposal is to be submitted on a unit price basis, unit prices will be accepted on all items of Work set forth in the Bid, except those designated to be paid for as a lump sum. The estimate of quantities of Work to be done is tabulated in the Bid and, although stated with as much accuracy as possible, is approximate only and is assumed solely for the basis of calculation upon which the award of Contract shall be made. Payment to the Contractor will be made on the measurement of the Work actually performed by the Contractor as specified on the Contract Documents. The Owner reserves the right to increase or diminish the amount of any class of Work as may be deemed necessary.

When the Bid Proposal is to be submitted on a lump sum basis, a single lump sum price shall be submitted in the appropriate place. The total amount to be paid the Contractor shall be the amount of the lump sum in the Bid, as adjusted for additions or deletions resulting from changes in construction. After award of Contract, the Contractor may be required to break down the lump sum Bid into unit prices for the various portions to be completed.

All blank spaces in the Bid form must be filled in, in ink, in both words and figures where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in cases of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail.

Any Bid Proposal shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Advertisement for Bids.

The Bidder shall sign the Bid Proposal in the blank space provided therefor. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. Bid proposals signed by a non-corporate officer shall be invalid. If Bidder is a co-partnership, the true name of the firm shall be set forth above, together with the signature of the general partner or general partners authorized to sign contracts on behalf of the co-partnership. If signature is by an agent, other than an officer of a corporation or a general partner of a partnership, a Power of Attorney must be on file with the Owner prior to opening of Proposals or submitted with the Proposal, otherwise the Proposal will be regarded as not properly authorized.

State and local sales and use taxes, as required by the laws and statutes of the State and its political subdivisions, shall be paid by the Contractor. Prices quoted in the Proposal shall include sales tax unless provision is made in the Bid Proposal form to separately itemize the tax.

Any Bidder may modify their bid by telegraphic or written communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time. The telegraphic or written communication should not reveal the bid price, but should state the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened.

Each Bidder must inform themselves of the conditions relating to the execution of the Work, and it is assumed that Bidders will inspect the site, site access limitations, subsurface conditions, weather, variations of soil moisture and workability with rainfall, and make themselves thoroughly familiar with all the Contract Documents. The Bidder should check with local contractors regarding local site, surface, subsurface and material conditions and variability. Failure to do so will not relieve the successful Bidder of the obligation to enter into a Contract and complete the contemplated Work in strict accordance with the Contract Documents. The Bidder's attention is called to the General Conditions of the Contract Documents in regard to the obligation of Bidders to verify for themselves and to their complete satisfaction all information concerning site and subsurface conditions, and Notice requirements.

The applicable California prevailing wage rates can be found at www.dir.ca.gov and are on file with the Owner’s principal office, which shall be available to any interested party upon request. The contractor is also required to have a copy of the applicable wage determination posted and/or available at each jobsite.

No contractor or subcontractor may be listed on a bid proposal for a public works project (submitted on or after March 1, 2015) or be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the State of California Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].This project is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations. Accordingly, all Prime and Subcontractors contained in a bid must provide valid Department of Industrial Relations registration number(s). Failure to provide valid DIR registration numbers in the bid documents shall disqualify the bid.

California State prevailing wage rates will be required on this project. The Contractor will be required to comply with any changes in these wage rates as they are updated by the State at no cost to the Owner.

All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement), electronic Certified Payroll Reporting (eCPR) at the DIR, and also directly submit certified payroll and supporting documents to the Humboldt Bay Municipal Water District. The contact information for the Humboldt Bay Municipal Water District is:

Address:	HBMWD Attn: John Friedenbach PO Box 95 Eureka, CA 95502-0095
Business Phone:	(707) 443-5018
Email:	friedenbach@hbmwd.com

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

Contractors shall be subject to withholding of progress or final payments if prevailing wage compliance is incomplete or has not been submitted by Contractor or any Subcontractor.

Bidders shall inform themselves of, and the Bidder awarded a Contract shall comply with, Federal, State and local laws, statutes, and ordinances related to the execution of the Work. This requirement includes, but is not limited to, grant requirements as they apply to the Contractor's work, applicable regulations concerning employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, permits, fees, and similar subjects.

BIDDERS' CHECKLIST

This checklist has been prepared and furnished to aid bidders in including all necessary supporting information with their bid. Bidders' submittals shall include, but are not limited to the following:

ITEM		PAGE	CHECKED
1.	Bid Proposal	1-7 through 1-10	_____
2.	Acknowledgement of Addenda	1-9	_____
2.	List of Subcontractors (Subcontractor Details)	1-11	_____
3.	Bid Bond	1-12 through 1-13	_____
4.	Authority to Sign Bid Proposal (if applicable)	(Attached to Bid Bond)	_____
5.	Power of Attorney	(Attached to Bid Bond)	_____
6.	Qualifications Statement as described in the Advertisement for Bids	(Attached to Bid)	_____
7.	Prime's and Subcontractor's valid Department of Industrial Relations registration number(s)	(where Requested herein)	_____

BID PROPOSAL

Proposal of _____
(hereinafter called "Bidder"), organized and existing under the laws of the State of California,

doing business as _____*.(*Insert: "a corporation," “a limited liability corporation”, "a partnership," or "an individual" as applicable)

To the Humboldt Bay Municipal Water District, (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all Work for the Collector 2 Rehabilitation Project in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

In the event of a difference between a price quoted in words and a price quoted in figures for the same quotation, the words shall be the amount bid. In the event that the product of a unit price and an estimated quantity does not equal the extended amount quoted, the unit price shall govern, and the corrected product of the unit price and the estimated quantity shall be deemed to be the amount bid. If the sum of two or more items in a bidding schedule does not equal the total amounts quoted, the individual item amounts shall govern, and the corrected total shall be deemed to be the amount bid.

By submission of this bid, each Bidder certifies, and in the case of a joint bid, each party certifies as to its own organization, that their bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other Bidder or with any competitor.

Bidder hereby agrees to commence Work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project and pay the liquidated damages as provided in Articles III and IV of the General Conditions.

Bidder agrees to perform all the Work described in the Contract Documents for the following prices. Bidder is advised to carefully review all sections of the Plans and Specifications in order to completely understand the Work and all constraints, including the schedule and material requirements.

BID PROPOSAL

BASE BID SCHEDULE

Item No.	Est. Qty.	Unit	Description	Unit Price	Total
1.	1	LS	Mobilization and Demobilization	$_____	$_____
2.	1	LS	Percolation Pond	$_____	$_____
3.	1	LS	Dewatering Pumps and Piping within Caisson		
4.	4	EA	Installation of Ports and 10-foot Blanks	$_____	$_____
5.	1	LS	Setup for Lateral Jacking	$_____	$_____
6.	560	LF	Furnish, Install & Develop 12" Diameter, Type 304 Stainless Steel lateral screen. Four 150-foot laterals with 140 feet of screen	$_____	$_____
7.	1	LS	Furnish and Install (2) 12" Stainless Steel Gate Valves with Tags and Install (2) Additional Valves to be Provided by Owner	$_____	$_____
8.	1	LS	Initial & Final Performance Tests	$_____	$_____

TOTAL OF BASE BID ($_____)

TOTAL OF BASE BID IN WORDS ($_____)

The objective of the project is to install 560 LF of screen. If the Contractor is not able to install 560 LF of screen in four laterals due to obstructions/refusal, additional alternate lateral(s) may be installed at the Owner's discretion. If additional locations are required, these locations will be determined through consultation with the Owner and the Engineer. The bidder agrees to install any additional laterals for the unit prices given in the Additive Bid Schedule below. Quantities have been provided as estimates only as a basis for comparing bids.

ADDITIVE BID SCHEDULE

Item No.	Est. Qty.	Unit	Description	Unit Price	Total
A-1	1	LS	Assembly and Disassembly of Owner-supplied Yelomine Piping, Valves, and Fittings		
A-2	1	EA	Installation of Ports and 10-foot Blanks	$_____	$_____
A-3	140	LF	Furnish, Install & Develop 12" diameter Type 304 Stainless Steel Laterals (does not include blank at each lateral)	$_____	$_____
A-4	1	EA	Furnish and Install 12" Stainless Steel Gate Valves with Tags	$_____	$_____
A-5	1	EA	Remove and reinstall support flooring to allow lateral installation at a different elevation than shown on plans	$_____	$_____
A-6	1	LS	Provide Stainless Steel Ladder	$_____	$_____
A-7	1	LS	Install Stainless Steel Ladder	$_____	$_____

TOTAL OF ADDITIVE BID ($_____)

TOTAL OF ADDITIVE BID IN WORDS ($_____)

Award will be made to the lowest, responsive, responsible bidder. The low bidder shall be determined based on the Total of Base + Additive Bid below.

TOTAL OF BASE + ADDITIVE BID ($_____)

TOTAL OF BASE + ADDITIVE BID IN WORDS ($_____)

Receipt of the following Addenda is acknowledged:

_____

_____

_____

_____

_____

The representations made herein are made under penalty of perjury.

Respectfully submitted:

Signature	Title
License Number	Date
License Expiration Date	
DIR Registration Number	

(SEAL - If Bid is by Corporation)

SUBCONTRACTOR DETAILS

The Bidder certifies that:

A. __ I do not intend to subcontract any Work on this project.

B. __ I do intend to subcontract portions of the Work on this project.

NOTE: The Bidder shall check box A or box B. If the Bidder does not check a box, it will be deemed that the Bidder has checked box A.

If awarded the Contract, the Bidder proposes to employ the following subcontractors who will perform Work or labor or render service to the Bidder in or about the Work in an amount in excess of one-half of one percent (0.5%) of the total amount of Bidder's proposal. If no subcontract Work is proposed, except within the one-half of one percent (0.5%) limit set forth, the Bidder shall so state.

NAME & ADDRESS OF SUBCONTRACTOR	DESCRIPTION OF WORK TO BE SUBCONTRACTED	SUBCONTRACTOR'S CALIF. LIC. NO. AND DIR NO.

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned,

_____ as Principal, and

_____ , as Surety, are hereby held and firmly bound unto

Humboldt Bay Municipal Water District,

as Owner, in the penal sum of _____for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this ____ day of _____, 20__.

The Condition of the above obligation is such that whereas the Principal has submitted to Humboldt Bay Municipal Water District a certain bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the:

Collector 2 Rehabilitation Project

NOW, THEREFORE,

(a) If said bid shall be rejected, or

(b) If said bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid), and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

SEAL:

_____
Principal

By: _____

Title: _____

_____
Surety

By: _____
Title

IMPORTANT - Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

NOTE: Bidder shall provide current “Power of Attorney” for Attorney-in-fact who signs Bid Bond.

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PART 2
CONTRACT FORMS

CONTRACT AGREEMENT

THIS AGREEMENT, MADE THIS _____ DAY OF _____, 20__, by and

between the *Humboldt Bay Municipal Water District*, hereinafter called "Owner," and

_____,

doing business as _____*, hereinafter called “Contractor”
(*insert "a corporation," “a limited liability corporation”, "a partnership," or "an individual" as applicable).

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete the:
   Collector 2 Rehabilitation Project

2. The Contractor will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.

3. The Contractor will commence the Work required by the Contract Documents within _____21_____ calendar days after the date of the Notice to Proceed and will complete the same within the time provided in Section B-35 of the General Conditions unless the period for completion is extended otherwise by the Contract Documents.

4. The Contractor agrees to perform all of the Work described in the Contract Documents and comply with terms therein for the sum of $_____, or as shown in the Bid Proposal.

5. The Contract Documents consist of the Bid Requirements, Contract Forms, General Conditions, Specifications, Appendices, and the Plans, including all modifications thereof incorporated into the documents before their execution, and including all other requirements incorporated by specific reference thereto. These form the Contract.

6. The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in quadruplicate, each of which shall be deemed an original on the date first above written.

_____	_____
Owner	Contractor
Title_____	Title_____
Date_____	Date_____

This page left blank intentionally.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter
(Corporation, LLC, Partnership, or Individual)

called Principal, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

Humboldt Bay Municipal Water District
(Name of Owner)

828 Seventh Street, Eureka, CA 95501
(Address of Owner)

hereinafter called Owner, in the penal sum of

_____ Dollars ($_____
_____)
in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated _____ day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

Collector 2 Rehabilitation Project

NOW, THEREFORE, If the Principal shall well, truly and faithfully perform its duties, all the undertaking, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety and during one year (minimum) guaranty period, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the

right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument may be executed in _4_ counterparts, each one of which shall be deemed an original, this _____ day of _____, 20__.

ATTEST:

_____	_____
(Principal) Secretary	Principal
	By_____
	_____
	Address
_____	_____
Witness as to Principal	
_____	
Address	
	_____
	Surety
ATTEST:	
_____	By_____
Witness as to Surety	Attorney-in-Fact
_____	_____
Address	Address
_____	_____

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a _____, hereinafter
(Corporation, LLC, Partnership, or Individual)

called Principal, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

Humboldt Bay Municipal Water District
(Name of Owner)

828 Seventh Street, Eureka, CA 95501
(Address of Owner)

hereinafter called Owner, in the penal sum of

_____ Dollars ($
_____)
in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated _____ day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

Collector 2 Rehabilitation Project

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, Subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such Work, and all insurance premiums of said Work, and for all wages and fringe benefits of labor, performed in such Work, whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulated and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument may be executed in __4__ counterparts, each one of which shall be deemed an original, this _____ day of _____, 20__.

ATTEST:

_____ _____
(Principal) Secretary Principal

By_____

_____
Address

_____ _____
Witness as to Principal

_____
Address

_____
Surety

ATTEST:

_____ By_____
Witness as to Surety Attorney-in-Fact

_____ _____
Address Address

_____ _____

NOTE: Date of bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

NOTICE OF AWARD

TO: _____
_____
_____

PROJECT: Collector 2 Rehabilitation Project

The Owner has considered the bid submitted by you for the above-described work in response to its Advertisement for bids dated _____ and Information for Bidders.

You are hereby notified that your bid has been accepted for items in the amount of

_____ Dollars ($_____
_____)

You are required by the Information for bidders to execute the Agreement and furnish the required Contractor's certificates of insurance within twenty-one (21) calendar days from the date this Notice is received by you.

If you fail to execute said Agreement and to furnish said insurance within twenty-one (21) calendar days from the date of receipt of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as a forfeiture of your bid bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this _____ day of _____, 20__.

Owner: Humboldt Bay Municipal Water District

By: _____ Title: General Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by:

_____
(Name of Contractor)

Dated this _____ day of _____, 20__.

By: _____ Title: _____

NOTICE TO PROCEED

TO: _____
_____
_____

PROJECT: Collector 2 Rehabilitation Project

You are hereby notified to commence Work in accordance with the Agreement on or before the _____ day of _____, 20__,
and you are to complete the Work within the timeframe dictated in the Agreement.

Based on the date of this Notice to Proceed, the date of completion of all Work will be modified in the Contract Agreement.

You are required to return an acknowledged copy of this Notice to Proceed to the Owner.

Dated this _____ day of _____, 20__.

Owner: Humboldt Bay Municipal Water District

By: _____ Title: General Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by:

_____
(Name of Contractor)

Dated this _____ day of _____, 20__.

By: _____ Title: _____

PART 3
GENERAL CONDITIONS

GENERAL CONDITIONS
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SECTION A
DEFINITIONS AND TERMS

A-1 General

Wherever the following abbreviations and terms, or pronouns in place of them, are used in these Conditions and other Contract Documents of which these Conditions are a part, the intent and meaning shall be interpreted as provided below.

A-2 Abbreviations

The following abbreviations may be used in the Contract Documents:

AA	Aluminum Association
AASHO	American Association of State Highway Officials
ABMA	American Boiler Manufacturer's Association
ACI	The American Concrete Institute
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturer's Association
AI	The Asphalt Institute
AIA	American Institute of Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALSC	American Lumber Standards Committee
ANSI	American National Standards Institute, Inc.
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CCMTC	California Concrete Masonry Technical Committee
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRSI	Concrete Reinforcement Steel Institute
DFPA	Douglas Fir Plywood Association
DIR	Department of Industrial Relations
ETL	Electrical Testing Laboratory
FEMA	Federal Emergency Management Agency
FS	Federal Specification
HBMWD	Humboldt Bay Municipal Water District
HMGP	Hazard Mitigation Grant Program
ICBO	International Conference of Building Officials
IEEE	The Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
MBMA	Metal Building Manufacturer's Association
MSS	Manufacturers Standardization Society of the Valve and Fitting Industry Standards
NBFU	National Board of Fire Underwriters

NBS	National Buildings Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Act of 1970
PCA	Portland Cement Association
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
UBC	Uniform Building Code
USPHS	United States Public Health Service
UL	Underwriter's Laboratory
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USAS	The United States of America Standard Institute
USBR	United States Bureau of Reclamation
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California

"Bureau" - United States Bureau of Reclamation
"State" - State of California
"State Standard Specifications" - Standard Specifications issued by the State of California Business and Transportation Agency, Department of Transportation, latest edition, unless a specific edition is referenced.

A-3 Definitions

a) Acceptance - The formal written acceptance by the District of the entire Contract which has been completed in all respects in accordance with the Specifications and any approved modifications.

b) Addenda - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications by additions, deletions, clarifications, or corrections.

c) As Approved - The words "as approved" unless otherwise qualified, shall be understood to be followed by the words "by the Engineer."

d) Bid - The offer of the Bidder for the Work when made out and submitted on the prescribed bid form, properly signed and guaranteed. A Bid is also known as a Proposal.

e) Bid Bond - The cash, cashier's check, certified check, or bidder's bond accompanying the Bid submitted by the bidder, as a guarantee that the Bidder will enter into a Contract with the District for the performance of work herein described.

f) Bidder - Any individual, firm, partnership or corporation submitting a bid for the work contemplated and acting directly or through a duly authorized representative.

g) Board of Directors or Board – The Board of Directors of the Humboldt Bay Municipal Water District

h) Change Orders - A written order to the Contractor authorizing an addition, deletion, or revision in the work within the general scope of the Contract Documents or authorizing adjustment in the Contract price or Contract time.

i) Claim - A separate demand by the Contractor for (i) a time extension, (ii) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (iii) an amount the payment of which is disputed by the District.

j) Contract - The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the Work. The Contract shall include all Contract Documents and supplemental agreements amending or extending the work contemplated which may be required to complete the Work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments or extensions to the Contract and include Addenda and Contract Change Orders.

k) Contract Documents - The Contract Documents are any or all of the documents listed in Article I of these General Conditions.

l) Contract Price - Total monies payable to the Contractor under the terms and conditions of the Contract Documents.

m) Contract Time - The numbers of days stated in the Contract Documents for the completion of the Work.

n) Contractor - The person or persons, firm, partnership or corporation or other entity that has entered into the Contract with the District to perform the Work.

o) Contract Drawings - "Contract Drawings" or "Drawings" means and includes:

(i) all drawings which have been prepared on behalf of the District and which are included in the Contract Documents and all modifying drawings issued by addenda thereto;

(ii) all drawings submitted pursuant to the terms of the Contract by the Contractor with his proposal and by the Contractor to the District during the progress of the Work when accepted by the Engineer. Except where a specific type of drawing is indicated, the terms "Drawings" and "Plans" are used interchangeably throughout the Contract Documents and the Plans are Drawings as defined above.

p) County - County of Humboldt, California.

q) Date of Execution of the Contract - The date on which the Contract is signed by the District's authorized representative.

r) Datum - The figures given in the Specifications or upon the Drawings after the word "Elevation" or an abbreviation of it shall be per datum noted on the Drawings.

s) Days - Unless otherwise designated, days as used in the Contract Documents shall mean calendar days.

t) District - The Humboldt Bay Municipal Water District, may also be referred to as the District, HBMWD, or Owner.

u) Engineer - Wherever in these documents the word "Engineer" appears, it shall be understood to mean GHD Inc. The Engineer will have final authority as regards to contract administration, field inspection, and related items.

v) Field Order or Field Work Directive - A written order effecting a change in the Work not necessarily involving an adjustment in the Contract Price or an extension of Contract Time, issued by the Engineer to the Contractor during construction.

w) His - "His" shall include "her" and "its".

x) Install - "Install" wherever and in whatever manner used shall mean the installation, complete in place of an item.

y) Notice of Award - The written notice of the acceptance of the Bid from the District to the successful Bidder.

z) Notice to Proceed - Written communication issued by the District to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work.

aa) Or Equal - The terms "or equal" or "approved equal" shall be understood to indicate that the "equal" product be the same or better than the product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirement will be made by the Engineer.

bb) District Project Representative – The authorized representative of the District who is assigned to the project site or any part of thereof.

cc) Plans or Specification Drawings - The term "Plans or Specification Drawings" refers to the official Plans, profiles, cross sections, elevations, details, and other working drawings and supplementary drawings, or reproductions thereof, signed by the Engineer, which show the location, character, dimensions, and details of the work to be performed. Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.

dd) Project - The undertaking performed as provided by the Contract Documents.

ee) Provide - "Provide" wherever and in whatever manner used shall be understood to mean furnish and install.

ff) Project Geophysical Engineer – Norcal Geophysical Consultants Inc.

gg) Resident Project Representative - Authorized representative of the Engineer who is assigned to the Project or any part thereof.

hh) Service of Notice - Any notice from one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative thereof. Any such notice shall not be effective for any purpose whatsoever unless service in the following manner:

(i) If the notice is given to the District by personal delivery thereof, the District's Project Representative or by depositing the notice in the U.S. mail, enclosed in a sealed envelope addressed to Humboldt Bay Municipal Water District, 828 Seventh Street, Eureka, CA 95501 postage prepaid, by certified mail return receipt requested.

(ii) If the notice is given to the Contractor, by personal delivery to the Contractor or its duly authorized representative at the project site or by depositing in the U.S. mail, enclosed in a sealed envelope address to the Contractor on the Contract Form, postage prepaid, by certified mail, return receipt request.

(iii) If the notice is given to the Surety or any other person, by personal delivery to such Surety or other person by personal delivery to such Surety or other person by depositing in the U.S. mail, enclosed in a sealed envelope, addressed to the surety or other person at the address of such Surety or other person last communicated to the party giving the notice, postage prepaid, by certified mail return receipt requested.

ii) Shall or Will - “Shall,” or “Will,” whenever used to stipulate anything, means shall or will be done

or be performed by either the Contractor or the District and means that the Contractor or the District has thereby entered into a covenant with the other party to do or perform the same.

jj) Shop Drawing - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

kk) Shown - “Shown,” “indicated,” “detailed,” and words of like import, wherever and in whatever manner used, with or without reference to the drawings, means shown, indicated or detailed on the Drawings or Plans.

ll) Specifications - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship, including the General Conditions.

mm) Specified - “Specified,” “described,” or “noted,” wherever and in whatever manner used, means as specified, described or noted in the Contract Documents.

nn) Subcontractors - The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor and it includes one who furnishes material worked to a special design according to the Plans or Specifications of this Work, but does not include one who merely furnishes material not so worked, which would be considered a supplier only.

oo) Substantial Completion - That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.

The Engineer may, at its sole discretion, issue a written notice of substantial completion for the purpose of establishing the starting date for specific equipment guarantees, and to establish the date that the District will assume the responsibility for the cost of operating such equipment. Said notice shall not be considered as final acceptance of any portion of the Work or relieve the Contractor from completing the remaining work within the specified time and in full compliance with the Contract Documents.

pp) Sufficient - “Sufficient,” “necessary,” or “proper,” “acceptable,” “satisfactory,” “desirable,” and words of like import, wherever and in whatever manner used, with or without reference to the Engineer, means sufficient, necessary, proper, acceptable, satisfactory, and desirable in the judgment of the Engineer.

qq) Supplementary Conditions (not included for this project) - Modifications to General Conditions required by a Federal Agency for participation in the PROJECT and approved by the Agency in writing prior to inclusion in the Contract Documents, or such requirements that may be imposed by applicable State laws.

References to “Supplemental General Conditions” in the General Conditions and elsewhere in the Contract Documents shall be construed to read “Supplementary Conditions.”

rr) Supplier - Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

ss) Time Limits - All time limits stated in the Contract Documents are of the essence of the Contract.

tt) Work - All the work specified, indicated, shown, or contemplated in the Contract to construct the improvements, including all alterations, amendments, or extensions thereto made by Contract Change Order or other written orders of the Engineer.

uu) Written Notice - "Written Notice" shall be deemed to have been duly served when delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended or if delivered at or sent by registered mail to the last business address known to it who gives the notice, or sent by email.

vv) Whenever in the Specifications or upon the Drawings the words DIRECTED, REQUIRED, PERMITTED, ORDERED, DESIGNATED, PRESCRIBED, or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer is intended, and similarly the words APPROVED, ACCEPTABLE, SATISFACTORY, or words of like import, shall mean approved or acceptable to, or satisfactory to the Engineer, unless otherwise expressly stated.

SECTION B
GENERAL CONDITIONS

ARTICLE I. SCOPE OF WORK

B-1 Intent of Contract Documents

a) The intent of the Contract Documents is to prescribe the details for the construction and completion of the Work which the Contractor undertakes to perform in accordance with the terms of the Contract. Where the Specifications and Plans describe portions of the Work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals and do all the work involved in performing the Contract in a satisfactory and workmanlike manner, ready for use occupancy or operation by the District.

b) The technical provisions are presented in sections for convenience. However, this presentation does not necessarily delineate trades or limits of responsibility. All sections of the Specifications and Plans are interdependent and applicable to the Project as a whole.

c) The Contract Documents are complementary, and what is called for in any one shall be as binding as if called for in all.

d) Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Any work shown on one drawing shall be construed to be shown in all drawings and the Contractor will coordinate the Work and the Drawings. If any portion of the Contract Documents conflicts with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: The District-Contractor Contract; the Bid; any Supplementary or Special Conditions; Instructions to Bidders; the General Conditions; the Specifications; the Drawings. Technical Specifications take priority over general Specifications and detail Drawings take precedence over general Drawings. As between schedules and information given on Drawings, the Schedules shall govern. As between figures given on Drawings and the scaled measurements, the figures shall govern. As between large-scale Drawings and small-scale Drawings, the larger scale shall govern. Any conflict or inconsistency between or in the Drawings shall be submitted to the Engineer through the District's Project Representative or Resident Project Representative in writing. Work done by the Contractor after their discovery of such discrepancies, inconsistencies, or ambiguities shall be done at the Contractor's own risk.

B-2 Contractor's Understanding

a) It is understood and agreed that the Contractor has, by careful examination, satisfied itself as to

the nature and location of the Work, the conformation of the ground, the character, quality, and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under this Contract. No verbal agreement or conversation with any officer, agent, or employee of the District, either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

b) Contractor shall comply with all Federal, State, and Local laws and regulations applicable to this scope of work and said project, as well as all permits and environmental conditions established for this project (see section B-13). Contractor is responsible for obtaining all necessary permits for construction except for those permits already obtained by the District prior to construction. If a Contractor materially fails to comply with any term of this award, whether stated in a Federal statute or regulation, an assurance, in a State plan or application, a notice of award, or elsewhere, the District may take one or more of the actions outlined in 44 CFR Section 13.43 including termination of the project. Project awards may be terminated for convenience through the procedures outlined in 2 CFR Section 200.339.

B-3 Changes in the Work

a) The District may, at any time, by written order make changes in the Work including but not limited to: (a) changes in the Specifications or Drawings; (b) changes in the sequence, method, or manner of performance of the Work; (c) changes in the owner-furnished facilities, equipment, materials, services or site; or (d) changes directing acceleration of the Work. If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contract, an equitable adjustment will be made and the Contract modified in writing accordingly.

b) Such modification will be in the form of a Contract Change Order which will set forth the work to be done or the method by which the change and cost adjustment, if any, will be determined, and the time of completion of the Work.

c) To comply with the California Environmental Quality Act (CEQA) and permitting processes, material additions or amendments to this scope of work (SOW) may have to be reviewed by all agencies participating in the CEQA and permitting processes. The Contractor shall obtain approval in writing from the District prior to proceeding with any changes of work.

d) The Engineer also may at any time by issuing a Field Order make changes in the details of the Work. The Contractor shall proceed with the performance of any change in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles it to a change in the Contract Price or Time, or both in which event the Contractor shall give the Engineer written notice thereof within seven (7) calendar days after the receipt of the ordered change. The Contractor shall not execute such changes pending the receipt of an executed change order or further instruction from the District.

e) If the Contractor is delayed in completing by reason of any change made pursuant to this section, the time for completion of the Work shall be extended by change order for a period agreed to, commensurate with such delay. The Contractor shall not be subjected to any claim for liquidated damages for this period of time, but the Contractor shall have no claim for any other compensation for any such delay.

B-4 Procedures and Allowable Costs on Changes

a) The portion of the proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales or use taxes and up to fifteen percent (15%) of such anticipated gross wages, but not payroll costs, as overhead

and profit for the Contractor or any such Subcontractor, as applicable (such overhead and profit to include all supervision except foremen.)

b) All changes which affect the cost or time of the construction of the project must be authorized by means of a Change Order. The Change Order will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes should be recorded on a Change Order as they occur. Each Change Order must contain complete and detailed justification for all items addressed by the Change Order.

c) If the change in or addition to the Work will result in an increase in the contract sum, the compensation to be paid for any extra work or change shall be determined in one or more of the following ways or at District's sole election:

(i) By unit prices previously approved (unit prices previously approved shall be used in all cases for similar units unless mutually agreed that for some reason they are not applicable).

(ii) By estimate and acceptance of an agreed upon lump sum. Markup by Subcontractors on their work shall not exceed fifteen percent (15%) in totality. Contractor's markup on Subcontractor's work shall not exceed five percent (5%).

(iii) On a time and materials basis involving the actual necessary expenses and other services necessary to complete the work. In addition, there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual necessary expense to cover the cost of general overhead, general superintendence, other expenses, and profit. In the events that items (a) and (b) above are not applicable, then this latter method (c) shall be used. The Contractor shall keep full and complete records of the actual cost of such work in the form and manner prescribed by the Engineer and shall permit the Engineer to have access to such records as may be necessary to assist in the determination of the compensation payable for such work. Markup by Subcontractors on their work shall not exceed fifteen percent (15%) in totality. Contractor's markup on Subcontractor's work shall not exceed five percent (5%).

d) If the District elects to have the Change in the Work performed on a lump sum basis, such election shall be based on a lump sum proposal which shall be submitted by the Contractor within ten (10) calendar days of the District's request therefor. Request for a lump sum proposal shall not be deemed an election to have the Work performed on a lump sum basis. The Contractor's proposal shall be itemized and segregated by labor and materials for the various components of the change (no aggregate labor total will be acceptable) and shall be accompanied by signed proposals of any Subcontractors which will perform any portion of the change, and of any persons who will furnish materials or equipment for incorporation therein. The proposal shall also include the Contractor's estimate of the time required to perform said changes or additional work.

e) The portion of the proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include reasonably anticipated gross wages of Job Site labor, including foremen, who will be directly involved in the Change in the Work (for such time as they will be so involved), plus payroll costs (including premium costs of overtime labor, if overtime is anticipated, social security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor) and up to fifteen percent (15%) of such anticipated gross wages, but not payroll costs, as overhead and profit for the Contractor or any such Subcontractor, as applicable (such overhead and profit to include all supervision except foremen.)

f) The portion of the proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales or use taxes and up to fifteen percent (15%) of said direct material costs as overhead and profit for the Contractor or

any such Subcontractor (such overhead and profit to include all small tools), and may further include the Contractor's and any of its Subcontractors' reasonably anticipated rental costs in connection with the Change in the Work (either actual rates or discounted local published rates), plus up to five percent (5%) thereof as overhead and profit for the Contractor or any such Subcontractors, as applicable. If any of the items included in the lump sum proposal are covered by unit prices contained in the Contract Documents, the District may, if it requires the Change in the Work to be performed on a lump sum basis, elect to use these unit prices in lieu of the similar items included in the lump sum proposal in which event and appropriate deduction will be made in lump sum amount prior to the application of any allowed overhead and profit percentages. No overhead and profit shall be applied to any unit prices.

g) The lump sum proposal may include up to five percent (5%) of the amount which the Contractor will pay to any of its Subcontractors for the Change in the Work as a commission to the Contractor.

h) In the event that the Contractor fails to submit its proposal within the designated period, the Engineer may direct the Contractor to proceed with the Change or Addition to the Work and the Contractor shall so proceed. The Engineer shall determine the reasonable costs and time to perform the Work in question, which determination when approved by District shall be final and binding upon the Contractor.

i) In the event that the parties are unable to agree as to the reasonable costs and time to perform the change in or addition to the Work based upon the Contractor's proposal and the Engineer and District do not elect to have the change in the Work performed on a time and material basis, the Engineer and District shall make a determination of the reasonable cost and time to perform the Change in the Work, based upon their own estimates, the Contractor's submission or combination thereof. A Change Order shall be issued for the amount of costs and time determined by the Engineer and the District and shall become binding upon the Contractor unless the Contractor submits its protest in writing to the District within thirty (30) calendar days of the issuance of the Change Order. The District has the right to direct the Contractor in writing to perform the Change in the Work which is the subject of the Change Order. Failure of the parties to reach agreement regarding the costs and time of the performing the Change in the Work and/or any pending protest shall not relieve the Contractor from performing the Change in the Work promptly and expeditiously.

j) If the District elects to have the Change in the Work performed on a time and material basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-subcontractors, at actual costs to the entity or entities performing the Change in the Work (without any charge for administration, clerical expense, supervision or superintendence of any nature whatsoever, including foremen, or the costs, use or rental of tools or plant), plus fifteen percent (15%) thereof as the total overhead and profit to the entity or entities actually performing the change (except that this fifteen percent (15%) shall not be applied against any payroll costs, defined herein with respect to lump sum proposals). If the entity or entities actually performing the work are Subcontractors or Sub-subcontractors, the Contractor shall be allowed five percent (5%) of the total charge of the performing entity or entities (including mark-up) as Contractor's mark-up. No other mark-ups shall be allowed hereunder. The Contractor shall submit to the District daily work and material tickets, to include the identification number assigned to the Change in the Work, the location and description of the Change in the Work, the classification of labor employed (and names and social security numbers), the material used, the equipment rented (not tools) and such other evidence of cost as the District may require. The District may require authentication of all time and material tickets and invoices by persons designated by the District for such purpose. The failure of the Contractor to secure any required authentication shall, if the District elects to treat it as such, constitute a waiver by the Contractor of any claim for the cost of that portion of the Change in the Work covered by a non-authenticated ticket or invoice; provided, however, that the authentication of any such ticket or invoice by the

District shall not constitute an acknowledgment by the District that the items thereon were reasonably required for the Change in the Work.

k) No overhead and profit will be paid by the District on account of a Change in the Work except as specifically provided in this Section B-4. Overhead and Profit, as allowed under this paragraph, shall be deemed to include all costs and expenses which the Contractor or any of its Subcontractors may incur in the performance of the Change in the Work and which are not otherwise specifically recoverable by them pursuant to this paragraph.

l) The Contractor shall not be entitled to any amount for indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the proposal is based and to which the parties have agreed pursuant to the provisions of this section, and which the Contractor, its Subcontractors and Sub-subcontractors or any other person may incur as a result of delays, interferences, suspensions, changes in sequence or the like, for whatever cause, whether reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable, arising from the performance of any and all Changes in the Work performed pursuant to this section. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of its direct costs as compensable hereunder and an extension of the time of the Contract, but only in accordance with the provisions of the Contract Documents.

m) The Contractor agrees that it shall not be entitled to claim damages for anticipated profits on any portion of work that may be deleted. The amount of any adjustment for work deleted shall be estimated at the time deletion of work is ordered and the estimated adjustment will be deducted for the subsequent monthly pay estimates.

n) The District reserves the right to contract with any person or firm other than the Contractor for any or all extra work.

B-5 Unilateral Change in or Addition to the Work

Notwithstanding the above, the District, directly or through the Engineer, may direct the Contractor in writing to perform changes in or additions to the scope of the Contract. The Contractor shall perform such work and the parties shall proceed pursuant to the provisions of Section B-4.

B-6 Differing Site Conditions

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

a) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25118 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; or

b) Subsurface or latent physical conditions at the site differing from those indicated in the Contract Documents; or

c) Unknown 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.

The Engineer shall thereupon promptly investigate the conditions. If the Engineer finds that they do involve hazardous waste, or do materially differ and cause any decrease or increase in the Contractor's cost or time of performance, it will issue a Change Order as appropriate. Any increase or decrease in the cost of the Work or the time for performance shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes. The procedures applicable to claims per

extra costs shall then apply.

In accordance with 36 CFR Part 800, in the event a potential historic property or cultural resource is discovered during construction activities, the Contractor must cease work in the vicinity of the discovery and take all reasonable measures to avoid or minimize harm to the discovered property/resource. Construction activities in the area of the discovery shall not resume until the District concludes consultation with the State Historic Preservation Officer (SHPO) for treatment of the discovery.

B-7 Claims for Extra Costs

a) The Plans for Work show the conditions as they are supposed or believed by the Engineer to exist, but it is neither intended nor to be inferred that the conditions as shown thereon constitute a representation by the District or its officers that such conditions are universally existent nor shall the District or any of its officers or representatives be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the Plans and alternate conditions revealed during the progress of the Work, or otherwise.

b) The District assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefor is assumed by the District.

c) It is hereby mutually agreed that the Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer or the District, or the happening of any event, thing or occurrence, unless the Contractor shall have given the Engineer due written notice of potential claims as hereinafter specified.

d) The written notice of potential claims shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. Except as provided in Section B-6, the notice as above required shall be given to the Engineer at least 48 hours prior to the time that the Contractor commences performance of the work giving rise to the potential claim for additional compensation. If such notice is not given, the Contractor shall be barred from making any such claim for extra compensation.

e) The Contractor may submit a claim to the Engineer concerning any matter for which a protest under Section B-3 or a notice of potential claim is filed within sixty (60) calendar days following the submission of said protest or notice, unless, due to the nature of the claim or the uncompleted state of the work, it is impracticable to determine the amount or the extent of the claim within such period, in which case a claim may be submitted at the earliest time thereafter that such determination can be made, but in no event later than the final release by the Contractor provided for in Section B-71. The claims shall set forth clearly and in detail, for each item of additional compensation claimed, the reasons for the claim, reference to applicable provisions of the Specifications, the nature and the amount of the cost involved, the computations used in determining such costs, and all pertinent factual data. The Contractor shall maintain complete and accurate records of the cost or any portion of the Work for which additional compensation is claimed, and shall provide the Engineer with copies thereof, as required.

f) The Engineer will, within a reasonable time after submission of the Contractor's claim, make decisions in writing on all claims of the Contractor. All such decisions of the Engineer shall be final unless the Contractor shall, within ten (10) calendar days after receipt of the Engineer's decision, file with the Engineer a written protest, stating clearly and in detail the basis thereof. Such protest will be forwarded promptly by the Engineer to the District, which will issue a decision upon each such protest, and the District's decision will be final. Pending such decision, the Contractor shall proceed with its work in accordance with the determination or instructions of the Engineer. It is

hereby agreed that the Contractor's failure to protest the Engineer's determination or instructions, within ten (10) calendar days from and after the Engineer's determinations or instructions, shall constitute a waiver by the Contractor of all its rights to further protest, judicial or otherwise.

g) It is the intention of this Section that the differences between the parties, arising under and by virtue of the Contract, be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible or other appropriate action promptly taken. The Contractor hereby agrees that it shall have no right to additional compensation for any claim that may be based on any act, failure to act, event, thing, or occurrence for which no written notice of potential claim as herein required was timely filed.

h) In the event of an emergency endangering life or property, the Contractor shall act as stated in Section B-62 herein, and after execution of the emergency work shall present an accounting of labor, materials and equipment in connection therewith. The procedure for any payment that may be due for emergency work will be as specified in Section B-3 herein.

B-8 Disputes

Except as otherwise specifically provided in the Contract Documents, the Engineer will initially decide all claims of the Contractor and all disputes arising under and by virtue of the Contract. Such claim or dispute will be processed and decided by the Engineer as soon as practicable after its submission and the submission or availability of any additional information necessary to its decision. If the Contractor is dissatisfied with the Engineer's decision, the Contractor may, within 15 calendar days from the date of the Engineer's decision, follow the procedures set forth in Section B-55. If the Contractor fails to follow the procedures set forth in Section B-55 within the 15-calendar-day period, then the Engineer's decision shall be final, conclusive, and binding on the Contractor.

B-9 Guarantee

a) In addition to warranties, representations and guarantees stated elsewhere in the Contract Documents, the Contractor unconditionally guarantees all materials and workmanship furnished hereunder, and agrees to replace at its sole cost and expense, and to the satisfaction of the Engineer and the District, any and all materials which may be defective or improperly installed.

b) The Contractor shall repair or replace to the satisfaction of the Engineer any or all such work that may prove defective in workmanship or materials, ordinary wear and tear excepted, together with any other work which may be damaged or displaced in so doing.

c) In the event of failure to comply with the above stated conditions within a reasonable time, the District is authorized to have the defect repaired and made good at the expense of the Contractor who will pay the costs and charges therefor immediately upon demand, including any reasonable management and administrative costs, and engineering, legal, and other consultant fees incurred to enforce this section.

d) The signing of the Contract by the Contractor shall constitute execution of the above guarantees. Except as otherwise provided in this Contract, the guarantees and warranties shall remain in effect through the warranty period specified in the Performance Bond.

ARTICLE II. CONTROL OF WORK

B-10 Authority of the Engineer

a) The Engineer is the representative of the District and has full authority to interpret the Contract Documents, to conduct the construction review and inspection of the Contractor's performance, and to decide questions which arise during the course of the work, and its decisions on these matters shall be final and conclusive. The Engineer has the authority to reject all work and materials which do not conform to the Contract Documents, and has the authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the Contract.

If at any time the Contractor's work force, tools, plant or equipment appear to the Engineer to be insufficient or inappropriate to secure the required quality of work or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, improve their character, to augment their number or to substitute other personnel, new tools, plant or equipment, as the case may be, and the Contractor shall comply with such order.

b) Neither the failure of the Engineer to demand such increase of efficiency, number, or improvement, nor the compliance by the Contractor with the demand, shall relieve the Contractor of its obligation to provide quality work at the rate of progress necessary to complete the Work within the specified time.

c) The Engineer shall have the authority to make minor changes in the Work, not involving extra costs, and not inconsistent with the purposes of the Work.

d) Any order given by the Engineer, not otherwise required by the Contract Documents to be in writing shall, on request of the Contractor, be given or confirmed by the Engineer in writing.

e) Whenever work, methods of procedure, or any other matters are made subject to direction or approval, such direction or approval will be given by the Engineer.

f) The Engineer shall not be responsible for the construction means, controls techniques, sequences (except where noted otherwise), procedures, or construction safety.

g) It is expressly agreed and understood that GHD Inc. will have no liability whatsoever resulting from the obligations entered into under the Contract except as provided in any scope of work agreement between GHD Inc. and the District; that the District must look solely to the Contractor for the furnishing of the Work; that the Contractor must look solely to the District for payment; and that the District and the Contractor must look solely to each other for the enforcement of any claims or liabilities arising under or by reason of the Contract.

B-11 Drawings

a) Drawings furnished herewith are for bidding purposes. No hard copies of the Drawings will be provided to the Contractor. However, the Contractor shall print for themselves and keep one copy of the drawings, in good order, available to the Engineer and its representatives, and convenient to the working site. The Contractor shall maintain on the job site and make available to the Engineer on request, one current full-sized marked-up set of design drawings which accurately indicate all variations in the completed work that differ from the design information shown on the Plans. If the Contractor, in the course of the Work, finds any discrepancy between the Drawings and the physical condition of the locality, or any errors or omissions in the Drawings, or in the layout as given by points and instructions, it shall be the Contractor's duty to inform the Engineer in writing, and the Engineer will promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk. All Drawings, Specifications, and copies thereof furnished by the Engineer are the property of the Engineer and shall not be reused on other work

and, with the exception of the signed Contract sets, are to be returned to the Engineer, on request, at the completion of the Work. All models are the property of the District. The Contractor may be furnished additional instructions and detail drawings by the Engineer as necessary to carry out the work required by the Contract Documents.

The additional drawings and instructions thus supplied, will become part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

b) The Drawings shall be supplemented by such shop drawings prepared by the Contractor as are necessary to adequately control the Work. No changes shall be made by the Contractor in any shop drawings after they have been accepted by the Engineer.

c) Shop Drawings for any structure shall include, but not be limited to: stress sheets, anchor bolt layouts, shop details, conduit and wire schedules, elevations, panel schedules, equipment inventory, seismic calculations, and mounting plans, which shall be reviewed and accepted by the Engineer before any such work is performed.

d) Contractor agrees that shop drawings processed by the Engineer are not Contract Change Orders; that the purpose of shop drawings submitted by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that it demonstrates its understanding by indicating which equipment and material it intends to furnish and by detailing the fabrication methods it intends to use.

e) It is expressly understood, however, that favorable review of the Contractor's shop drawings shall not relieve the Contractor of any responsibility for accuracy of dimensions and details, field verification of dimensions, or for mutual agreements of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of its shop drawings with the Specifications. Contractor further agrees that if deviations, discrepancies or conflicts between shop drawings and Specifications are discovered either prior to or after shop drawings are processed by the Engineer, the Specifications shall control and shall be followed.

f) Unless otherwise stated, the Engineer shall have thirty (30) calendar days from the date of receipt of shop drawings for review.

g) Full compensation for furnishing all shop drawings and submittals shall be considered as included in the prices paid for the Contract items of Work to which such drawings relate and no additional compensation will be allowed therefor. Any cost related to the Engineer's review of any particular set of shop drawings or submittals more than twice, due to incompleteness or unacceptability, shall be borne by the Contractor, and the District reserves the right to withhold such costs from payments due the Contractor.

h) When submitted for the Engineer's review, Shop Drawings and submittals shall bear the Contractor's certification that they have reviewed, checked and approved the Shop Drawings and submittals and that they are in conformance with the requirements of the Contract Documents.

i) That portion of the Work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

j) Acceptance by the Engineer of any drawing, method of work, or any information regarding materials and equipment the Contractor proposes to furnish shall not relieve the Contractor of its responsibility for any errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or District, or any officer or employee thereof, and the Contractor shall have no

claim under the Contract on account of the failure or partial failure or inefficiency or insufficiency of any plan or method or work or material and equipment so accepted. Such acceptance shall be considered to mean merely that the Engineer has no objection to the Contractor using, upon the Contractor's own full responsibility, the plan or method of work proposed, or furnishing the materials and equipment proposed.

B-12 Construction Staking and Surveys

The Contractor shall furnish land surveys deemed necessary for locating the principal component parts of the Work.

B-13 Permits and Regulations

Permits, licenses, and easements of a temporary or permanent nature, necessary for the prosecution of the Work shall be secured and paid for by the Contractor, except as noted in Section B-32, and herein.

The Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the Work as shown on the Plans and described in the Specifications. The Contractor shall promptly notify the Engineer in writing of any specification at variance therewith and any necessary changes shall be adjusted as provided in the Contract for Changes in the Work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations and without such notice to the Engineer, it shall bear all costs arising therefrom.

B-14 Conformity with Contract Documents and Allowable Deviations

Work and materials shall conform to the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on Contract Documents. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Specifications and Plans, and its decision as to any allowable deviations therefrom shall be final and conclusive.

Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered as described in Section B-28. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutions are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitution will be made by the Contractor without a change in the Contract Price or Contract Time.

B-15 Coordination and Interpretation of Contract Documents

a) The Contract Documents are complementary and a requirement occurring in one is as binding as though occurring in all.

b) In the event of conflict between the Plans and the Technical Specifications, the Technical Specifications shall govern, except that, where items are shown on the Plans and are not specifically included in the Technical Specifications, the Plans shall govern.

c) Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in the Specifications or Plans, the Contractor shall apply to the Engineer for

such further explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Specifications and Plans, reference shall be made to the Engineer, whose decision thereon shall be final and conclusive.

d) In the event of any discrepancy between any plans and the figures written thereon, the figures shall be taken as correct. Detailed drawings shall prevail over general drawings.

e) Any reference made in these Specifications or on the plans to any Specification, standard, method, or publication of any scientific or technical society or other organization shall, in the absence of a specific designation to the contrary, be understood to refer to the Specification, standard, method, or publication in effect as of the date that the Work is advertised for Bids.

B-16 Subcontracts

a) The attention of the Contractor is directed to the provisions of Public Contract Code sections 4100-4113, regarding subcontracting and said provisions are by this reference incorporated herein and made a part hereof.

b) Each Subcontract shall contain a suitable provision for the suspension or termination thereof should the Work be suspended or terminated or should the Subcontractor neglect or fail to conform to every provision of the Contract Documents insofar as such provisions are relevant. No Subcontractor or supplier will be recognized as such, and all persons engaged in work will be considered as employees of the Contractor, and the Contractor will be held responsible for their work, which shall be subject to the provisions of the Contract Documents. The Contractor shall be fully responsible to the District for the acts or omissions of its Subcontractors and of the persons either directly or indirectly employed by him. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the District. If a legal action, including arbitration and litigation, against the District is initiated by a Subcontractor or Supplier, the Contractor shall reimburse the District for the amount of legal, engineering and all other expenses incurred by the District in defending itself in said action.

c) The District and the Engineer reserve the right to approve all Subcontractors. Such approval shall be a consideration to the awarding of the Contract and unless notification to the contrary is given to the Contractor prior to the signing of the Contract, the list of Subcontractors which is submitted with its proposal will be deemed to be acceptable.

B-17 Cooperation of Contractors

a) Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work specified or should work of any other nature be under way by other forces within or adjacent to said limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site (including material sources) at any time, by the use of other forces.

b) When two or more contractors are employed on related or adjacent work, each shall conduct its operation in such a manner as not to cause any unnecessary delay or hindrance to the other. Each contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by its operations, and for loss caused the other due to its unnecessary delays or failure to finish the Work within the time specified for completion.

B-18 Superintendence

a) The Contractor shall designate in writing before starting work an individual as authorized

representative who shall have the authority to represent and act for the Contractor. This authorized representative shall be present at the site of the work at all times while work is actually in progress on the Contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.

b) The Contractor is solely responsible, at all times, for the superintendence of the Work and for its safety and progress.

c) Whenever the Contractor or its authorized representative is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.

d) Any order given by the Engineer, not otherwise required by the Specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

B-19 Inspection of Work

a) Unless otherwise provided, all equipment, materials, and work shall be subject to inspection and testing by the Engineer. The Engineer will observe the progress and quality of the Work and determine, in general, if the Work is proceeding in accordance with the intent of the Contract Documents. The Engineer shall not be required to make comprehensive or continuous inspections to check the quality of the Work, and it shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work. Visits and observations made by the Engineer shall not relieve the Contractor of its obligation to conduct comprehensive inspections of the Work and to furnish proper materials, labor, equipment, and tools, and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract.

b) Whenever the Contractor varies the period during which work is carried on each day, it shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer shall be subject to rejection. Proper facilities for safe access for inspection to all parts of the Work shall at all times be maintained for the necessary use of the Engineer and other agents of the District, and agents of the Federal, State, or Local governments at all reasonable hours for inspection by such agencies to ascertain compliance with laws and regulations.

c) One or more inspectors may be assigned to observe the Work and to act in matters of construction under this Contract. It is understood that inspectors shall have the power to issue instructions and make decisions within the limitations of the authority of the Engineer. Such inspection shall not relieve the Contractor of its obligation to conduct comprehensive inspections of the work, to furnish proper materials, labor, equipment and tools, and perform acceptable work, and to provide adequate safety precautions in conformance with the intent of the Contract.

d) The Engineer and its representatives and the District and its representatives shall at all times have access to the Work wherever it is in preparation or progress, and the Contractor shall provide safe and convenient facilities for such access and for inspection. If the Specifications, the Engineer's instructions, laws, ordinances, or any public authority require any material, equipment or work to be specifically tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspection is by an authority other than the District, of the time fixed for inspection.

e) Work performed without inspection may be required to be removed and replaced under proper inspection, and the entire cost of removal and replacing, including the cost of District-furnished

materials used in the Work, shall be borne by the Contractor, regardless of whether or not the Work exposed is found to be defective. Examination of questioned work, other than that installed without inspection, may be ordered by the Engineer and, if so ordered, the work must be uncovered by Contractor. If such work is found to be in accordance with the Contract Documents, the District will pay the cost of re-examination and replacement. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such cost.

f) The inspection of the Work shall not relieve the Contractor of its obligation to fulfill the Contract as herein prescribed, or in any way alter the standard of performance provided by the Contractor, and defective work shall be made good and unusable materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer and accepted or estimated for payment. If the Work or any part thereof shall be found defective, Contractor shall, within ten (10) calendar days, make good such defect in a manner satisfactory to the Engineer. If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove the condemned materials from the Work within ten (10) calendar days after direction by the Engineer in writing, the District may make the ordered repairs, or remove the condemned materials, and deduct the cost thereof from any monies due the Contractor.

g) The Contractor shall furnish promptly without additional charge all facilities, labor and materials reasonably needed by the Engineer for performing all inspections and tests. Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.

h) Where any part of the Work is being done under an encroachment permit or building permit, or is subject to Federal, State, County or City codes, laws, ordinances, rules or regulations, representatives of the government agency shall have full access to the Work and shall be allowed to make any inspection or tests in accordance with such permits, codes, laws, ordinances, rules, or regulations. If advance notice of the readiness of the Work for inspection by the governing agency is required, the Contractor shall furnish such notice to the appropriate agency.

i) The Engineer may inspect production of the material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer or its authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The District assumes no obligation to inspect materials at the source of supply.

j) Forty-eight (48) hours prior to work being accomplished, the Contractor will notify the Engineer of the proposed working hours to accomplish the work for that day. Overtime and shift work may be established as a regular procedure by the Contract and with the written permission of the Engineer. Such permission may be revoked at any time. No work other than overtime and shift work established as a regular procedure shall be done between the hours of 7 p.m. and 7 a.m., nor on Sundays or legal holidays, except for such work as is necessary for the proper care and protection of the work already performed, or in case of an emergency.

If required, nighttime work periods shall be coordinated with the Engineer in advance, and approval shall be given by the Engineer prior to any work occurring outside the hours described above.

All costs for the overtime inspection, including those occurring as a result of overtime and shift work established as a regular procedure, shall be paid for by the Contractor. Overtime inspection shall include inspection required during holidays, Saturdays, Sundays, and any weekday between the hours of 7 p.m. and 7 a.m. Such costs will include, but will not necessarily be limited to, engineering, inspection, general supervision, and other expenses which are directly chargeable to

the overtime work. All such charges shall be deducted by the District from payment due the Contractor.

k) A prefinal inspection of the Work will be made by the District and the Engineer. This inspection shall be made as soon as practical after Contractor has notified the District in writing that the Work is ready for this inspection. The prefinal inspection shall be made prior to acceptance of any portion of the Work as being substantially complete and prior to filing the Notice of Completion.

A final inspection of all the Work will be made by the District, Engineer, and Contractor.

B-20 Tests

The District shall witness all tests specified or required by the Technical Specifications. The responsibility for payment for these tests is also outlined in the Technical Specifications. In general, and unless explicitly stated otherwise, the Contractor is responsible for the performance of all tests required by an independent testing service, and the payment for such tests is to be included in the Bid Item to which it relates. No additional payment will be made for the required testing. The Engineer will direct the Contractor to perform such tests as it deems necessary to determine the quality of work or compliance with Contract Documents. The Contractor shall furnish promptly without additional charge all facilities, labor, and material reasonably required for performing safe and convenient tests as may be required by the Engineer. The Contractor shall not be required to reimburse the District for tests performed by the District or Engineer above and beyond those outlined in the plans or specifications. If samples of materials are submitted which fail to pass the specified tests, the Contractor shall pay for all subsequent tests.

B-21 Removal of Rejected and Unauthorized Work and Materials

a) All work or materials which have been rejected shall be remedied or removed and replaced by the Contractor in an acceptable manner, and no compensation will be allowed for such removal, replacement, or remedial work.

b) Any work done beyond the lines and grades shown on the plans or established by the Engineer or any extra work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.

c) Upon failure of the Contractor to comply with any order of the Engineer made under this Section, the District may cause rejected or unauthorized work to be remedied, removed or replaced, and may deduct the costs therefor from any monies due or to become due the Contractor.

d) If following the installation of any equipment furnished hereunder, defects requiring correction by the Contractor are found, the District shall have the right to operate such unsatisfactory equipment and make reasonable use thereof until the equipment can be shut down for correction of defects without injury to the District.

B-22 Deductions for Uncorrected Work

If the Engineer deems it inexpedient to correct work damaged or not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefor, and such sum may be withheld by District from Contractor's payment.

B-23 Equipment and Plants

a) If equipment is acquired by the contractor under this project and paid for by the District, the use and disposition of the equipment shall be in compliance with 2 CFR Section 200.313.

b) Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project.

c) Plants will be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to ensure the production of sufficient material to carry the Work to completion within the time limit.

d) The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer, shall remove unsuitable equipment from the Work and discontinue the operation of unsatisfactory plants.

e) The Contractor shall identify each piece of its equipment, other than hand tools, by means of an identifying number plainly stenciled or stamped on the equipment at a conspicuous location and shall furnish to the Engineer a list giving the description of each piece of equipment and its identifying number. In addition, the make, model number, and empty gross weight of each unit of compacting equipment shall be plainly stamped or stenciled in a conspicuous place on the unit. The gross weight shall be either the manufacturer's rated weight or the scale weight.

f) In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the District, shall promptly remove any part or all of its equipment and supplies from the property of the District. If the Contractor fails to do so, the District shall have the right to remove such equipment and supplies at the expense of the Contractor.

B-24 Character of Worker

The Contractor shall employ only competent Subcontractors or skillful workers to do the work. If any Subcontractor, or person employed by the Contractor or any Subcontractor shall fail or refuse to carry out the directions of the District or its agents or shall appear to the District or its agents to be incompetent or to act in a disorderly or improper manner, it shall be removed from the project Work immediately on the requisition of the District or its agents, and such person shall not again be employed on the Work. Such discharge shall not be the basis for any claim for compensation or damages against the District, or any of its officers or agents.

B-25 Separate Contracts

The District reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate its work with the other contractor's work.

If any part of the Contractor's work depends for proper execution or results upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results. The Contractor's failure to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of its work, except as to defects which may develop in the other contractor's work after the execution of its work.

To ensure the proper execution of its subsequent work, the Contractor shall measure work already in place and shall at once report to the Engineer any discrepancy between the executed work and the Drawings.

The District may perform additional Work related to the Project itself, or it may let other contracts containing provisions similar to these. The Contractor will afford the other contractors who are parties to such contracts (or the District, if the District is performing the additional Work itself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work and shall properly connect and coordinate his Work with theirs.

If the performance of additional Work by other contractors or the District is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the District or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore as provided in Section B-7 of this Contract.

B-26 Materials, Services and Facilities

a) Unless otherwise specifically stated in the Contract Documents, the Contractor shall furnish all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature on all of the facilities necessary for the execution and completion of the Work. Unless otherwise specified, all materials shall be new and shall be manufactured, handled, and installed in a workmanlike manner to ensure completion of the Work in accordance with the Contract Documents. The Contractor shall, upon request of the Engineer, furnish satisfactory evidence as to the kind and quality of materials.

b) Where materials are to be furnished by the District, the type, size, quantity, and location at which they are available will be stated in the Contract Documents.

c) Manufacturers' warranties, guarantees, instruction sheets and parts listed, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before acceptance of the Contract.

d) Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

e) Materials, supplies and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.

f) Materials, supplies or equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

g) The completed Work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items required by the State and Federal (OSHA) industrial safety authorities and applicable local and national codes. Further, any features of the Work subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. Prior to performing Work specified herein, the Contractor shall request an inspection by a State Industrial Safety representative for the purpose of determining that the facilities provided are in compliance with the State and Federal safety requirements. Any facilities which are deemed necessary by official response following the above safety inspection shall be added or corrected as required as a part of the Contract Work. However, no payment will be made to the Contractor for such changes or additions to equipment furnished under this Contract since it is a requirement of these Specifications that such equipment be manufactured or fabricated in such a manner as to be in conformance with all Federal, State, and local safety requirements. The Contractor shall notify all manufacturers, equipment suppliers, and Subcontractors of the provisions of this article.

h) In approving equipment for installation in the project, the District and Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable National, State, and local safety codes or requirements, or the safety requirements of a recognized agency, or failure due to faulty design concepts, or defective workmanship and materials.

i) All materials incorporated into the job shall be new, especially purchased for the project unless otherwise specified or agreed in writing. Unless otherwise noted, any equipment offered shall be

current modifications which have been in successful regular operation under comparable conditions for a period sufficient to determine the reliability of the product. This time requirement, however, does not apply to minor details nor to thoroughly demonstrated improvements in design or in materials of construction.

j) Whenever the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market from firms of established good reputation, or, if not ordinarily carried in stock, shall conform to the usual standards of first-class materials or articles of the kind required with due consideration of the use to which they are to be put. In general, the work performed shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.

B-27 Storage of Materials

Materials shall be so stored as to ensure the preservation of their quality and fitness for the Work. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground, and they shall be placed under cover. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the owner or lessee.

Electrical equipment, devices, and motors shall be placed in dry and warm storage as approved by the Engineer.

All equipment and materials which are not to be painted (such as aluminum and stainless steel) and all factory finished or coated equipment and materials which are not to be painted, that are installed prior to completion of adjacent work, shall be completely covered and protected.

Articles or materials to be incorporated in the Work shall be stored in such a manner as to ensure the preservation of their quality and fitness for the Work, and to facilitate inspection.

B-28 Trade Names and Alternatives

For convenience in designation in the Specifications and Plans, certain articles or materials to be incorporated in the Work may be designated under a trade name or the name of a manufacturer and its catalog information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

a) The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and it shall furnish all information necessary as required by the Engineer. The Engineer shall be the sole judge as to the quality and suitability of alternative articles or materials and its decision shall be final.

b) Whenever the Specifications and Plans permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material or article will be made until the request for substitution is made in writing by the Contractor accompanied by complete data as to the equality of the material or article proposed. Such request by the Contractor must be made within thirty-five (35) calendar days after award of Contract.

B-29 Certificate of Compliance

a) A Certificate of Compliance shall be furnished prior to the use of any materials for which the Technical Specifications require that such a certificate be furnished. In addition, when so authorized in the Specifications, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The Certificate shall be signed by the manufacturer of the material or the manufacturer of assembled

materials and shall state that the materials involved comply in all respects with the requirements of the Contract. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the Certificate.

b) All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents and any such material not conforming to such requirements will be subject to rejection whether in place or not.

c) The District reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

d) The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

B-30 Assignment

The Contractor shall not assign the Contract or sublet it as a whole or in part without the prior written consent of the District, nor shall the Contractor assign any monies due, or to become due to it hereafter, without the prior written consent of the District.

B-31 Use of Completed Portions, Right to Operate Unsatisfactory Equipment or Facilities

a) The District may, at any time, and from time to time, during the performance of the Work, enter the work site for the purpose of installing any necessary work by the District labor or other contracts, and for any other purpose in connection with the installation of facilities. In doing so, the District shall endeavor not to interfere with the Contractor and the Contractor shall not interfere with other work being done by or on behalf of the District.

b) If, prior to completion and final acceptance of all the Work, the District takes possession of any structure or facility (whether completed or otherwise) comprising a portion of the Work with the intent to retain possession thereof (as distinguished from temporary possession contemplating the return to the Contractor), then, while the District is in possession of the same, the Contractor shall be relieved of liability for loss or damage to such structure other than that resulting from the Contractor's fault or negligence. Such taking of possession by the District shall not relieve the Contractor from any provisions of this Contract respecting such structure, other than to the extent specified in the preceding sentence, nor constitute a final acceptance of such structure or facility.

c) If, following installation of any equipment or facilities furnished by the Contractor, defects requiring correction by the Contractor are found, the District shall have the right to operate such unsatisfactory equipment or facilities and make reasonable use thereof until the equipment or facilities can be shut down for correction of defects without injury to the District.

B-32 Lands for Work, Right-of-Way Construction Roads

a) The District will provide the lands, easements, and/or rights-of-way necessary or other rights to enter and work on lands necessary for the performance of the Work. Other permits and licenses are addressed by sections B-13 and B-49. Should the Contractor find it advantageous to use any additional land for any purpose whatsoever, the Contractor shall provide for the use of such land at its expense. The Engineer shall be furnished with a copy of written agreements or otherwise be notified in writing of additional working space which is acquired. Nothing herein contained and nothing marked on the Plans shall be interpreted as giving the Contractor exclusive occupancy of the territory provided by the District. When two or more contracts are being executed at one time on the same or adjacent land in such a manner that work on one contract may interfere with that on another, the Engineer shall decide which contractor shall cease work, and which shall continue,

or whether the work on both contracts shall progress at the same time and in what manner, and the decision of the Engineer shall be final and binding. When the territory of one contract is the necessary or convenient means of access for the performance of another contract, such privilege of access or any other reasonable privilege may be granted by the Engineer to the contractor so desiring, to the extent, amount, in the manner, and at the time permitted. No such decision as to the method or time of conducting the work or the use of territory shall be the basis of any claim for delay or damage.

b) Lands, easements or rights-of-way to be furnished by the District for construction operations will be defined by the District or shown on the Plans prior to the start of work.

c) The Contractor shall construct and maintain all roads necessary to reach the various parts of the Work and for the transportation thereto of construction material and personnel. The cost of constructing and maintaining such roads shall be borne by the Contractor.

B-33 District's Right to Audit and Preservation of Records

a) If applicable, the Contractor shall facilitate the completion of an audit in accordance with 2 CFR Section 200 Subpart F as it relates to the Contractor's work on this project.

b) The Contractor shall maintain books, records and accounts of all costs in accordance with generally accepted accounting principles and practices. The District, the Comptroller General of the United States, State of California, and its authorized representatives shall have the right to audit the books, records and accounts of the Contractor under any of the following conditions:

(i) The Contract is terminated for any reason in accordance with the provisions of the Contract Documents in order to arrive at equitable termination costs;
(ii) In the event of a disagreement between the Contractor and the District over the amount due the Contractor under the terms of the Contract;
(iii) To check or substantiate any amounts invoiced or paid which are required to reflect the costs of the Contractor, or the Contractor's efficiency or effectiveness under this Contract or in connection with extras, changes, claims, additions, backcharges, or others, as may be provided for in this Contract; and/or
(iv) If it becomes necessary to determine the District's rights and the Contractor's obligations under the Contract or to ascertain facts relative to any claim against the Contractor which may result in a charge against the District;
(v) To determine any difference in cost occasioned by a permissible substitution;
(vi) To make audits, examinations, excerpts, and transcriptions pertinent to the loan financing on this project.
(vii) For any other reason in the District's sole judgment.

c) If any of the conditions stated in paragraph B-33(b)a) are satisfied, Contractor shall provide the District (or its representatives), unlimited, reasonable access during working hours to the Contractor's books and records under the conditions stated above. The District's audit rights shall be liberally construed in the District's favor.

d) The Contractor, from the effective date of final payment or termination hereunder, shall preserve and make available to the District for a period of three (3) years thereafter, at all reasonable times at the office of the Contractor (but without any charge to the District), all its books, records, documents, photographs, micro-photographs, and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work hereunder.

e) In accordance with 2 CFR Section 200.512, financial and programmatic records related to expenditure of funds on grant-supported projects shall be maintained at least 3 years following the date the grantee submits its final expenditure report on the project.

f) The District will make all payments required of it under this Contract subject to audit, under circumstances stated above, which audit may be performed at the District's option, either during the Contract time period or during the record retention time period. Regardless of authorization, approval or acceptance, signatures or letters which are given by the District and are part of the District's control systems or are requested by the Contractor, the payments made under this Contract shall not constitute a waiver or agreement by the District that it accepts as correct the billings, invoices or other charges on which the payments are based. If the District's audit produces a claim against the Contractor, the District may pursue all its legal remedies even though it has made all or part of the payments required by this Contract.

g) If any audit by the District or its representative discloses an underpayment by the District pursuant to the terms of the Contract Documents, the District shall have the duty to pay any amount found by the audit to be owed to the Contractor. If such audit discloses an overpayment, the Contractor shall have the obligation to reimburse the District for the amount of the overpayment. The District's right to claim reimbursement from the Contractor of any overpayment shall not be terminated or waived until three years after the completion of the District's audit or upon the termination of audit rights under subparagraph B-33(d), whichever date is later. The obligation of the Contractor to make reimbursements hereunder shall not terminate except as provided by law.

The District's right to audit and the preservation of records shall terminate at the end of three (3) years after the date final payment is made or termination of the Contract. The Contractor shall include this "Right to Audit and Preservation of Records" clause in all subcontracts issued by it and shall require the same to be inserted by all lower tier Subcontractors in their subcontracts, for any portion of the Work. Should Contractor fail to include this clause in any such contract or lower tier contract, or otherwise fail to ensure the District's rights hereunder, Contractor shall be liable to the District for all costs, expenses and attorney's fees which the District may have to incur obtaining or attempting to obtain an audit or inspection of or the restoration of records which otherwise have been available to the District from said persons under this clause. Such audit may be conducted by the District or its authorized representative.

ARTICLE III. PROGRESS AND COMPLETION OF WORK

B-34 Progress Schedule

The Contractor shall submit to the District such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records, and other data, where applicable, as are required by the Contract Documents for the Work to be performed.

Prior to the first partial payment estimate, the Contractor shall submit construction progress schedules showing the order in which it proposes to carry on the Work, including dates at which it will start the various parts of the Work, estimated date of completion of each part and as applicable:

a) The dates at which special detail drawings will be required; and

b) Respective dates for submission of shop drawings, the beginning of manufacture, the testing and the installation of materials, supplies, and equipment.

c) The Contractor shall also submit a schedule of payments that it anticipates it will earn during the course of the Work.

The progress schedules shall be submitted monthly and shall cover a time period satisfactory to the Engineer. The Contractor shall also forward to the Engineer, with the request for progress payment each month, a summary report of the progress of the various parts of the Work under the Contract in the shops and in the field, stating the existing status, rate of progress, estimated time of completion, and cause of delay, if any. If the Work is behind the submitted schedule, the Contractor shall submit in writing a plan acceptable to the District and Engineer for bringing the Work up to schedule.

B-35 Commencement and Progress of the Work and Time of Completion

Prior to the start of construction, the District will conduct a preconstruction conference. At the conference, the District will review the planned development with the Engineer, Contractor, and other interested parties. Items to be reviewed include materials, equipment, rights-of-way, schedules and all arrangements for prosecuting the Work.

The Contractor shall begin work within **twenty-one (21) calendar days** after receiving a Notice to Proceed and shall diligently prosecute the work to completion within **two hundred fifty (250)** calendar days. Note that due to permitting requirements, work that requires access to the river bar can only be performed during the period from July 1st through October 15th. Because the District will need to remove / raise pumps and re-install / lower pumps prior to and after construction, respectively, the Contractor must complete work on the river bar between July 15th and October 1st. River flow conditions may dictate the Contractor leaving the river bar prior to October 1st; however, that is unlikely. Work that occurs outside the ordinary high water line may occur any time within the contract period. Engineer shall have the right to specify the locations where Contractor shall start and proceed with the Work.

B-36 Suspension of Work

a) The Engineer may at any time, by notice in writing to the Contractor, suspend any part of the Work for such period of time as may be necessary to prevent improper execution of the Work on the project by the Contractor, its Subcontractors or agents, and the Contractor shall have no claim for damages or additional compensation on account of any such suspension.

b) The District may at any time suspend any part or all of the Work upon ten (10) calendar days' written notice to the Contractor, who shall thereupon discontinue all Work suspended except for all operations to prevent loss or damage to Work already executed as may be directed by the Engineer. In the event a part of the Work is suspended, the Contractor, if the suspension is not through its fault or the fault of its Subcontractors or agents, shall be paid on the same basis as

Extra Work for costs of work performed in accordance with such orders of the Engineer during such suspension, provided that this shall not include any cost pertaining to Work not suspended by said notice. Work shall be resumed by the Contractor after such suspension on written notice from the District. In the event of suspension of the entire Work by the District, the Contractor, if the suspension is not through fault of the Contractor or the fault of its Subcontractors or agents, shall be paid the sum of $500.00 for each calendar day during which the entire Work shall have been suspended. Said sum is hereby mutually agreed upon as fixed and liquidated damages in full settlement of all costs and expenses, losses and damages resulting to the Contractor from such suspension. Work shall be resumed by the Contractor after such suspension on written notice from the District.

c) In the event of any suspension of the Work in whole or in part under subsection (b) above, the Contractor shall be entitled to an extension of time wherein to complete the Work to the extent of the delay caused the Contractor thereby.

d) In the event the entire Work shall be suspended by order of the District, as hereinabove provided, and shall remain so suspended for a period of sixty (60) consecutive calendar days, through no fault of the Contractor, and notice to resume the Work shall not have been served on the Contractor as hereinabove provided, Contractor may, at its option, by written notice to the District, terminate the Contract in the same manner as if the termination had been initiated by the District, and the District shall have no claim for damages because of such termination of the Contract.

e) If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) calendar days by the District or under an order of Court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) calendar days after it is submitted, or the District fails to pay the Contractor substantially the sum approved by the Engineer or any final award by arbitration or litigation within sixty (60) calendar days of its approval and presentation, then the Contractor may, after ten (10) calendar days from delivery of a written notice to the District and the Engineer, terminate the Contract and recover from the District payment for all Work executed and all expenses sustained.

In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the District has failed to make any payment as aforesaid, the Contractor may upon ten (10) calendar days written notice to the District and the Engineer stop the Work until he has been paid all amounts then due, in which event and upon resumption of the Work, Change Orders shall be issued for adjusting the Contract Price or extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the Work.

If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of a failure of the District or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the District or Engineer.

If the Contractor intends to file a claim for additional compensation for a delay caused by the District or Engineer at a particular time, the Contractor shall file a Notice of Claim with the District within seven (7) calendar days of the beginning of the occurrence. The Notice of Claim shall be in duplicate, in writing, and shall state the circumstances and the reasons for the Claim, but need not state the amount. No Claim for additional compensation will be considered unless a Notice of Claim has been filed with the District within the time and in the manner stated above. Contractor's failure to file a claim shall constitute a waiver.

B-37 Termination For Default - Damages For Delay - Timely Extension

a) The Contractor shall at all times employ such force, plant, materials, and tools as will be sufficient, in the opinion of the Engineer, to prosecute the Work at not less than the rates fixed under the terms of the Contract and to complete the Work or any part thereof within the time limits fixed therein. If the Contractor refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will ensure the completion within the time specified in the Contract, or any extension thereof, or fails to complete said Work within such time, the District may, after giving ten (10) calendar days written notice to the Contractor, terminate its right to proceed with the Work or such part of the Work as to which there has been delay.

b) The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

(i) The delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to Acts of God, acts of the public enemy, acts of the District, acts of another contractor in the performance of a Contract with the District, fires, floods, excluding site flooding due to groundwater, epidemics, quarantine restrictions, unusually severe weather, as determined by the Engineer; and

(ii) The Contractor shall, within 48 hours of the start of the occurrence, give notice to the District of the cause of the potential delay and an estimate of the possible time extension involved. The Contractor, within seven (7) calendar days from the beginning of any such delay (unless the Engineer grants further period of time before the date of final payment under the Contract), notifies the Engineer in writing of the causes of delay and requests an extension of time.

(iii) The Engineer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when, in its judgment, the findings of fact justify such an extension, and its findings of fact shall be final and conclusive on the parties.

c) A request for an extension of time, or the granting of an extension of time, shall not constitute a basis for any claim against the District for additional compensation or damages unless caused by the District or another contractor employed by the District.

d) If the Contractor should be adjudged bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed for the Contractor on account of its insolvency and not be discharged within ten (10) calendar days after its appointment, or if the Contractor should fail to make prompt payments to Subcontractors or suppliers, or should it persistently disregard laws, ordinances, or the instructions of the Engineer, or otherwise commit a substantial violation of any provisions of the Contract, the District may, after giving ten (10) calendar days written notice to the Contractor, terminate the Contract and the Contractor's right to proceed with the Work.

e) No extension of time will be considered for time lost due to weather conditions normal to the area. Unusual weather conditions, if determined by the Engineer to be of a severity that could not be predicted, may be considered as cause for an extension of Contract completion time.

f) Delays in delivery of equipment or material purchased by the Contractor or his Subcontractors shall not be considered as a just cause for delay. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting delivery, and installation of all equipment and materials.

g) The rights and remedies of the District provided in this section are in addition to any of the rights and remedies provided by law or under this Contract.

h) In addition to the District's rights under this section, if at any time before completion of the work

under the Contract, it shall be determined by the District that reasons beyond the control of the parties hereto render it impossible or against the interests of the District to complete the Work, or if the Work shall be stopped by an injunction of a court of competent jurisdiction or by order of any competent authority, the District may, upon ten (10) calendar days written notice to the Contractor, discontinue the Work and terminate the Contract. Upon service of such notice of termination, the Contractor shall discontinue the Work in such manner, sequence, and at such times as the Engineer may direct. The Contractor shall have no claim for damages for such discontinuance or termination, nor any claim for anticipated profits on the Work thus dispensed with, nor any other claim except for the Work actually performed up to the time of discontinuance, including any extra work ordered by the Engineer to be done, nor for any claim for liquidated damages in accordance with the provisions of Section B-39.

B-38 Rights of District Upon Termination

a) In the event the right of the Contractor to proceed with the Work, or any portion thereof, has been terminated because of the fault of the Contractor and the Contractor has been given ten (10) calendar days' notice to cure such fault and has not done so, the District may take over the Work and prosecute the same to completion by contract or any other method the District deems expedient, and may take possession of and utilize in completing the Work such materials, appliances, equipment and plant as may be on the site of the Work and necessary therefor. Whether or not the Contractor's right to proceed with the Work is terminated, it and its sureties shall be liable for all damages including costs of managerial and administrative services, engineering, legal and other consultant fees, sustained or incurred by the District in enforcing the provisions of Section B-37 and in completing or causing to complete the Contract Work.

b) Upon termination the Contractor shall not be entitled to receive any further payment until the Work is finished. If upon completion of the Work the total cost to the District, including engineering, legal and other consultant fees, costs of managerial and administrative services, construction costs, and liquidated damages shall be less than the amount which would have been paid if the Work had been completed by the Contractor in accordance with the terms of the Contract, then the difference shall be paid to the Contractor in the same manner as the final payment under the Contract. If the total cost incurred by the District on account of termination of the Contract and subsequent completion of the Work by the District by whatever method the District may deem expedient shall exceed said amount which the Contractor would otherwise have been paid, the Contractor and its sureties shall be liable to the District for the full amount of such excess expense.

c) The rights and remedies of the District provided in this section are in addition to any of the rights and remedies provided by the law or under this Contract.

B-39 Failure to Complete the Work in the Time Agreed Upon - Liquidated Damages

a) Liquidated Damages - It is agreed by the parties to the Contract that time is of the essence; and that in case all the Work is not completed before or upon the expiration of the time limit as set in the Bid, Contract and Progress Schedule, or within any time extensions that may have been granted, damage will be sustained by the District; and that it may be impracticable to determine the actual amount of damage by reason of such delay; and it is, therefore, agreed that the Contractor shall pay to the District as damages the amount of $750.00 per day for each and every day's delay in finishing the Work in excess of the number of days specified. The parties expressly agree that this liquidated damage clause is reasonable under the circumstances existing at the time the Contract was made. The District shall have the right to deduct the amount of liquidated damages from any money due or to become due the Contractor.

b) In addition to the damages noted in subsection (a), the District shall have the right to charge to the Contractor and to deduct from the final or progress payments for the Work the actual cost to the District of legal, engineering, inspection, superintendence, and other expenses, which are

directly chargeable to the Contract and which accrue during the period of such delay, except that the cost of final inspection and preparation of the final estimate shall not be included in the charges.

c) Exclusions - Notwithstanding the provisions of subsection (a), the Contractor shall not be liable for liquidated damages or delays caused by the removal or relocation of utilities when such removal or relocation is the responsibility of the District or the owner of the utility under Government Code Section 4215.

B-40 Clean-up

During the progress of the Work, the Contractor shall maintain the site and related structures and equipment in a clean, orderly condition and free from unsightly accumulation of rubbish. Upon completion of Work and before the final estimate is submitted, the Contractor shall at its own cost and expense remove from the vicinity of the Work all plants, buildings, rubbish, unused work materials, concrete forms, and other like materials, belonging to it or used under its direction during the construction, and in the event of its failure to do so, the same may be removed by the District after ten (10) calendar days' notice to the Contractor, such removal to be at the expense of the Contractor. Areas disturbed during construction shall be restored by the Contractor to preconstruction condition, at the Contractor's expense.

ARTICLE IV. LEGAL RELATIONS AND RESPONSIBILITY

B-41 Compliance with Laws - Permits, Regulations, Taxes

Contractor is an independent contractor and shall at its sole cost and expense comply with all laws, rules, ordinances and regulations of all governing bodies having jurisdiction over the Work, obtain all necessary permits and licenses therefor, pay all manufacturers' taxes, sales taxes, use taxes, processing taxes, and all Federal and State taxes, insurance and contributions for social security and unemployment which are measured by wages, salaries or any remuneration paid to Contractor's employees, whether levied under existing or subsequently enacted laws, rules, or regulations. Contractor shall also pay all property tax assessments on materials or equipment used until acceptance by the District. If any discrepancy or inconsistency is discovered in the Plans or Specifications, or in this Contract in relation to any such law, rule, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Engineer in writing. It shall also protect and indemnify the District, the Engineer, and all of the District's officers, agents, and servants against any claim or liability arising from or based upon the violation of any such law, rule, ordinance, regulation, order or decree, whether by the Contractor itself or by its employees. Particular attention is called to the following:

a) Without limitation, materials furnished and performance by Contractor hereunder shall comply with Safety Orders of the Division of Industrial Safety, State of California, Federal Safety regulations of the Bureau of Labor, Department of Labor; and any other applicable Federal regulations.

The Contractor, upon request, shall furnish evidence satisfactory to the District and Engineer that any or all of the foregoing obligations have been or are being fulfilled. The Contractor warrants to the District that it is licensed by all applicable governmental bodies to perform this Contract and will remain so licensed throughout the progress of the Work, and that it has, and will have, throughout the progress of the Work, the necessary experience, skill and financial resources to enable it to perform this Contract.

Government code section references shall be interpreted to be the most recent applicable version.

B-42 Prevailing Wage

a) The applicable California prevailing wage rates can be found at www.dir.ca.gov and are on file with the Agency’s principal office, which shall be available to any interested party upon request. The contractor is also required to have a copy of the applicable wage determination posted and/or available at each jobsite

b) The Contractor shall forfeit as penalty to the District the sum of Two Hundred Dollars ($200) for each calendar day or portion thereof for each worker (whether employed by the Contractor or Subcontractor) paid less than the stipulated prevailing rates for any Work done under the Contract in violation of the provisions of the Labor Code and in particular, Section 1775. The Contractor shall forfeit $25 per day per worker for all overtime violations (Labor Code Section 1813); $100 per worker per day for failure to submit certified payroll and other requested documentation to the agency within 10 days of request and be subject to apprenticeship violation penalties under Labor Code Section 1777.7 This project is subject to compliance monitoring and enforcement of both the District and the California Department of Industrial Relations.

c) The District will not recognize any claims for additional compensation because of the payment of the wages set forth in the Contract Documents. The possibility of wage increases is one of the elements to be considered by the Contractor in determining its proposal, and will not under any circumstances be considered as the basis of a claim against the District or the Engineer.

d) The Contractor shall at all times keep posted at the jobsite current wage rates in effect for this Work.

e) This is a Public Works Project funded with District funds and Department of Water Resources Proposition 1 funds distributed through Humboldt County. Therefore, CA State prevailing wage rates will be required on this project. The District requires that all contractors and subcontractors working on this project keep certified payroll records in accordance with California Labor Code 1776 and submit copies to the District.

(i) In accordance with the provisions of section 1720 et seq. of the Labor Code, the Division of Labor Standards and Research has determined the general prevailing rates or wages and employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in section 1773.8.

(ii) It shall be mandatory upon the Contractor herein and upon any Subcontractor to pay not less than the said specified rates to all laborers, workers and mechanics employed by them in the execution of the Agreement pursuant to CA Labor Code 1774.

(iii) Attention is directed to the provisions in section 1777.5 and sections 1777.6 of the Labor Code concerning the requirement to employ apprentices by the Contractor or any Subcontractor under it. The Contractor shall submit documentation to the District confirming compliance with these requirements.

(iv) The Contractor shall comply with and shall cause his subcontractors to comply with all laws and regulations governing the contractor's and subcontractor's performance on this project including, but not limited to: anti-discrimination laws, workers' compensation laws, and prevailing wage laws as set forth in CA Labor Code, Sections 1720-1861 et seq. and licensing laws, the Copeland "Anti-Kickback" Act (40 USC 276(c); and the Contract Work Hours and Safety Standards Act (CWHSSA) (40 USC 327-333). The contractor is required to include the prevailing wage language in all subcontracts pursuant to CA Labor Code 1775(E)(b)(1). The Contractor shall post, at appropriate conspicuous points on the site of the Project, a schedule showing all the determined general prevailing wage rates.

(v) The Contractor agrees to comply with Labor Code Section 1775 (Payment of the Prevailing Wage Rates) and Labor Code 1776 (keeping accurate records) and Labor Code 1777.5, placing responsibility for compliance with the statutory requirements for all apprenticeable occupations on the prime contractor. The Contractor shall comply with the requirements imposed by the California Labor Code Sections 1720 through 1861 regarding public works projects and prevailing wage laws and sections 16000-16800 of the CA Code of Regulations.

(vi) Each worker needed to execute the work must be paid travel and subsistence payments as defined in the applicable collective bargaining agreements filed in accordance with Labor Code Section 1773.8.

(vii) Holiday and overtime work when permitted by law shall be paid for at a rate of at least one and one-half times the above specified rate of per diem wages, unless otherwise specified.

(viii) Contractors and any Subcontractors shall be assessed penalties for violating the following labor codes; CA Labor Code 1813 for overtime, 1775 for underpayment of the prevailing wage, and 1776 for inaccurate or incomplete payroll records.

B-43 Labor Compliance and Discrimination

Pursuant to Labor Code section 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

a) On each job site that is subject to compliance monitoring and enforcement by the Department of Industrial Relations under this subchapter, the prime contractor shall post a Notice containing the following language:

"This public works project is subject to monitoring and investigative activities by the Division of Labor Standards Enforcement (DLSE), Department of Industrial Relations, State of California. This Notice is intended to provide information to all workers employed in the execution of the contract for public work and to all contractors and other persons having access to the job site to enable the

DLSE to ensure compliance with and enforcement of prevailing wage laws on public works projects."

"The prevailing wage laws require that all workers be paid at least the minimum hourly wage as determined by the Director of Industrial Relations for the specific classification (or type of work) performed by workers on the project. These rates are listed on a separate job site posting of minimum prevailing rates required to be maintained by the public entity which awarded the public works contract. Complaints concerning nonpayment of the required minimum wage rates to workers on this project may be filed with the DLSE."

Local Office Contact Information:

Telephone Number: 844-522-6734

Address: BOFE – Public Works
Attn: Complaints Unit
2031 2031 Howe Ave, Suite 100
Sacramento, CA 95825

"Complaints should be filed in writing immediately upon discovery of any violations of the prevailing wage laws due to the short period of time following the completion of the project that the DLSE may take legal action against those responsible."

"Complaints should contain details about the violations alleged (for example, wrong rate paid, not all hours paid, overtime rate not paid for hours worked in excess of 8 per day or 40 per week, etc) as well as the name of the employer, the public entity which awarded the public works contract, and the location and name of the project."

"For general information concerning the prevailing wage laws and how to file a complaint concerning any violation of these prevailing wage laws, you may contact any DLSE office. Complaint forms are also available at the Department of Industrial Relations website found at www.dir.ca.gov/dlse/PublicWorks.html."

Attention is directed to Section 1735 of the Labor Code, which reads as follows:

a) No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status of such persons, except as provided in Section 12940 of the Government Code, and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

Federal Equal Opportunity Clauses from 41 CFR 60 1.4(b) also apply.

B-44 Eight-Hour Day Limitation

a) In accordance with the provisions of the Labor Code, and in particular, Labor Code Sections 1810 to 1815 thereof, inclusive, eight hours labor shall constitute a day's work, and no worker, in the employ of said Contractor, or any Subcontractor, doing or contracting to do any part of the Work contemplated by this Contract, shall be required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of those provisions; provided that subject to Labor Code Section 1815, a worker may perform work in excess of either eight (8) hours per day or forty (40) hours during any one week upon compensation for all hours worked in excess of eight (8) hours per day or forty (40) hours during any one week at not less than one and one-half times the basic rate of pay.

b) The Contractor and each Subcontractor shall also keep an accurate record showing the names, addresses, social security numbers, work classifications, 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 by the Contractor and by the Subcontractor in connection with the work specified herein, which record shall be open at all reasonable hours to the inspection of the District, State and Federal officers and agents; and it is hereby further agreed that, except as provided in (a) above, the Contractor shall forfeit as a penalty to the District the sum of twenty-five dollars ($25) for each worker employed in the performance of this Contract by it or by any Subcontractor under it for each calendar day during which such worker is required or permitted to labor more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of Labor Code Sections 1810 through 1815.

B-45 Compliance with State Requirements for Employment of Apprentices

The Contractor's attention is directed to Section 1777.2 through 1777.5 of the Labor Code; provisions of those Sections pertaining to employment of registered apprentices are hereby incorporated by reference into these Specifications. As applicable, the Contractor or any Subcontractor employed by it in the performance of the Contract work shall take such actions as necessary to comply with the provisions of Section 1777.5. Contractor shall provide the District copies of applicable forms or equivalent: DAS 140 – Public Works Contract Award Information; DAS 142 – Request to Train Apprentices; and CAC2 or other proof of payment of Training Fund Contributions; and any other communications relating to apprentices on public works projects. Contractor shall be solely liable for any and all fines assessed by the DIR or other agency or entity for non-compliance with any prevailing wage requirements.

B-46 Underground Utilities

In accordance with Government Code Section 4215, the Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating existing main or trunkline utility facilities not indicated in the Contract Plans and Specifications with reasonable accuracy, and for the equipment on the project necessarily idled during such work; provided that the Contractor shall first notify the Engineer before commencing work on locating, repairing damage to, removing, or relocating such utilities.

B-47 Water Pollution

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, and other waters of the state and/or United States from pollution with fuels, oils, bitumens, calcium chloride, and other harmful materials and shall conduct and schedule its operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, and water bodies. Care shall be exercised to preserve vegetation beyond the limits of construction. The Contractor shall comply with Section 5650 of the California Fish and Wildlife Code, State of California Construction General Permit, and all other applicable statutes and regulations relating to the prevention and abatement of water pollution.

B-48 Payment of Taxes

The Contract prices paid for the Work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State, or local governments.

B-49 Permits and Licenses

Except as otherwise provided in this Contract, the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the lawful prosecution of the Work.

B-50 Patents

The Contractor shall pay all applicable royalties and license fees and assume all costs arising from the

use of patented materials, equipment, and devices. The Contractor shall defend all suits or claims for infringement of any patent rights and save the District and Engineer and their duly authorized representatives harmless from loss on account thereof, except that the District shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified; however if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Engineer.

B-51 Public Convenience

a) This section defines the Contractor's responsibility with regard to convenience of the public and public traffic in connection with its operations.

b) The Contractor shall so conduct its operations as to offer the least possible obstruction and inconvenience to the public and it shall have under construction no greater length or amount of work than it can prosecute properly with due regard to the rights of the public.

c) Spillage resulting from hauling operations along or across any publicly traveled way shall be removed immediately by the Contractor at the Contractor’s expense.

d) Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.

e) Water shall be supplied if ordered by the Engineer for the alleviation or prevention of dust nuisance as provided in the Contract Documents.

f) In order to expedite the passage of public traffic through or around the Work and where ordered by the Engineer, the Contractor shall install signs, lights, flares, barricades, and other facilities for the sole convenience and direction of public traffic. Also, where directed by the Engineer, the Contractor shall provide and station competent flagpersons whose sole duties shall consist of directing the movement of public traffic through or around the Work. The cost of furnishing and installing such signs, lights, flares, barricades, and other facilities, and the cost of providing and stationing such flagpersons, all for the convenience and direction of public traffic, will be considered as included in the Contract price and no additional compensation will be allowed.

g) Flagpersons and guards, while assigned to traffic control, shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flagmen" of the California Department of Transportation. The equipment shall be furnished and kept clean and in good repair by the Contractor at its expense.

B-52 Safety

a) General - The Contractor shall be solely and completely responsible for the conditions of the job site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to all applicable Federal, State, and local laws, ordinances, and codes, and to the rules and regulations established by the California Division of Industrial Safety, and to other rules of law applicable to the Work.

b) The services of the Engineer in conducting construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's work methods, equipment, bracing or scaffolding or safety measures, in, on, or near the construction site, and shall not be construed as supervision of the actual construction nor make the Engineer or the District responsible for providing a safe place for the performance of work by the Contractor, Subcontractors, or suppliers; or for access, visits, use work, travel or occupancy by any person.

c) The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to the potential dangers and shall provide such necessary safety equipment and instruction as is necessary to prevent injury and damage to property. The Contractor shall appoint for the duration of this Contract, a qualified supervisor employee to develop and/or supervise the Contractor's job safety program that will effectively implement the safety provisions of the above agencies.

d) The Contractor, as a part of its safety program, shall maintain at its office or other well-known place at the job site, safety equipment applicable to the Work as prescribed by the aforementioned authorities, all articles necessary for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the job site.

e) If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Engineer and the District. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to, the site, giving full details and statements of witnesses.

f) If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

g) All work and materials shall be in strict accordance with all applicable State, Federal, and local laws, rules, regulations, and codes.

h) Nothing in this Contract is to be construed to permit work not conforming to governing law. When Contract Documents differ from governing law, the Contractor shall furnish and install the higher standards called for without extra charge. All equipment furnished shall be grounded and provided with guards and protection as required by safety codes. Where vapor-tight or explosion-proof electrical installation is required by law, this shall be provided.

i) Shoring and Trench Safety Plan - Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent support, and the Contractor shall comply with this law.

j) Trenching and Worker Protection - In accordance with Section 6705 of the State Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground. Not less than thirty (30) calendar days before beginning excavation for any trench or trenches five (5) feet or more in depth required under this Contract, the Contractor shall furnish to the Engineer working drawings of its trench safety plan. The trench safety plan working drawings shall be detailed plans showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground. If such plan varies from the shoring system standards established by the Construction Safety Orders of the California Department of Industrial Relations or the Federal Safety and Health Regulations for Construction of the Occupational Safety and Health Administration, Department of Labor, the plan shall be prepared by a registered civil or structural engineer. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders, or less effective than that required by said Federal Safety and Health Regulations for Construction. Submission of this plan in no way relieves the Contractor from the requirement to maintain safety in all operations performed by it or its Subcontractors.

k) Hazardous Wastes and Unforeseen Conditions - In accordance with Section 7104 of the State Public Contract Code, if the Work contemplated hereunder involves digging trenches or other earthwork activities, the Contractor shall promptly, and before the following conditions are

disturbed, notify the District, in writing, of any: (i) material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; (ii) Subsurface or latent physical conditions at the site differing from those indicated; or (iii) 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. The 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 the 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 herein. In the event that a dispute arises between the District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from any scheduled completion date provided for herein, but shall proceed with all Work to be performed hereunder. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the District and Contractor.

l) The Contractor shall perform all Work in a fire-safe manner. The Contractor shall supply and maintain onsite adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable Federal, State, and local fire prevention regulations and where the regulations do not cover, with applicable parts of the National Fire Prevention Standard for "Safeguarding Building Construction Operations," (NFPA No. 241).

B-53 Protection of Person and Property

a) The Contractor shall take whatever precautions are necessary to prevent damage to all existing improvements, including above ground and underground utilities, trees, shrubbery that is not specifically shown to be removed, fences, signs, mailboxes, survey markers and monuments, buildings, structures, the District's property, adjacent property, and any other improvements or facilities within or adjacent to the Work. If such improvements or property are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored, at the Contractor's expense, to a condition at least as good as the condition they were in prior to the start of the Contractor's operations.

b) The Contractor shall adopt all practical means to minimize interference to traffic and public inconvenience, discomfort, or damage. The Contractor shall protect against injury any pipes, conduits or other structures, crossing the trenching or encountered in the Work and shall be responsible for any injury done to such pipes or structures, or damage to property resulting therefrom. The Contractor shall support or replace any such structures without delay and without any additional compensation to the entire satisfaction of the Engineer. All obstructions to traffic shall be guarded by barriers illuminated at night. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations and, under all circumstances, the Contractor must comply with the laws and regulations of Humboldt County and the State of California relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdictions.

c) The Contractor is cautioned that it must replace all improvements in rights-of-way and within the public streets to a condition equal to what existed prior to the Contractor's entry onto the job.

d) Type and time of construction required at any road subject to interference by Contract work will be determined by those authorities responsible for maintenance of said road. It shall be the responsibility of the Contractor to determine the nature and extent of all such requirements, including provision of temporary detours as required; however, the construction right-of-way obtained by the District at affected roadways will be adequate for provision of all required detours. As required at any road crossing, the Contractor shall provide all necessary flagpersons,

guardrails, barricades, signals, warning signs and lighting to provide for the safety of existing roads and detours. Immediately after the need for temporary detours ceases, or when directed, the Contractor shall remove such detours and perform all necessary cleanup work, including replacement of fences, and removal of pavement. Included shall be all necessary replacement of existing roadway appurtenances, grading work, soil stabilization and dust control measures, as required and directed. The cost of all work specified under this Section shall be borne by the Contractor.

e) The Contractor shall examine all bridges, culverts, and other structures over which it will move its materials and equipment, and before using them, it shall properly strengthen such structures where necessary. The Contractor shall be responsible for any and all injury or damage to such structures caused by reason of its operations.

B-54 Responsibility for Repair of Facilities

All public or private facilities, including but not limited to structures, telephone cables, roadways, parking lots, private drives, levees, and embankments disturbed during construction of the Work shall be repaired and/or replaced by the Contractor to match facilities existing prior to construction. In addition, the Contractor shall be responsible for any settlement damage to such facilities or adjoining areas for a period of one year after acceptance of such required facilities.

B-55 Resolution of Construction Claims

a) For any claim arising under this Contract, the following procedures will apply:

(i) The claim must be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the day of final payment. Nothing in this subsection is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth elsewhere in this Contract.

b) The Contractor shall proceed with the Work in accordance with the Plans and Specifications and determinations and instructions of the Engineer during the resolution of any claims or disputes.

B-56 District's Repair

In the event the Contractor refuses or neglects to make good any loss or damage for which the Contractor is responsible under this Contract, the District may itself, or by the employment of others, make good any such loss or damage, and the cost and expense of doing so, including any reasonable engineering, legal and other consultant fees, and any costs of administrative and managerial services, shall be charged to the Contractor. Such costs and expenses may be deducted by the District from claims for payment made by the Contractor for Work completed or remaining to be completed.

B-57 Antitrust Claim Assignment

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this Contract, the Contractor and all subcontractors shall offer and agree to assign to the District 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 subcontract. This assignment shall be made and become effective at the time the District tenders final payment to the Contractor, without further acknowledgement by the parties.

B-58 Waiver of Right to Rescind For Material Breach

The Contractor agrees that it can be adequately compensated by money damages for any breach of this

Contract which may be committed by the District and hereby agrees that no default, act, or omission of the District or the Engineer, except for failure to make progress payments as a required by Section B-67, shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of this Contract or (unless the District shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, save only its right to money damages.

B-59 Contractor's License Notice

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors of a complaint if filed within three (3) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, 9835 Goethe Road, Sacramento, California. Mailing address: P.O. Box 26000, Sacramento, California 95826.

ARTICLE V. INSURANCE AND LIABILITY

B-60 Insurance

a) Neither the Contractor nor any Subcontractors shall commence any work until all required insurance has been obtained at their own expense. Such insurance must have the approval of the District as to limit, form, and amount, and shall be placed with insurers with a current A.M. Best's rating of no less than A-:VII.

b) Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guarantee period.

c) Prior to execution of the Contract, the Contractor shall furnish the District with original endorsements effecting coverage for all policies required by the Contract. The Contractor shall not permit any Subcontractor identified in the Designation of Subcontractors form to commence work on this project until such Subcontractor has furnished the District with original endorsements effecting coverage for all insurance policies required by the Contract. The endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. The Contractor's insurer shall provide complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by this paragraph. The Contractor agrees to furnish one copy of each policy to the District, and additional copies as requested in writing, certified by an authorized representative of the insurer.

d) All of the Contractor's policies shall contain an endorsement providing that written notice shall be given to the District at least thirty (30) calendar days prior to termination, cancellation, or reduction of coverage in the policy.

e) The inclusion of more than one (1) insured shall not operate to impair the rights of one (1) insured against another insured, and the coverage afforded shall apply as though separate policies had been issued to each insured, but the inclusion of more than one (1) insured shall not operate to increase the limits of the insurer’s liability.

f) District, County and Engineer are to be notified immediately if twenty-five percent (25%) or more of any required insurance aggregate limit is encumbered, and Contractor shall be required to purchase additional coverage to meet the within-referenced aggregate limits.

g) Any policy or policies of insurance that the Contractor elects to carry as insurance against loss or damage to its construction equipment and tools shall include a provision therein providing a waiver of the insurer's right to subrogation against the County, the District and the Engineer.

h) The requirements as to the types, limits, and the District's approval of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under the Contract.

i) In addition to any other remedy the District may have, if the Contractor or any of the Subcontractors fails to maintain the insurance coverage as required in this Section, the District may obtain such insurance coverage as is not being maintained, in form and amount substantially the same as required herein, and the District may deduct the cost of such insurance from any amounts due or which may become due the Contractor under this Contract.

j) The Contractor and all Subcontractors shall, at their expense, maintain in effect at all times during the performance of work under the Contract not less than the following coverage and limits of insurance, which shall be maintained with insurers and under forms of policy satisfactory to the District. The maintenance by the Contractor and all Subcontractors of the following coverage and limits of insurance is a material element of this Contract. The failure of the Contractor or any

Subcontractor to maintain or renew coverage or to provide evidence of renewal may be treated by the District as a material breach of this Contract.

k) Worker's Compensation and Employer's Liability Insurance.

a. Worker's Compensation – As required by the California Labor Code, with statutory limits, Employer's Liability Insurance with a limit of no less than One Million Dollars ($1,000,000.00) per accident for bodily injury or disease shall be provided. Said policy shall contain or be endorsed to contain, a waiver of subrogation against the County and its agents, officers, officials, employees and volunteers. The Contractor shall Provide, during the life of this Contract, workers' compensation insurance for all of the employees engaged in Work under this Contract, on or at the Project site, and, in case any of sublet Work, the Contractor shall require each subcontractor similarly to provide workers' compensation insurance for all the latter's employees as prescribed by State law. Any class of employee or employees not covered by a subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in work under this Contract, on or at the Project site, is not protected under the Workers' Compensation Statutes, the Contractor shall provide or shall cause a subcontractor to provide, adequate insurance coverage for the protection of such employees not otherwise protected. The Contractor is required to secure payment of compensation to his employees in accordance with the provisions of Section 3700 of the Labor Code. The Contractor shall file with the District certificates of its insurance protecting workers and shall provide certificates at any time upon request. Company or companies providing insurance coverage shall be acceptable to the District, if in the form and coverage as set forth in the Contract Documents.
b. Contractor shall assume the immediate defense of and indemnify and save harmless the District and its officers and employees, agents, and consultants from all claims, loss, damage, injury, and liability of every kind, nature, and description brought by any person employed or used by Contractor, or any subcontractor, to perform the Work under this contract regardless of responsibility or negligence. Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation. The Workers' Compensation Policy shall be endorsed with a waiver of subrogation in the favor of the District for all work performed by the Contractor, its employees, agents and subcontractors.
c. The Contractor and all Subcontractors shall maintain insurance to protect the Contractor or Subcontractor from all claims under Worker's Compensation and Employer's Liability Acts, including Longshoremen's and Harbor Worker's Act. Such coverage shall be maintained, in type and amount, in strict compliance with all applicable State and Federal statutes and regulations. The Contractor shall execute a certificate in compliance with Labor Code Section 1861.

l) Professional Liability Insurance – Error and Omission Coverage including coverage in an amount no less than Two Million Dollars ($2,000,000.00) for each occurrence (Four Million Dollars ($4,000,000.00) general aggregate). Said insurance shall be maintained for the statutory period during which Contractor may be exposed to liability. Contractor shall require that such coverage be incorporated into its professional services with any other entities.

m) Claims Against District - If an injury occurs to any employee of the Contractor or any of the Subcontractors for which the employee or its dependents, in the event of its death, may be entitled to compensation from the District under the provisions of the said Acts, or for which compensation is claimed from the District, there will be retained out of the sums due the Contractor under this Contract, an amount sufficient to cover such compensation as fixed by said Acts, until such compensation is paid or it is determined that no compensation is due. If the District is required to

pay such compensation, the amount so paid will be deducted and retained from such sums due, or to become due the Contractor.

n) Commercial General Liability and Automobile Liability Insurance - the Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:

a. Coverage – coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:
   i. Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 0001)
   ii. Insurance Services Office (ISO) Business Auto Coverage (Form CA 0001), covering Symbol 1 (any auto)

b. Limits – the Contractor shall maintain limits no less than the following:
   iii. General Liability - Five million dollars ($5,000,000) per occurrence or the full per occurrence limits of the policies available, whichever is greater for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit or products-completed operations aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2503, or ISO CG 2504, or insurer's equivalent endorsement provided to District) or the general aggregate limit and products-completed operations aggregate limit shall be twice the required occurrence limit.
   iv. Automobile Liability - One million dollars ($1,000,000) for bodily injury and property damage each accident limit. Such insurance shall include coverage of all owned, hired and non-owned vehicles, and be at least as broad as Insurance Services Offices Form Code 1 (any auto).

c. Required Provisions - the general liability, auto liability and excess liability policies are to contain, or be endorsed to contain, the following provisions:
   i. The District, its directors, officers, employees, and authorized volunteers are to be given insured status at least as broad as ISO endorsement CG 2010 11 85; or both CG 20 10 10 01 and CG 20 37 04 13 (or the CG 20 10 04 13 (or earlier edition date) specifically naming all of the District parties required in this agreement, or using language that states “as required by contract”). All Subcontractors hired by Contractor must also have the same forms or coverage at least as broad; as respects (via CG 20 38 04 13): liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; and automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the District, its directors, officers, employees, or authorized volunteers.
   ii. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and the District insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory using the ISO endorsement CG 20 01 04 13 or coverage at least as broad.
   iii. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the District, its directors, officers, employees, or authorized volunteers.
   iv. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
   v. Each insurance policy required above shall provide that coverage shall not be

canceled, except with notice to the District.

d. Such liability insurance shall indemnify the Contractor and his/her sub-contractors against loss from liability imposed by law upon, or assumed under contract by, the Contractor or his/her sub-contractors for damages on account of such bodily injury (including death), property damage, personal injury, completed operations, and products liability.
e. The general liability policy shall cover bodily injury and property damage liability, owned and non-owned equipment, blanket contractual liability, completed operations liability, explosion, collapse, underground excavation, and removal of lateral support.
f. All of the insurance shall be provided on policy forms and through companies satisfactory to the District.
g. The comprehensive general and automobile liability insurance coverage shall also include the following:
    i. Provision or endorsement naming the County, the District, the Engineer and its consultants, and each of their officers, employees, officials, volunteers and agents, each as additional insureds in regards to liability arising out of the performance of any work under the Contract and providing that such insurance is primary insurance as respects the interest of the District and Engineer and that any other insurance maintained by the District and Engineer is excess and not contributing insurance with the insurance required hereunder.
    ii. Contractual liability
    iii. Does not contain exclusions as to property damage caused by explosion or collapse of structures or underground damage, commonly referred to as “XCU Hazards”.
    iv. Is the primary insurance in regard to the County.
    v. Does not contain a pro-rate, excess only and/or escape clause.
    vi. "Cross Liability", "Severability of Interest" or “Separation of Insureds” clause.
    vii. Provision or endorsement stating that such insurance, subject to all of its other terms and conditions, applies to the liability assumed by the Contractor under the Contract, including, without limitation, that set forth in Section B-61, Indemnity and Litigation Costs.
    viii. Provision or endorsement stating that any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the District, its officers, officials, employees, or volunteers.

o) Deductibles and Self-Insured Retentions - Insurance deductibles or self-insured retentions must be declared by the Contractor, and such deductibles and retentions shall have the prior written consent from the District. At the election of the District the Contractor shall either 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses. Policies containing any self-insured retention (SIR) provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named or additional insureds, co-insurers, and/or insureds other than the First Named Insured.

p) Acceptability of Insurers - Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of California unless waived, in writing, by the District. Carrier(s) shall have an A.M. Best rating of not less than an A-: VII or better.

q) Responsibility for Work - Until the completion and final acceptance by the District of all the work under and implied by this agreement, the work shall be under the Contractor’s responsible care and charge. The Contractor shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by causes of any nature whatsoever.

    a. The Contractor shall provide and maintain builder’s risk insurance (or installation floater)

covering all risks of direct physical loss, damage, or destruction to the work in the amount specified in the General Conditions, to insure against such losses until final acceptance of the work by the District. Such insurance shall insure at least against the perils of fire and extended coverage, theft, vandalism and malicious mischief, and collapse. The District, its directors, officers, employees, and authorized volunteers shall be named insureds on any such policy. The making of progress payments to the Contractor shall not be construed as creating an insurable interest by or for the District or be construed as relieving the Contractor or his/her subcontractors of responsibility for loss from any direct physical loss, damage or destruction occurring prior to final acceptance of the work by the District.

b. The Contractor shall waive all rights of subrogation against the District, its directors, officers, employees, or authorized volunteers.

r) Evidences of Insurance - Prior to execution of the agreement, the Contractor shall file with the District a certificate of insurance (Acord Form 25 or equivalent) signed by the insurer's representative evidencing the coverage required by this agreement. Such evidence shall include an additional insured endorsement signed by the insurer's representative and evidence of waiver of rights of subrogation against the District (if builder's risk insurance is applicable). Such evidence shall also include (1) attached additional insured endorsements with primary & non-contributory wording, (2) Workers' Compensation waiver of subrogation, and (3) a copy of the CGL declarations or endorsement page listing all policy endorsements, and confirmation that coverage includes or has been modified to include Required Provisions i-v above. The District reserves the right to obtain complete, certified copies of all required insurance policies, at any time. Failure to continually satisfy the Insurance requirements is a material breach of contract.

s) Continuation of Coverage - The Contractor shall, upon demand of the District deliver evidence of coverage showing continuation of coverage for at least (10) years after completion of the project. Contractor further waives all rights of subrogation under this agreement. When any of the required coverages expire during the term of this agreement, the Contractor shall deliver the renewal certificate(s) including the general liability additional insured endorsement and evidence of waiver of rights of subrogation against the District (if builder's risk insurance is applicable) to the District at least ten (10) days prior to the expiration date.

t) Subcontractors - In the event that the Contractor employs other contractors (Subcontractors) as part of the work covered by this agreement, it shall be the Contractor's responsibility to require and confirm that each sub-contractor meets the minimum insurance requirements specified above. The Contractor shall, upon demand of the District, deliver to the District copies such policy or policies of insurance and the receipts for payment of premiums thereon.

u) The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

v) The District reserves the right to modify these insurance requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

w) Insurance Notices – Any and all insurance notices required to be given pursuant to the terms herein shall be sent to the addresses set forth below in accordance with the notice requirements contained herein.

a. County: County of Humboldt
Attention: Risk Management
825 Fifth Street, Room 131
Eureka, California 95501

AND

b. District: Humboldt Bay Municipal Water District

Attention: John Friedenbach, General Manager
PO Box 95
Eureka, CA 95502-0095

B-61 Indemnity and Litigation Costs

a) Promptly upon execution of the Contract, the Contractor specifically obligates itself and hereby agrees to protect, hold free and harmless, defend and indemnify the District, the Engineer and its consultants, and each of their officers, officials, employees and agents, from and against any and all liability, penalties, costs, losses, damages, expenses, causes of action, claims or judgments, including without limitation attorneys' fees and other costs of litigation, which arise out of or are in any way connected with the Contractor's, or its Subcontractors' or suppliers', performance of Work under this Contract or failure to comply with any of the obligations contained in the Contract. This indemnity shall not extend, however, to attorney fees and costs incurred by the District in prosecuting or defending against the Contractor in any proceeding under Section B-8, and shall imply no reciprocal right of the Contractor in any action on the contract pursuant to California Civil Code section 1717 or section 1717.5. To the extent legally permissible, this indemnity and hold harmless agreement by the Contractor shall apply to any acts or omissions, whether active or passive, on the part of the Contractor or its agents, employees, representatives, or Subcontractor's agents, employees and representatives, resulting in liability, irrespective of whether or not any acts or omissions of the parties to be indemnified hereunder may also have been a contributing factor to the liability, except such loss or damage which was caused by the active negligence, sole negligence or willful misconduct of the District.

b) In any and all claims against the District or the Engineer and its consultants, and each of their officers, employees and agents by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Worker's Compensation statutes, disability benefit statutes or other employee benefit statutes.

c) Each party to this Contract has been represented by counsel in the negotiation and execution of this Contract.

B-62 Protection of Work

a) The Contractor shall be responsible for the care of all work until completion and final acceptance; and the Contractor shall, at its own expense replace damaged or lost material and repair damaged parts of the Work or the same may be done at the Contractor's expense by the District and the Contractor and its sureties shall be liable therefore. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work. The Contractor shall take all risks from floods and casualties except as provided by law, and shall make no charge for the restoration of such portions of the Work as may be destroyed or damaged by flood or other casualties or because of danger from flood or other casualties or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on account of such delays, subject to the conditions hereinbefore specified. The Contractor shall not be responsible for the cost, in excess of five percent (5%) of the contracted amount, of repairing or restoring damage to the Work, if the damage was proximately caused by an earthquake in excess of a magnitude of 3.5 on the Richter Scale or by tidal waves; provided that the Work damaged was built in accordance with accepted and applicable building standards, and the Plans and Specifications.

b) The Contractor shall effectively secure and protect adjacent property and structures. The

Contractor shall be responsible that no loss or inconvenience shall accrue to the owner or tenant by virtue of its fences having been opened or the gate not having been either shut or attended at all times. In all cases where the Contractor removes fences to obtain work room, it shall provide and install temporary fencing as required, and on completion of construction shall restore the original fence to the satisfaction of the Engineer. All costs of providing, maintaining and restoring gates and fencing shall be borne by the Contractor. The Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions.

c) The Contractor shall use extreme care during construction to prevent damage from dust to crops and adjacent property. The Contractor, at its own expense, shall provide adequate dust control and take other preventive measures as directed by the Engineer.

d) The Contractor shall be responsible for all damage to any property resulting from trespass by the Contractor or its employees in the course of their employment, whether such trespass was committed with or without the consent or knowledge of the Contractor.

e) The Contractor shall see that the work site is kept drained and free of all ground water and any other water which may impede the progress or execution of the Contract work.

f) The Contractor shall be responsible for any damage caused by drainage or water runoff from construction areas and from construction plant areas. In an emergency affecting the safety of life, or of the Work, or of adjoining property, the Contractor, without special instruction or authorization from the Engineer, is hereby permitted to act at the Contractor's discretion to prevent such threatened loss or injury, and it shall so act without appeal if so instructed or authorized. Any compensation claimed by the Contractor on account of emergency work shall be determined as specified under Section B-3. Should the Engineer deem an emergency condition to exist, the Contractor shall immediately do those things and take those steps ordered by the Engineer. The decision of the Engineer in this respect shall be final and conclusive. Any claims for compensation made by the Contractor on account of emergency work shall be determined as specified under Section B-3.

g) Except as provided by Government Code Section 4215, the Contractor shall be responsible for the removal, relocation and protection of all public and private utilities, including irrigation facilities in the nature of utilities, located on the site of the construction project if and to the extent that the same are identified in the Contract Documents, and the Contractor shall not be entitled to any extension of time or claim for damages for extra compensation in connection therewith. If and to the extent that such utilities or facilities are not identified in the Contract Documents, as between the Contractor and the District, the District will be responsible for the cost of their removal, relocation, or protection, as the case may be, but the Contractor shall perform any such work in conformance with applicable provisions of Sections B-3 and B-4, if so directed by the Engineer and in such situation the Contractor shall not be responsible for delay in completion of the project caused by the failure of the District or the owner of the utility to provide for such removal or relocation. If the Contractor, while performing the Contract, discovers utility or irrigation facilities not identified by the District in the Contract Documents, it shall immediately notify the Engineer in writing.

B-63 No Personal Liability

Neither the County, the District, the Engineer, nor any of their other officers, agents, or employees nor any other public office shall be personally responsible for any liability arising under the Contract, except such obligations as are specifically set forth herein.

ARTICLE VI. MEASUREMENT AND PAYMENT

B-64 Measurement of Quantities

a) Where the Contract provides for payment on a lump sum price basis, the Contractor shall submit a price breakdown to the Engineer immediately after award of the Contract. The price breakdown as agreed upon between the Contractor and the Engineer shall be used for preparing future estimates for partial payments to the Contractor and shall list the major items of Work and a price for each item. Overhead and other general costs and profit shall be prorated to each item so that the total of all items equals the lump sum price. The price breakdown shall be subject to the approval of the Engineer and Contractor may be required to verify the prices for any or all items.

Where the Contract provides for payment on a unit price basis, the quantities of work performed will be computed by the Engineer on the basis of measurements taken by the Engineer.

b) Whenever the estimated quantities of Work to be done and materials to be furnished under this Contract are shown in any of the documents including the Proposal, they are given for use in comparing bids and the right is especially reserved, except as herein or otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the District to complete the Work contemplated by this Contract and such increase or diminution shall in no way violate this Contract, nor shall any such increase or diminution give cause for claims, liability for damage or adjustment to the Contract time bid price.

B-65 Scope of Payment

a) The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed Work and for performing all Work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work until the acceptance by the District and for all risks of every description connected with the prosecution of the Work, also for all expenses incurred in consequence of the suspension or discontinuance of the Work as provided in the Contract; and for completing the Work according to the Specifications and Plans. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.

b) No compensation will be made in any case for loss of anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as provided in such agreements.

B-66 Progress Estimate

At the end of each month where work was performed, the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial pay estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the District, as will establish the District's title to the material, and equipment and protect its interest therein, including, applicable insurance. The Engineer will within seven (7) calendar days after receipt of each partial payment estimate either recommend payment to the District or return the estimate to the Contractor indicating in writing its reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial pay estimate.

Payroll certification forms provided by the Contractor and fully executed shall be filed with the Owner at the time of submission of each partial payment estimate and also when the claim for final payment is

submitted. Wage Report forms shall be completed and submitted as required by the California Department of Industrial Relations.

B-67 Progress Payments

a) The Contractor is made aware that the District shall have final approval authority for all partial payments.

b) Upon receipt of an undisputed, properly submitted progress estimate from the Contractor, recommended by the Engineer, the District shall act in accordance with the following:

(i) Each payment request shall be reviewed by the District as soon as practicable after receipt for the purpose of determining that the progress estimate is a proper payment request.

(ii) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable but not later than seven (7) calendar days after receipt (seven-day return requirement). A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

c) The number of days available to the District to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the District exceeds the seven-day return requirement set forth in the paragraph above.

d) The District will pay the Contractor ninety-five percent (95%) of the amount of each progress estimate within sixty (60) calendar days after receipt of an undisputed, properly submitted progress estimate from the Contractor, recommended by the Engineer. If the District fails to pay an undisputed progress estimate within the allotted sixty (60) calendar days, the District shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (s) of Section 685.010 of the Code of Civil Procedures. Five percent (5%) of the amount of each estimate shall be retained by the District until final completion and acceptance of all Work under Contract.

e) When, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the Contract, or when in the Engineer's judgment the total amount of the work done since the last estimate amounts to less than $1,000, no pay estimate will be prepared and no progress payment will be made.

f) No progress estimate or payment shall be considered to be an approval or acceptance of any work, materials, or equipment. Estimated amounts and values of work done and materials and equipment furnished will be confirmed with actual amounts and values as they become available in subsequent progress estimates, progress payments and the final estimate and payment. All estimates and payments will be subject to correction in subsequent progress estimates and payments and the final estimate and payment.

g) The District requires that any payments due to Subcontractors for a portion of the Work satisfactory completed shall be made by Contractor to Subcontractors within thirty (30) calendar days of District's payment to Contractor. Failure to make such payments in a timely fashion may result in the District issuing future progress payments by joint check to the Contractor and Subcontractors.

h) It is mutually agreed between the parties to the Contract that no payments made under the Contract, including progress payments and the final payment, shall be evidence of the performance of the Contract, either wholly or in part, and no payment shall be construed to be an acceptance of any defective or incomplete work or improper materials.

B-68 Liens and Stop Notices

The Contractor agrees to keep the Work, the site of the Work and all monies held by the District free and clear of all liens and stop notices related to labor and materials furnished in connection with the Work, if permitted by law. Furthermore, the Contractor waives any right it may have to file any type of lien or stop notice in connection with the Work. Notwithstanding anything to the contrary contained in the Contract documents, if any such lien or stop notice is filed or there is evidence to believe that lien or stop notice may be filed at any time during the progress of the Work or within the duration of this Contract, the District may refuse to make any payment otherwise due the Contractor or may withhold any payment due the Contractor a sum sufficient in the opinion of the District to pay all obligations and expenses necessary to satisfy such lien or stop notice. The District may withhold such payment unless or until the Contractor, within ten (10) calendar days after demand therefor by the District, shall furnish satisfactory evidence that the indebtedness and any lien or stop notice in respect thereof has been satisfied, discharged and released of record, or that the Contractor has legally caused such lien or stop notice to be released of record pending the resolution of any dispute between the Contractor and any person or persons filing such lien or stop notice. If the Contractor shall fail to furnish such satisfactory evidence within ten days of the demand therefor, the District may discharge such indebtedness and deduct the amount thereof, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the District from any sum payable to the Contractor under the Contract documents, including but not limited to final payment and retained percentage. This Section shall be specifically included in all Subcontracts and purchase orders entered into by the Contractor.

B-69 Final Acceptance and Date of Completion

Whenever the Contractor shall deem all Work under this Contract to have been completed in accordance therewith, it shall so notify the Engineer in writing, and the Engineer shall promptly ascertain whether the Work has been satisfactorily completed and, if not, shall advise the Contractor in detail and in writing of any additional work required. When all the provisions of the Contract have been fully complied with to the satisfaction of the Engineer, the Engineer shall proceed with all reasonable diligence to determine accurately the total value of all Work performed by the Contractor at the prices set forth in the Contract or fixed by Change Orders, and the total value of all extra work, all in accordance with the Contract. The Engineer will then certify to said final estimate and to the completion of the Work, and will file copies thereof with the District and the Contractor. The date of completion shall be the date upon which the District makes its formal written acceptance of the Work.

B-70 Final Payment

Within ten (10) calendar days after the date of completion, the District will file in the Office of the County Recorder, a Notice of Completion of the Work herein agreed to be done by the Contractor. On the expiration of thirty-five (35) calendar days after the recordation of such Notice of Completion the difference between said final estimate and all payments theretofore made to the Contractor shall be due and payable to the Contractor, subject to any requirements concerning the furnishings of a maintenance bond, and excepting only such sum or sums as may be withheld or deducted in accordance with the provisions of this Contract. All prior certifications upon which partial payments may have been made, being merely estimates, shall be subject to correction in the final certificate.

B-71 Final Release

Final payment to the Contractor in accordance with the final estimate is contingent upon the Contractor furnishing the District with a signed written release of all claims against the District arising by virtue of the Contract. Disputed Contract claims in stated amounts may be specifically excluded by the Contractor from the operation of the release. The release shall be in substantially the following form:

WAIVER AND RELEASE UPON FINAL PAYMENT

The undersigned has been paid in full by the Humboldt Bay Municipal Water District (District) for all labor, services, equipment and material furnished to the District for the Collector 2 Rehabilitation Project located in Humboldt County, California, and does hereby waive and release the District, its officers, agents, and employees, from all claims and liability to the Contractor arising out of, or in any way connected with, the Contract, except for the disputed contract claims specified below:

Notice of Disputed Claim

Amount of Claim

$_____

Dated: _____ _____
(Name of Contractor)

By: _____
(Title)

Any payment, however, final or otherwise shall not release the Contractor or its sureties from obligations under the Contract Documents or Performance and Payment Bonds.

B-72 Right to Withhold Payments

a) In addition to all other rights and remedies of the District hereunder and by virtue of the law, the District may withhold or nullify the whole or any part of any partial or final payment to such extent as may reasonably be necessary to protect the District from loss on account of:

(i) Defective work not remedied, irrespective of when any such work be found to be defective;
(ii) Claims or liens filed or reasonable evidence indicating probable filing of claims or liens including, but not limited to claims under Sections 1775, 1776, or 1777.7 of the Labor Code;
(iii) Failure of Contractor or Subcontractors to submit complete, sufficient, correct labor compliance documentation.
(iv) Failure of the Contractor to make payments properly for labor, materials, equipment, or other facilities, or to Subcontractors and/or suppliers;
(v) A reasonable doubt that the Work can be completed for the balance then unearned;
(vi) A reasonable doubt that the Contractor will complete the Work within the agreed time limits;
(vii) Costs to the District resulting from failure of the Contractor to complete the Work within the proper time; or
(viii) Damage to Work or property.
(ix) Damage to another Contractor.
(x) Performance of Work in violation of the Terms of the Contract Documents.
(xi) Where work on unit items is substantially complete but lacks cleanup and/or other corrections ordered by the Engineer, amounts shall be deducted from the unit prices in partial payment estimates to amply cover such cleanup and correction.

b) Whenever the District shall, in accordance herewith, withhold any monies otherwise due the Contractor, written notice of the amount withheld and the reasons therefore will be given the Contractor. After the Contractor has corrected the enumerated deficiencies, the District will promptly pay to the Contractor the amount so withheld. When monies are withheld to protect the District against claims or liens of mechanics, material men, Subcontractors, etc., the District may at its discretion permit the Contractor to deliver a surety bond in terms and amount satisfactory to the District, indemnifying the District against any loss or expense, and upon acceptance thereof by the District, the District shall release to the Contractor monies so withheld.

B-73 Waiver of Interest

The District shall have no obligation to pay and the Contractor hereby waives the Contractor’s right to recover interest with regard to monies which the District is required to withhold by reason of judgment, order, statute or judicial process.

B-74 Satisfaction of Claims and Liens

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the District, a complete release of all liens and claims arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as it has knowledge or information the releases and receipts include all the labor and material for which a lien or claim could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Engineer, to indemnify the District against any lien or claim. If any lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the District all monies that the latter may be compelled to pay in discharging such a lien, or claim, including all costs and reasonable attorney's fees.

ARTICLE VII. ADDITIONAL GRANT-SPECIFIC REQUIREMENTS

B-75 Acknowledgement of Credit and Signage

Signage shall be posted in a prominent location at the Project site(s) and shall include the Department of Water Resources color logo and the following disclosure statement: “Funding for this project has been provided in full or in part from the Water Quality, Supply, and infrastructure Improvement Act of 2014 and through and agreement with the State Department of Water Resources.”

B-76 Americans with Disabilities Act

Contractor must comply with Americans with Disabilities Act (ADA) of 1990 (42 U.S.C. § 12101 et seq.), which prohibits discrimination on the basis of disability, as well as all applicable regulations and guidelines issued pursuant to the ADA.

B-77 Drug-Free Workplace Certification

Contractors or subcontractors hereby certify, under penalty of perjury under the laws of State of California, compliance with the requirements of the Drug-Free Workplace Act of 1990 (Gov. Code, § 8350 et seq.) and have or will provide a drug-free workplace by taking the following actions:

a) Publish a statement notifying employees, contractors, and subcontractors that unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited and specifying actions to be taken against employees, contractors, or subcontractors for violations, as required by Government Code section 8355.

b) Establish a Drug-Free Awareness Program, as required by Government Code section 8355 to inform employees, contractors, or subcontractors about all of the following:

   (i) The dangers of drug abuse in the workplace,
   (ii) Grantee policy of maintaining a drug-free workplace,
   (iii) Any available counseling, rehabilitation, and employee assistance programs, and
   (iv) Penalties that may be imposed upon employees, contractors, and subcontractors for drug abuse violations.

c) Provide, as required by Government Code section 8355, that every employee, contractor, and/or subcontractor who works under this Grant agreement:

   (i) Will receive a copy of Grantee drug-free policy statement, and
   (ii) Will agree to abide by terms of Grantee condition of employment, contract or subcontract.

B-78 Nondiscrimination

Contractors or subcontractors shall not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex (gender), sexual orientation, race, color, ancestry, religion, creed, national origin (including language use restriction), pregnancy, physical disability (including HIV and AIDS), mental disability, medical condition (cancer/genetic characteristics), age (over 40), marital status, and denial of medial and family care leave or pregnancy disability leave. Contractors or subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment. Contractors or subcontractors shall comply with the provisions of the California Fair Employment and Housing Act (Gov. Code, § 12990.) and the applicable regulations promulgated there under (Cal. Code Regs., tit. 2, § 11000 et seq.). The applicable regulations of the Fair Employment and Housing are incorporated into this Agreement by reference. Contractors or subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

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PART 4
SPECIFICATIONS

SECTION 01 01 00

SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Description:

1. The work generally consists of the furnishing of all labor, material, equipment, and supervision necessary for the installation of four new laterals at the Humboldt Bay Municipal Water District's (Owner) existing Collector 2, near Arcata, California. Work includes pre-installation baseline testing, dewatering pipe and pump installation, percolation pond construction and maintenance, caisson dewatering and sediment removal, caisson floor installation (as required for installation of laterals), lateral port installation, projecting lateral pipe, lateral screen design, lateral screen installation, gate valve installation, lateral development, cleaning and disinfecting laterals, performance testing, percolation pond removal, erosion and sediment control, installation, maintenance and removal of construction materials, and preparation and submittal of final installation As-Built and performance Report.
2. Dewatering System
    a. A dewatering system consisting of dewatering pipe and pumps within the caisson (Base Bid Item 3), 12-inch Yelomine pipe (Additive Bid Item A-1), a percolation pond with approximately 1.5 million gallons of capacity with two feet of freeboard (Base Bid Item 2), an existing overflow trench for the percolation pond, and a "clean water" disposal option to the Pump Station #6 Forebay is shown on the Drawings. The dewatering system has been split into three items (Bid Item 2, Bid Item 3, and Additive Item A-1). The intent is that the Contractor will provide (except for the Yelomine pipe as discussed in Additive Item A-1), assemble, maintain, and disassemble a complete, functioning dewatering system (potentially except for assembly/disassembly of the Yelomine pipe as discussed in Additive Item A-1). The intent of the system as shown is to discharge less turbid water (water that will increase the background turbidity in the Mad River by less than 10%) to the Pump Station #6 Forebay, and discharge all other water to the percolation pond for infiltration and disposal.
3. Construct all work in strict accordance with the Drawings and Specifications and subject to the terms and conditions of the Contract Documents.

B. Location of the work:

1. Humboldt Bay Municipal Water District's Ranney Collector 2 is located approximately 1.5 miles east of the City of Arcata. Access to the site is off West End Road, approximately 0.5 miles west of the intersection of West End Road and Warren Creek Road.
2. The Owner shall give right of way access to the work site. Work will be strictly confined to the designated areas.

C. Contractor's duties:

1. Except as specifically noted, provide and pay for all:

   a. Labor, materials and equipment.
   b. Tools, construction equipment and machinery.
   c. Utilities required for construction, except as detailed in Section 01 50 00 of these specifications.
   d. All other facilities and services necessary for proper execution and completion of work.
2. Pay legally required sales, consumer and use taxes.
3. Secure and pay for, as necessary for proper execution and completion of the work, all applicable permits and licenses except when explicitly noted otherwise. Note that the Owner has determined that project-specific Army Corps of Engineers 404, California Regional Water Control Board 401, California Department of Fish and Wildlife, and Coastal Development Permits are not required for this project.
4. Contractor is responsible for conforming to all the applicable provisions of the following permits that have been obtained by the Owner and are attached and are part of these Contract Documents:
   a. HBMWD Habitat Conservation Plan for its Mad River Operations, April 2004.
   b. HBMWD Long Term Streambed Alteration Agreement No. R1-2010-00093
   c. General NPDES Permit for Drinking Water System Discharges
   d. Long-term Army Corps of Engineers 404 Permit
   e. The NPDES and Army Corps of Engineers permits attached to these Contract Documents are currently expired. However, they are each in the renewal process, and it is not anticipated that changes will be made to the renewed permits that will affect the Contractor's work on this project. If any changes occur that will affect the Contractor's work, Contractor will be notified, and a corresponding Change Order will be issued if appropriate.
5. Give required notices.
6. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, which bear on performance of the work.
7. Promptly submit written notice to Engineer of observed variance of Contract Documents from legal requirements.
8. If any Subcontractor or person employed by the Contractor shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, they shall be discharged immediately on the requisition of the Engineer, and such person shall not again be employed on the work.
9. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with this project. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to all persons on the jobsite.
10. The Contractor shall utilize maintenance procedures that minimize fire hazards to the extent practicable. Combustible debris and waste shall be collected and removed from the jobsite each day.
11. Secondary containment shall be in place for all stationary equipment to prevent discharges of gasoline, oil, hydraulic fluid, or other petroleum products onto the ground or waters adjacent to the site.
12. Equipment operating in and around the collectors and on the river bar shall be maintained, serviced, cleaned, and refueled in conformance with the requirements of the Owner's Habitat Conservation Plan for its Mad River Operations (attached to these Specifications).

13. The Contractor shall construct and maintain the percolation pond as shown on the Plans and as detailed in these Contract Documents. Contractor is responsible for the installation and maintenance of the pond and all associated erosion and sediment control measures associated with the pond. The Contractor is also responsible for maintaining the fencing around the pond to prevent public access to the pond and for ensuring all other safety measures detailed in the Contract Documents are in place and are maintained. Contractor is also responsible for re-grading the percolation pond flat after project completion and placing seed and straw over the disturbed area.
14. The Contractor shall implement and maintain an on-going Erosion and Sediment Control Plan necessary for the performance of this project and compliance with applicable permits and statutes.
15. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons (including employees) and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours.
16. Safety provisions shall conform to U.S. Department of Labor (OSHA), the California Occupational Safety and Health Act, and all other applicable Federal, State, county, and local laws, ordinances, codes, the requirements set forth below, and any regulations that may be detailed in other parts of these Specifications.
    a. The Contractor shall have at the worksite, copies or suitable extracts of the Construction Safety Orders of Cal-OSHA.
    b. All work shall comply with the provisions of these and all other applicable laws, ordinances and regulations.

1.2 CONTRACTS

A. All work is contained in these Contract Documents. The limits of work are shown in the Plans. It will be the Contractor's responsibility to coordinate their activities to resolve conflicts.

1.3 WORK SEQUENCE

A. The first order of business is submission of submittals. Complete submittals for all items to be incorporated into the work shall be submitted by the Contractor no later than 20 working days following receipt of Notice of Award.

B. The Contractor shall submit a complete work schedule to be approved by the Owner and the Engineer. Contractor shall regularly update and submit updated copies of the schedule to adequately inform the Owner on the progress of the work.

C. Contractor shall note that work that requires access to the river bar can only be performed during the period from July 1st through October 15th. Because the District will need to remove / raise pumps and re-install / lower pumps prior to and after construction, respectively, the Contractor must complete work on the river bar between July 15th and October 1st.

D. The Contractor shall conduct work in an orderly sequence to assure efficient use of materials and equipment and so as not to cause unnecessary delays to other Contractors who might be present on the jobsite

E. The Contractor shall install laterals in the following order: C-1, C-2, C-4, and C-3.

F. The Contractor shall be responsible for providing transportation of personnel, equipment, and materials to and from the site and for providing ingress and egress inside the Collector.

G. The Contractor shall coordinate access to the site with the Owner.

1.4 CONTRACTOR USE OF PREMISES

A. Construction corporation yards and/or storage areas, if required outside the designated areas for staging/laydown on District property, are the responsibility of the Contractor.

B. Confine operations at site to areas permitted by:
   1. Permits
   2. Contract Documents

C. Do not encumber site with materials or equipment.

D. Do not load structure or roadway with weight that will endanger or render unusable any structures or roadways.

E. Assume full responsibility for protection and safekeeping of products stored on premises.

F. Move any stored products which interfere with operations of the Owner or other Contractors.

G. Obtain and pay for use of additional storage of work area for operations.

H. Return all surface areas to their original condition upon completion of the work.

1.5 UTILITIES & FACILITIES

A. The Contractor may utilize Owner's existing electrical systems (as specified in Section 01 50 00 of these specifications) however, they are responsible for extending and supplementing with temporary devices as needed to maintain specified conditions for construction operations. Contractor is responsible for maintaining safe connections and shall coordinate initial establishment of connections with Owner. Contractor is responsible for all grounding, circuit breakers and other equipment necessary for the safe utilization of the Owner’s electrical system. Contractor is responsible for all repairs caused by improper use of the Owner’s systems.

B. The Owner shall provide all labor and equipment necessary to raise or temporarily remove existing piping, pumps, and appurtenances in Collector 2, if required for new lateral installation, and to replace same after installation is complete. The Contractor is responsible for coordinating and cooperating with the Owner.

C. Restore existing utilities and facilities used during construction to original condition.

D. The Contractor is responsible for locking the gate at the conclusion of each workday.

1.6 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish generated from the Construction activity from site.

C. The Contractor shall take whatever measures are necessary to protect direct discharge of water, sediments, and any other deleterious materials from entering the Mad River or being deposited adjacent to the river during the construction process.

D. The Contractor is responsible for re-grading and re-stabilizing the site by re-seeding and mulching the areas disturbed by construction activities per the General Notes on the Plans and in accordance with these specifications.

1.7 SUBMITTALS AND REQUESTS FOR INFORMATION

A. The Contractor shall submit a complete work schedule to be approved by the Owner and the Engineer. Contractor shall regularly update and submit updated copies of the schedule to adequately inform the Owner on the progress of the work.

B. Other submittals shall be provided as noted in Section 01 33 00.

C. Requests for information regarding the plans and specifications shall be submitted to Nathan Stevens (nathan.stevens@ghd.com; 707-267-2204) and Malia Gonzales (malia.gonzales@ghd.com; 707-267-2269) at GHD Inc.

END OF SECTION

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SECTION 01 14 00

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 SCOPE

A. The Contractor shall conform to all requirements of the permits and requirements listed herein, as well as all other applicable State and Federal regulations.

B. During the progress of the work, keep the work areas occupied by the Contractor in a neat and clean condition and protect the environment both onsite and offsite, throughout and upon completion of the construction project.

C. Contractor shall implement the permitting requirements of the permits referenced in this section prior to the commencement of Work and throughout the performance of the construction.

D. Contractor is responsible for the development of a spill prevention, control and countermeasure plan (SPCC Plan) prior to construction and the installation and maintenance of all spill prevention and control measures outlined in the Plan and detailed in the Owner's Habitat Conservation Plan and Long-term Streambed Alteration Agreement throughout out the construction. Spill protection supplies shall be readily available onsite at all times during construction.

E. Contractor is responsible throughout construction for the installation and maintenance of all sediment and erosion control Best Management Practices (BMPs) and procedures required by the Owner's Habitat Conservation Plan (HCP), the Owner's Long-term Streambed Alteration Agreement (LTSAA), the Statewide National Pollution Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges, and the District's long-term Army Corps of Engineers (ACOE) Permit. The referenced permits have all been included as attachments to these Specifications.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this item shall be included in the Bid Item to which it relates. No additional measurement or payment will be included for the requirements of this section.

1.3 SUBMITTALS

A. Spill Prevention Control & Countermeasure Plan - Contractor shall develop a Spill Prevention Control and Countermeasure Plan (SPCC Plan) in detail and submit to the Engineer in the Product Review category within 20 working days from the date of the Notice to Proceed. Approval of the SPCC Plan shall be obtained from the Engineer prior to the performance of any site work.

B. Sediment & Erosion Control Plan – Contractor shall develop a Sediment and Erosion Control Plan in detail and submit to the Engineer in the Product Review category within 20 working days from the date of the Notice to Proceed. Approval of the Sediment & Erosion Control Plan shall be obtained from the Engineer prior to the performance of any site work.

1.4 WORK ON THE RIVER BAR

A. Collector 2 is located on the river bar of the Mad River. Per the District's LTSAA with the California Department of Fish and Wildlife, any work on the river bar must occur between July 1st and October 15th. Because the District will need to remove / raise pumps and re-install / lower pumps prior to and after construction, respectively, the Contractor must complete work on the river bar between July 15th and October 1st.

1.5 SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

A. It is anticipated that this project will not fall under the Federal or State SPCC requirements; however, portions of the Owner's HCP, LTSAA, NPDES, and ACOE permits have spill prevention and control requirements that the Contractor shall conform to. The intent of the SPCC Plan is to ensure that the Contractor and their employees and subcontractors are aware of and implements measures to conform to these requirements to prevent the discharge of diesel, gasoline, grease, oil and other hydrocarbons to the Waters of the United States as well as into or upon the Owner's water distribution facilities.

B. SPCC Plan shall include, but not be limited to, the following items:
   1. Details of secondary containment for all hydrocarbon containing pumps, generators, fuel tanks, etc. placed adjacent to the Mad River or into or adjacent to the Owner's collectors or facilities.
   2. Details and procedures for inspecting all equipment operating on the river bar, and Contractor's conformance with Mitigation Measure 8 contained in the HCP.
   3. Details for other spill prevention measures to be implemented by the contractor on-site.
   4. Details for absorbent pads to be placed under hydrocarbon containing pumps or other equipment not contained in a secondary containment structure and used on-site.
   5. Details for all other spill containment procedures and materials to be implemented on site.
   6. Details for spill response procedures including detailed procedures, equipment requirements and location, and employee responsibilities.

C. The approved SPCC Plan shall be reviewed by all employees and all subcontractor and their employees prior to their performance of work on-site.

D. A copy of the approved SPCC shall be available on-site at all times during construction.

E. Sufficient spill response materials shall be available on-site at all times during construction. Contractor is responsible for disposal of all used spill response materials according to applicable regulations.

1.6 SEDIMENT & EROSION CONTROL AND NPDES REQUIREMENTS

A. Sediment and erosion control requirements are detailed in Section 01 57 13, and NPDES requirements are detailed in the NPDES permit attached to these Specifications.

1.7 MITIGATION OF CONSTRUCTION IMPACTS

A. Requirements: All operations shall comply with all federal, state and local regulations pertaining to water, air, solid waste, noise pollution, and all items listed in these Specifications.

B. Definitions of Contaminants:

1. Sediment: Soil and other debris that have been eroded and transported by runoff water.
2. Solid Waste: Rubbish, debris, garbage and other discarded solid materials resulting from construction activities, including a variety of combustible and non-combustible wastes, such as ashes, waste materials that result from construction or maintenance and repair work, leaves and tree trimmings.
3. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, disinfectants, organic chemicals and inorganic wastes. Some of the above may be classified as “hazardous”.
4. Sanitary Wastes:
    a. Sewage: That which is considered as domestic sanitary sewage.
    b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing and consumption of food.
5. Hazardous Materials: As defined by applicable laws and regulations. Undisclosed hazardous material contamination, if encountered, will constitute a changed site condition.

C. The existing gravel access road through the Owner’s property will be used to access Collectors 2. The contractor is responsible for ensuring that any gates within the park are securely closed after passing through.

D. Vehicles, equipment, and personnel will be restricted to areas within the Owner’s property, as indicated on the plans. Temporary fencing will be erected to delineate parking and laydown/storage areas from the remainder of the park grounds.

E. Should concentrations of archaeological materials be encountered during construction, all ground-disturbing work will be temporarily halted in that area. Work near the archaeological finds will not be resumed until a qualified archaeologist has evaluated the materials and offered recommendations for further action. Project personnel shall not collect cultural resources.

F. Should human remains be encountered during construction, State law requires that the County coroner be contacted immediately. Should the Coroner determine that the remains are likely those of a Native American, he or she must contact the California Native American Heritage Commission. The Heritage Commission consults with the most likely Indian descendants from the area to determine appropriate treatment of the remains.

G. Prehistoric resources include chert or obsidian flakes or tools, projectile points, mortars and pestles, groundstone artifacts, deposits of shell, dietary bone, locally darkened midden (dark friable soil containing shell and bone dietary debris), heat-affected rock or human burials. Historic resources include; stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits, found often in old wells and privies.

H. Construction shall be limited to 7:00 a.m. to 6:00 p.m., except for the Constant Rate Tests.

I. Construction equipment shall be equipped with mufflers that meet applicable noise standards.

J. Construction Responsibilities. During the installation, development and pump tests, techniques shall be employed by the Contractor to prevent harmful materials, construction debris, and suspended solids from entering the Mad River. The Contractor shall submit proposed methods to the Owner for review prior to the start of construction activities. The Contractor shall comply with the following construction-related requirements:
    1. Sand, silt and debris removed from the bottom of the caisson and pumped discharges carrying the same, as well as all other sediment generated during the course of construction shall be diverted to prevent erosion and runoff of sediment, solids or debris from entering waters of the State of California or the United States or otherwise impacting the Owner's or surrounding properties;
    2. No construction debris or waste shall be placed or stored where it may be subject to entering river waters;
    3. A dewatering system consisting of a temporary percolation pond and discharge to the Pump Station 6 Forebay is shown on the Drawings and detailed in these Specifications. Unless noted otherwise, the Contractor is ultimately responsible for the construction, maintenance and dismantling of any system necessary for dewatering of the caisson and required for the performance of the work. Contractor is also responsible for preventing sediment and other water quality impacts associated with the project construction to the Mad River or other waters during the performance of the work, and compliance with all permits listed in this section as well as all other Local, State and Federal regulatory requirements applicable to the construction. If the Contractor choses to construct some other dewatering system than that shown, they are responsible for obtaining all necessary permits and complying with said permits.
    4. Contractor is responsible for conforming to any other necessary applicable permits, including, but not limited to, applicable provisions of the following permits that have been obtained by the Owner and which are attached and are part of these Contract Documents:
        a. Habitat Conservation Plan
        b. Long-term Streambed Alteration Agreement
        c. Statewide National Pollution Discharge Elimination System (NPDES) Permit for Drinking Water System Discharges to Waters of the United States
        d. Army Corps of Engineers Permit
    5. Surface erosion shall be prevented during construction activities;
    6. BMPs shall be implemented so that turbidity and sediment in stormwater running on to the site will not be allowed to enter the Mad River.

7. Any and all debris resulting from construction activities shall be removed from the project site within 10 days of completion of construction of the project, with the exception of gravels removed from the caisson during the construction process. These will be either buried in the percolation pond or removed by the Owner for future use.
8. No machinery or construction materials shall be allowed at any time in Mad River channel;

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION

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SECTION 01 20 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 GENERAL

A. Unless otherwise specified in other individual sections of these specifications, quantities of work shall be determined from measurements or dimensions in horizontal planes.

B. Units of measurement shall be in accordance with U.S. Standard Measures.

1.2 PAYMENT PROVISIONS

A. The Contractor shall provide unit price information on the Unit Price Bid Summary Sheet.

PART 2 - MATERIALS

2.1 THE MEASUREMENT AND PAYMENT ITEMS ARE LISTED BELOW:

A. The payments to the Contractor are based on the following items. It is the intent that the scope of the description of the following items encompasses the entire scope of the work as shown on the plans and described in the specifications. The bid amounts shall be for complete in place installations.

B. The Contractor is reminded that written permission to dispose of any material must be obtained and delivered to the Engineer in advance of any disposal activities. Failure to do so shall result in the contractor accepting all liabilities for the material.

BASE BID SCHEDULE

Item 1 – Mobilization/Demobilization

Measurement and Payment for this item shall be on a lump sum basis. This work covers all contractor costs and effort associated with mobilizing equipment, materials, and labor to the project site as well as demobilization of the same for both the base bid schedule and any additive bid schedules, if awarded. Items covered by this include, but are not limited to, bonds, insurance, contracting and administrative costs, attendance at construction coordination meetings, costs associated with temporary facilities and utilities, coordinating with the Owner, submittals, preparation and updating of construction schedules, repairs of damaged property, permits, site cleanup, and project maintenance and warranty.

When at least 10% of the total original Contract amount is earned from bid items, 80% of the amount of the bid price for mobilization, or 10% of the total contract amount, whichever is less, is eligible to be paid for mobilization. Upon completion of all Work on

the project, payment of the balance of the bid amount for Mobilization/Demobilization will be paid.

Item 2 – Percolation Pond

Measurement and payment for this item shall be on a lump sum basis and include, but is not necessarily limited to, percolation pond construction, erosion and sediment control, maintenance, removal, re-grading, revegetation, restoration, and control and disposal of construction water as allowable by the District's permits and all other applicable laws and regulations. The District may utilize gravels deposited into the pond from the construction operation and shall be responsible for removing and hauling any such gravels. Contractor shall assume that all other gravels, sands, and silts generated during construction activities can be buried in the percolation pond or some similar method upon completion of construction, and no material will need to be hauled off site. See Specification 01 01 00 Section 1.1.A.2 for a description of the complete dewatering system.

Item 3 – Dewatering Pumps and Piping within Caisson

Measurement and payment for this item shall be on a lump sum basis and shall include, but is not necessarily limited to, the installation and maintenance of all equipment and materials necessary within the caisson for construction dewatering. The Contractor is responsible for all pumps, pipes, labor, materials, equipment, and fuel associated with this item. This item shall also include providing and installing discharge piping out of the caisson sufficient to allow for connection to the Yelomine pipe shown on the Drawings and discussed in Additive Item A-1. See Specification 01 01 00 Section 1.1.A.2 for a description of the complete dewatering system.

Item 4 – Installation of Ports and 10-foot Blanks

Measurement and payment for this item shall be on a per each stainless steel port and 10-foot stainless steel blank installed and accepted basis. The price shall include the cost of all materials, labor, equipment, and supervision necessary for coring of the caisson wall, port installation, grouting and sealing port penetration, final finishing of the port, and blank installation.

Item 5 – Setup for Lateral Jacking

Measurement and payment for this item shall be on a lump sum basis. The price shall include the cost of all materials, labor, equipment, and supervision necessary for installing and removing a floor or work surface required for lateral projection, placement of jacking equipment into caisson, setting up jacking equipment for projection of laterals, removal of jacking equipment from the caisson upon project completion, and disinfection of caisson.

Item 6 – Furnish, Install & Develop 12" Diameter, Type 304 Stainless Steel Lateral Screens

Measurement and Payment for this item shall be by the lineal foot for the actual amount of lateral screen pipe installed and accepted. The per foot price shall include the cost of all materials, labor, equipment and supervision necessary for projection pipe installation,

sizing and installation of wire round stainless steel screens, projection pipe retrieval, lateral development, and disinfection as shown on the Drawings, and in accordance with these Specifications. The base bid is for installing four 150-foot laterals with 140 LF of screen per lateral (560 LF of screen total).

Item 7 – Furnish and Install (2) 12" Stainless Steel Gate Valves with Tags and Install (2) Additional Valves to be Provided by Owner

Measurement and payment for this item shall be on a lump sum basis. Payment shall include full compensation for all labor, equipment, materials, and supervision to install four 12-inch stainless steel gate valves (two valves provided by the Contractor, two valves provided by the District) as shown on the plans, complete and in place including but not limited to the gate valve, stem, handwheel, bolts, nuts, and a tag as shown on the Drawings and in accordance with these Specifications.

Item 8 – Initial & Final Performance Tests

Measurement and payment for this item shall be on a lump sum basis and shall include, but not necessarily be limited to, performing the multiple rate step and constant rate tests prior to and following lateral installation and development activities. Contractor shall present the results of the performance testing in a Final Conditions Report. The Final Conditions Report shall discuss means and methods and final results of the collector rehabilitation, results of final and initial performance testing including flows measured in each new lateral (new and existing), underwater inspection, and the long-term sustained yield projected for the Collectors under maximum and minimum recharge conditions. Payment shall include full compensation for all labor, equipment, materials, and supervision to perform tests in accordance with these Specifications.

ADDITIVE BID SCHEDULE

The objective of the project is to install 560 LF of screen. If the Contractor is not able to install 560 LF of screen in four laterals due to obstruction/refusal, additional alternate lateral(s) may be installed at the Owner’s discretion. If this is the case, the Bidder agrees to install additional lateral(s) in Collector 2 at location(s) to be coordinated with Engineer and Owner for the unit prices provided in the Additive Bid Schedule.

The Owner may also choose to extend any given lateral past the length shown in the Drawings. This additional screen length (once the contract 560 LF of screen are installed) will also be paid for at the unit price provided in the Additive Bid Schedule

Item A-1 – Assembly and Disassembly of Owner-supplied Yelomine Piping, Valves, and Fittings

The District will provide and has sufficient Yelomine piping, valves, and fittings to construct the dewatering pipe outside of the collector caisson as shown on the Drawings. The piping and fittings will be made available for use by the Contractor. The District will move the piping and appurtenances from their offsite storage location and stage them at the project site at the location indicated on the Drawings. Measurement and payment for this item shall be on a lump sum basis and shall include, but is not necessarily limited to, assembly, maintenance, disassembly, and returning the pipe and

appurtenances to the original staging location. See Specification 01 01 00 Section 1.1.A.2 for a description of the complete dewatering system.

Item A-2 – Installation of Ports and 10-foot Blanks

Measurement and payment for this item shall be on a per each stainless steel port and 10-foot stainless steel blank installed and accepted basis, above and beyond the Base Bid Schedule quantity. The price shall include the cost of all materials, labor, equipment, and supervision necessary for coring of the caisson wall, port installation, and sealing port penetration, final finishing of port, and blank installation.

Item A-3 – Furnish, Install & Develop 12" Diameter Type 304 Stainless Steel Lateral Screens

Measurement for this item shall be by the lineal foot for the actual amount of lateral screen installed and accepted basis, above and beyond the Base Bid Schedule quantity. The per foot price shall include the cost of all materials, labor, equipment, and supervision necessary for projection pipe installation, sizing and installation of wire round stainless steel screens, projection pipe retrieval, lateral development, disinfection, and performance testing, as shown on the plans, in accordance with these specifications and as directed by the Owner and Engineer.

Item A-4 – Furnish and Install 12" Stainless Steel Gate Valves with Tags

Measurement and payment for this item shall be on a per each valve installed and accepted basis, above and beyond the Base Bid Schedule quantity. Payment shall include full compensation for all labor, equipment, materials, and supervision to provide and install additional 12-inch stainless steel gate valve(s), complete and in place including but not limited to the gate valve, stem, handwheel, bolts, nuts, and a tag as shown on the Drawings and in accordance with these Specifications.

Item A-5 – Remove and reinstall support flooring to allow lateral installation at a different elevation than shown on plans

Measurement and payment for this item shall be on a per each temporary floor installed basis, above and beyond what is required for the lateral layout as shown on the Drawings. Payment shall include the cost of all materials, labor, equipment, and supervision necessary for floor installation for lateral projection at a different elevation than shown on the Drawings.

Item A-6 – Provide Stainless Steel Ladder

Measurement and payment for this item shall be on a lump sum basis and shall include the cost of all materials, shipping, and other costs required for providing a stainless steel ladder and fall arrest system as shown on the Drawings and getting the materials to the site.

Item A-7 – Install Stainless Steel Ladder

Measurement and payment for this item shall be on a lump sum basis and shall include full compensation for all labor, equipment, and supervision required to install and anchor

the stainless steel ladder and fall arrest system as shown on the Drawings.

END OF SECTION

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SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

A. Section includes:
   1. Coordination and project conditions.
   2. Preconstruction meeting.
   3. Progress meetings.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this item shall be included in the Mobilization/Demobilization Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00 Shop Drawings & Submittals:
   1. Construction schedule.
   2. Contractor's Organization Chart with titles and contact information for a minimum of the Project Manager, Site Foreman, Site Superintendent, and Project Geologist.

1.4 PRECONSTRUCTION MEETING

A. Engineer will schedule meeting after Notice to Proceed.

B. Prior to the commencement of Work at the site, a Preconstruction meeting will be held at a mutually agreed time and place. The Preconstruction meeting shall be attended by District representatives, District Engineer, Resident Engineer, Construction Foreman, Contractor's Construction Superintendent, key Subcontractors, and any other parties requested by the Contractor or the Owner.

C. Unless previously submitted to the Engineer, the Contractor shall bring to the conference three (3) copies of each of the following:
   1. Draft Construction Schedule.
   2. Procurement schedule of major equipment and materials and items requiring long lead time.
   3. Shop Drawing/Sample/submittal schedule.
   4. Substitution Requests per Section 01 33 00 Shop Drawings & Submittals.
   5. Letter of Responsibility designating emergency contacts for the Contractor after business hours.

D. The purpose of the meeting is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established.

E. The Engineer will preside at the Preconstruction Meeting and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

F. Agenda:
   1. Notice to Proceed date.
   2. Distribution of Contract Documents.
   3. Designation of personnel representing parties in Contract.
   4. Review of Contractor's Construction Schedule.
   5. Major equipment deliveries and priorities.
   6. Critical work sequencing.
   7. Submission of list of Subcontractors, list of products, schedule of values if not previously submitted.
   8. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
   9. Use of premises by Owner and Contractor.
   10. Owner's requirements and occupancy.
   11. Site Safety: Contractor's assignments for safety and first aid.
   12. Construction facilities and controls provided by Owner.
   13. Temporary utilities provided by Owner.
   14. Application for payment procedures.
   15. Procedures for testing.
   16. Procedures for maintaining record documents.
   17. Requirements for system shut down.

1.5 PROGRESS MEETINGS

A. The Engineer shall schedule, arrange, and conduct progress meetings. These meetings shall be conducted once per week, or at a frequency as mutually agreed upon by the Contractor and Owner, and shall be attended by the Contractor's superintendent and representatives of key Subcontractors, and others who are active in the execution of the Work. The purpose of these meetings shall be to review the Contractor's schedule provided in accordance with this Section, resolve conflicts, and in general, coordinate and expedite the execution of the Work.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings and record the meeting minutes.

C. Attendance Required: Job superintendent, key subcontractors, Owner, Engineer, and others as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review and acceptance of minutes of previous meeting.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Site Safety.
   5. Identification of problems impeding planned progress.

6. Review of submittals schedule and status of submittals.
7. Review of delivery schedules.
8. Maintenance of progress schedule.
9. Corrective measures to regain projected schedules.
10. Planned progress during succeeding work period.
11. Coordination of projected progress.
12. Maintenance of quality and work standards.
13. Effect of proposed changes on progress schedule and coordination.
    a. Progress Payment.
    b. Change Orders.
    c. Claims.
14. Other business relating to Work.

E. The Engineer shall record minutes and distribute copies within two days after meeting to participants, with one copy each to Contractor, Owner, and those affected by decisions made.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 33 00

SHOP DRAWINGS AND SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:
   1. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.
   2. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its favorable review or rejection by the Engineer.

B. Related work described elsewhere:

1. Contractual requirement for submittals	General Conditions
2. Individual submittals required	Pertinent Sections of these Specifications

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this item shall be included in the Mobilization/Demobilization Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.3 PRODUCT HANDLING

A. Make all submittals of Shop Drawings, samples, requests for substitutions, and other items, in strict accordance with the provisions of this section of these specifications.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Scale required: Unless otherwise specifically directed by the Engineer, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the work.

B. Type of prints required: Unless otherwise specifically directed by the Engineer, make all shop drawing prints in blue or black line on white background.

C. Number of prints required: Submit all shop drawings electronically unless noted otherwise.

2.2 SAMPLES

A. Accuracy of sample: Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article(s) proposed to be furnished.

B. Number of samples required: Submit all samples in the quantity which is required to be returned plus one which will be retained by the Engineer.

2.3 COLORS

A. General: Unless the precise color and pattern is specifically described in the Contract Documents, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Engineer for review and selection.

B. Comparative analysis: Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited for the installation, completely describe the relative costs and capabilities of each.

2.4 SUBSTITUTIONS

A. Engineer's approval required:
   1. The Contract is based on the materials, equipment, and methods described in the Contract Documents.
   2. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Engineer to evaluate the proposed substitution.
   3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Engineer.

B. "Or equal":
   1. Where the phrase "or equal" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Engineer unless the item has been specifically approved for this work by the Engineer.
   2. The decision of the Engineer shall be final.

C. Availability of specified items:
   1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the work.
   2. In the event specified item or items will not be available, so notify the Engineer prior to receipt of bids.
   3. Costs of delays because of non-availability of specified items, which such delays could have been avoided by the Contractor, shall be the responsibility of the Contractor and shall not be borne by the Owner.

PART 3 - EXECUTION

3.1 SUBMITTAL FORM

All submittals shall be transmitted with a copy of the form provided at the end of this section or Contractor-supplied form that has been pre-approved by the Engineer.

3.2 COORDINATION OF SUBMITTALS

A. General: Prior to submittal for Engineer's review, use all means necessary to fully coordinate all material, including the following procedures:
   1. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.
   2. Coordinate as required with all trades and with all public agencies involved.
   3. Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.
   4. Clearly indicate all deviations from the Contract Documents.

B. Grouping of submittals: Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

C. Shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp or other approved means that the work shown is in conformance with the Contract Documents and has been checked for dimensions and relationship with work of all other trades involved.

3.3 TIMING OF SUBMITTALS

A. General:
   1. Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
   2. In scheduling, allow at least fifteen (15) working days for the Engineer's review following receipt of the submittal.
   3. Contractor shall coordinate on-site grain size analysis and screen selection with the Engineer in advance of performance of the work. Sufficient time shall be allowed and previously agreed upon for the Engineer to review sieve data and approve screen size selection prior to the installation of the screen.

B. Delays: Costs of delays occasioned by tardiness of submittals are the responsibility of the Contractor and shall not be borne by the Owner.

C. Scheduling: Until submittals have been favorably reviewed by the Engineer, progress payments beyond the scheduled date of the submittals will not be made to the Contractor.

3.4 SUBMITTALS REQUIRED

Submit shop drawings, sediment control and spill prevention plans, catalog cuts for fabricated items and manufactured items required for construction, and all other submittal requested by the

Engineer including all those detailed in these specifications. Contractor shall provide table to Owner that lists screen slot sizes used for each segment of lateral screen installed.

The Contractor is directed to each Specification section for required submittals; however, the anticipated submittals shall consist of, but is not necessarily limited to, the following:

Section	Submittal Description
01 01 00	Complete work schedule
01 14 00	Spill prevention control and countermeasure plan (SPCC Plan)
01 14 00	Sediment and Erosion Control Plan
01 30 00	Construction schedule to be submitted at regular intervals at the request of the Engineer or Owner.
01 30 00	Contractor's organization chart with titles and contact information for a minimum of the Project Manager, Site Foreman, Site Superintendent, and Project Geologist
01 57 13	Mill certificate or affidavit attesting that the erosion control fabric and factory seams meet chemical, physical, and manufacturing requirements.
01 57 13	Erosion Control Plan
03 60 00	Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, and appropriate uses for each type of non-shrink and epoxy grout used in the work.
15 21 00	Shop drawings of lateral layouts, elevations, details, valves, port assembles, and screens
15 21 00	Table that lists screen slot sizes used for each segment of lateral screen installed for each lateral installed
15 21 00	Complete list of all materials and equipment proposed to be furnished and installed for lateral installation, giving manufacturer's name, catalog number, and catalog cuts for each item where applicable.
15 21 00	Manufacturer's current recommended method of installation for the materials and shop drawings
15 21 00	Manufacturer's certificate of conformance for lateral installation materials
15 21 00	Method of lateral installation

Section	Submittal Description
15 21 00	Method of lateral development
15 21 00	Method for determining lateral deflection in the field, as well as methods proposed to ensure deflection standards set forth in the specifications are achieved.
15 21 00	Submit a Final Conditions Report detailing the lateral installation procedures, including new lateral locations and lengths, the screen slot size table for each lateral, development procedures, sand test results and Initial and Final Performance Test results
31 00 00	Manufacturer's literature and data including, where applicable, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following: imported fill, rip-rap, and geotextile fabric.
31 23 19	Dewatering plan. Submit shop drawings and data showing the intended plan for dewatering operations to Engineer for review and approval. Contractor may use the dewatering plan given in the Drawings, but has the option of designing their own dewatering plan that meets the intended use. The plan should contain at a minimum the sizes of pumps, location of percolation pond, location of drainage trench, dewatering pipe layout inside and outside the caisson, and turbidity curtain locations.
31 23 19	Data for dewatering pumps including sizes, capacities, priming methods, and engine or motor characteristics, as well as pumping equipment for control of discharge.
31 25 13	Signed certification from each source of seed supply indicating that the material meets the specified requirements.
31 25 13	A letter, signed certification, or appropriate lot tag, from seed provider stating the scientific name, common name, quantity, and origin of seed material to confirm it meets the specified requirements.
31 25 13	Manufacturer's receipt that describes the provenance and constituents of mulch and certifies that it meets the specification described in this Section. Receipt shall certify that mulch does not contain noxious weeds or originate from a Sudden Oak Death host seed species derived from a quarantined county
31 25 13	Manufacturer's specification sheets for all erosion matting or blankets.
33 12 16	Shop drawings for all valves and appurtenances that include a complete list of all materials and equipment catalog number, and catalog cuts for each item where applicable.
33 12 16	Submit the following valve data: assembly drawings, cross section drawings; head loss, C_v, calculated port area; torque seating, un-seating, and dynamic torque at 10-degree increments; test certifications, seat leakage, hydrostatic, coating thickness.

Section	Submittal Description
33 12 16	Copies of manufacturer's current operation and maintenance manuals for all valves and appurtenances.
33 12 16	Manufacturer's current recommended method of installation for all valves and appurtenances.
33 13 13	Disinfection procedure: submit procedures, proposed chemicals, application procedures, and treatment levels for review.
33 13 13	Manufacturer's certificate certifying that disinfectants meet or exceed AWWA Standards requirements.
33 13 13	Disinfection Report (to be included as a part of the Final Conditions Report)

3.5 RESUBMITTALS

A. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the Contract Documents and will be returned to the Contractor for resubmission in the proper form.

B. Engineer shall complete two detailed reviews of shop drawings and submittals at no cost to the Contractor. The cost of additional reviews resulting from improper submission or completion of shop drawings shall be deducted by the Owner from the contract sum.

END OF SECTION

Humboldt Bay Municipal Water District
SHOP DRAWING & SUBMITTAL REVIEW FORM

Date:	**Contract Title:** Collector 2 Rehabilitation Project GHD Job #: 11218863
To: GHD, Inc. 718 Third Street Eureka, CA 95501 **Attention:** Nathan Stevens, PE Email: nathan.stevens@ghd.com Phone: (707) 267-2204	**From:** Contractor Name Contractor Address Line 1 Contractor Address Line 2 **Submitted By:** **Signature:** Phone:

Spec Section or Dwg	Submittal No.	Rev. No.	Qty.	Subject of Shop Drawing or Submittal	Review Action

Engineer's Review Comments:

Signature: **Date:**

Review Action Explanation:

1. No Exceptions Taken
2. Make Corrections Noted – No Resubmittal Required
3. Amend and Resubmit
4. Rejected – Resubmit
5. Answer provided
6. Not Reviewed – Filed Only

Shaded areas for Engineer use only.

This review is only for general conformance with the design concept and the information given in the Construction Documents. Notations made on the submittals during this review do not relieve the Contractor from compliance with the requirements of the construction documents, including without limitation, the plans and specifications, and all applicable laws and codes. Review of that specific item shall not include review of an assembly of which the item is a component. The Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods techniques, sequences and procedures of construction; and coordination of the Work with all other trades and performing all Work in a safe and satisfactory manner. This review is not for constructability or Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto. This review is subject to all provisions of the Contract Documents.

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section covers the work necessary to move in personnel and equipment, and related facilities necessary to prepare the work area for construction. Temporary facilities and controls required for this work include, but are not necessarily limited to:

1. Temporary utilities such as water and electricity
2. Sanitary facilities.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this item shall be included in the Mobilization/Demobilization Bid Item. No additional measurement or payment will be included for the requirements of this section.

1.3 PRODUCT HANDLING

A. Protection:

1. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

PART 2 - PRODUCTS

2.1 UTILITIES

A. General: The Contractor is responsible for coordinating all onsite utility connections and usage with the Owner.

B. Temporary water: Potable water is generally available at the site. The Contractor shall make his own arrangements for transportation of water from the Owner's facilities to the work site. Water for cleaning the caisson after project completion will be available.

C. Electricity: It is assumed that the electrical feed to Collector 2 needs to be de-energized in order to safely perform the construction work associated with this project, meaning that electrical power will not be available on-site, and the Contractor shall be responsible for providing the necessary power and any air quality permits, if applicable.

2.2 SANITARY FACILITIES

A. Contractor is responsible for providing and maintaining temporary sanitary facilities. Furnish and install all required temporary facilities with sanitary toilets for use of all workers; comply with all minimum requirements of the Health Department or other

public agency having jurisdiction; maintain in a sanitary condition at all times. Protect facilities against vandalism.

2.3 FIELD OFFICES

A. Contractor and Subcontractors:

1. The contractor and their subcontractors may maintain such office and storage facilities on the site as may be necessary for the proper conduct of the work. These shall be located so as to cause no interference with any work to be performed on the site.

B. Removal:

1. Upon completion of the project, or as directed by the Owner or Engineer, the Contractor shall remove all such temporary structures and facilities from the site and leave the premises in the condition required by the Owner.

PART 3 - EXECUTION

3.1 REMOVAL

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work; remove all such temporary facilities and controls as rapidly as progress of the Work will permit or as directed by the Engineer.

END OF SECTION

SECTION 01 57 13

EROSION CONTROL

PART 1 GENERAL

1.1 GENERAL

A. Minimize the extent of all ground disturbing activities and avoid Work on the river bar if at all feasible. No work shall occur in the river at any time.

B. Heavy equipment shall be placed outside of river bar except when absolutely necessary to perform the Work.

C. Upon completion of construction activities, natural drainage shall be restored and re-contoured as nearly as practicable to pre-project conditions, and shall match adjacent natural channel contours.

1.2 RELATED SECTIONS

Related work specified in other sections:

A. Section 31 23 19 - Dewatering

B. Section 31 25 13 – Hydroseeding and Revegetation

1.3 MEASUREMENT AND PAYMENT

A. Measurement and Payment for the requirements of this section shall be paid for under the Percolation Pond Bid Item and no additional measurement or payment will be made for this contract item.

1.4 SUBMITTALS

A. Mill Certificate or Affidavit. A mill certificate or affidavit shall be provided attesting that the erosion control fabric and factory seams meet chemical, physical, and manufacturing requirements specified above.

B. Erosion Control Plan.

1.5 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. American Society for Testing and Materials (ASTM)
   1. ASTM D4439-04 - Standard Terminology for Geosynthetics.
   2. ASTM D4491-99a(2009) - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
   3. ASTM D4533- 04(2009) - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

4. ASTM D4632-08 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
5. ASTM D4751-04 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
6. ASTM D4873-02(2009) - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

C. California State Water Resources Control Board:
   1. National Pollutant Discharge Elimination System (NPDES) General Permit Discharge for Drinking Water System Discharges. Order WQ 2014-0194-DWQ, General Order No. CA140001
      a. Note that the District is in the process of reviewing this permit, but changes that will affect the Contractor's work are not anticipated. If there are changes in the permit that affect the Contractor's work, a change order will be issued, if appropriate.

D. Humboldt Bay Municipal Water District:
   1. Long-Term Lake and Streambed Alteration Agreement, No. R1-2010-0093, by and between the California Department of Fish and Game and the Humboldt Bay Municipal Water District, January 26, 2012. Sections regarding gaining access to and maintaining Ranney Collectors.
   2. Habitat Conservation Plan for its Mad River Operations, Final Approved HCP – April 2004. Sections pertaining to gaining access to and maintaining Ranney Collectors.
   3. Army Corps of Engineers Long-Term 404 Permit
      a. Note that the District is in the process of reviewing this permit, but changes that will affect the Contractor's work are not anticipated. If there are changes in the permit that affect the Contractor's work, a change order will be issued, if appropriate.

1.6 EROSION AND SEDIMENT CONTROLS

A. The controls and measures required by the Contractor are described but not limited to the below.
   1. Structural Practices: Structural practices shall be implemented to divert flows from steep slopes, exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices.
      a. Silt Fences. The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly placed and installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, trench excavation, backfilling, and grading). Silt fences shall be installed in the locations as directed by the Engineer. Final removal of silt fence barriers shall be upon approval by the Engineer.
      b. Fiber Rolls (sediment logs or wattles): Contractor shall provide fiber rolls as temporary structural practice to minimize erosion and sediment runoff. Fiber rolls shall be properly placed and installed to effectively retain sediment

immediately after completing each phase of work (e.g., clearing and grubbing, trench excavation, backfill, and grading) in each independent runoff area (e.g., after clearing and grubbing in an area between a ridge and drain, fiber rolls shall be placed as work progresses; fiber rolls shall be removed/replaced/relocated as needed for work to progress in the drainage area). Final removal of fiber roll barriers shall be upon approval by the Engineer. Fiber Rolls shall be provided as follows, or as required to conform to the intent of this section:

(1) Along the downhill perimeter edge of all areas disturbed.
(2) Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
(3) Along the toe of all cut slopes and fill slopes of the construction areas.
(4) Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced a maximum of 100 feet apart.
(5) Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced a maximum of 100 feet apart.
(6) At the entrance to culverts that receive runoff from disturbed areas.

c. To minimize wildlife entanglement and plastic debris pollution, the use of plastic netting (such as polypropylene, nylon, polyethylene, polyester, or other synthetic fibers used in fiber rolls, erosion control blankets, and mulch control netting) in temporary rolled erosion and sediment control products is prohibited. Any erosion control associated netting shall be made of natural fibers and constructed in a loose-weave design with movable joints between the horizontal and vertical twines.

2. All trees and natural vegetation shall be retained, unless specifically noted otherwise, to stabilize hillsides, retain moisture, reduce erosion, and minimize siltation and nutrient runoff.

PART 2 PRODUCTS

2.1 SILT FENCES

A. Ultraviolet stabilized woven polypropylene face. The filter fabric shall meet the following requirements:

Physical Property	Test Procedure	Required Value
Grab Tensile	ASTM D 4632	160 lbs. min.
Elongation (%)	ASTM D 1682	25 % max.
Mullen Burst Strength, psi, min.	ASTM D 3876	350
Equivalent Opening Size, max.	US Standard Sieve	30-70
Ultraviolet Radiation Resistance, %	ASTM D 4355	70

Strength Retention		
Weight oz./sq. yd.	ASTM D 3776	4

B. Mill Certificate or Affidavit. A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above.

C. The Contractor may use either wooden stakes or steel posts for silt fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot.

2.2 FIBER ROLLS (SEDIMENT LOGS OR WATTLES)

A. Composed of certified weed free rice straw or coconut fiber in 8.5 to 9-inch diameter rolls with and approximate weight of 2lbs/lineal foot, contained in a core, jute, or burlap netting.

B. Manufacturers:
1. Earth Savers 9”-Coir Log
2. Erosion Control Blanket, 9-inch Stenlog
3. Substitutions: Section 01 33 00 – Shop Drawings and Submittals

C. The Contractor shall use wooden stakes for fiber roll installation. Wooden stakes used for fiber roll installation shall have a minimum cross section of 1 inch by 2 inches, or as suggested by the fiber roll manufacturer.

PART 3 EXECUTION

3.1 DUST CONTROL

A. All construction areas shall be treated and maintained as necessary to minimize the emission of dust.

3.2 INSTALLATION OF SILT FENCES

A. Silt fences shall extend a minimum of 24 inches above the ground surface and shall not exceed 34 inches above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 6 inches wide and 6 inches deep on the upslope side of the location of the silt fence. The 6-inch by 6-inch trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Engineer.

B. Maximum spacing for post supports shall be 6 feet on center. Posts shall be buried 18 inches minimum and shall not exceed 36-inches above the ground surface.

3.3 INSTALLATION OF FIBER ROLLS (SEDIMENT LOGS OR WATTLES)

A. Fine grade the subgrade by hand, dressing where necessary to remove local deviations and to remove larger stones or debris that will inhibit intimate contact of the fiber roll with the subgrade. Prior to roll installation, contour a concave key trench 2 to 4 inches deep along the proposed installation route. Soil excavated in trenching shall be placed on the uphill or flow side of the roll to prevent water from undercutting the roll.

B. Place fiber rolls into the key trench and stake on both sides of the roll within 6 feet of each end. Spacing for stakes shall be 3 to 5 feet. Stakes are typically driven in on alternating sides of the roll. Stakes shall be buried 12 inches minimum.

C. When more than one fiber roll is placed in a row, the rows should be abutted securely to one another to provide a tight joint, not overlapped. Fiber rolls shall be placed in a single row, lengthwise on the contour, with ends of adjacent rolls tightly abutting one another.

3.4 MAINTENANCE

A. The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

1. Silt Fence Maintenance. Silt fences shall be inspected in accordance with Part 4 of this Specification. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be re-vegetated.
2. Fiber Roll Maintenance. Fiber roll barriers shall be inspected in accordance with Part 4. Close attention shall be paid to the repair of damaged rolls, end runs and undercutting beneath rolls. Necessary repairs to barriers or replacement of rolls shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Roll rows used to retain sediment shall be turned uphill at each end of each row. When a fiber roll barrier is no longer required, it shall be removed. The immediate area occupied by the roll and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be re-vegetated.

PART 4 INSPECTION

4.1 SITE INSPECTIONS

A. Person(s) Responsible for Inspecting Site
   1. The person inspecting the site may be on the Contractor's staff or a third party hired by the Contractor to conduct such inspection. Contractor is responsible for ensuring that the person who conducts inspections is a "qualified person".
   2. A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skill to access conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

B. Frequency of Inspections:
   1. At a minimum, conduct a site inspection in accordance with one of the two schedules listed below:
      a. At least once every seven (7) calendar days; or
      b. Once every 14 calendar days and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. To determine if a storm event of 0.25 inches or greater has occurred on the project site, you must either keep a properly maintained rain gauge on the site, or obtain the storm event information from a weather station that is representative of the project location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day.
      c. Inspections are only required during the project's normal working hours.

C. Reduction in Inspection Frequency:
   1. Inspection frequency may be reduced as follows:
      a. For Stabilized Areas. Contractor may reduce frequency of inspection to once per month in any area of the site where the stabilization steps. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required for general construction. Contractor must document the beginning and ending dates of this period in their records.

D. Areas that need to be inspected. During site inspection, the following areas of the site must be inspected at a minimum:
   1. All areas that have been cleared, graded, or excavated and that have not yet completed stabilization;
   2. All stormwater controls (including pollution prevention measures) installed at the site;
   3. Materials, waste, borrow, or equipment storage and maintenance areas;
   4. All areas where stormwater typically flows within the site, including drainage ways designed to divert, convey and/or treat stormwater;
   5. All points of discharge from the site; and
   6. All locations where stabilization measures have been implemented.

E. Requirements for Inspections. During site inspection, the Contractor's inspector must at a minimum:

1. Check whether all erosion and sediment controls and pollution prevention controls installed appear to be operational and are working as intended to minimize pollutant discharges. Determine if any controls need to be replaced, repaired, or maintained;
2. Check for presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
3. Identify any locations where new or modified stormwater controls area necessary to meet the requirements of these specifications or the applicable permit conditions;
4. At points of discharge and, if applicable, the banks of any surface waters flowing within site boundaries or immediately adjacent to the site, check for signs of visible erosion and sedimentation that have occurred and are attributable to discharge; and
5. Identify any and all incidents of noncompliance observed.
6. If a discharge is occurring during inspection, the Contractor's inspector is required to:
    a. Identify all points of the property from which there is a discharge
    b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators or stormwater pollutants; and
    c. Document whether the stormwater controls are operating effectively, and describe any such controls that are clearly not operating as intended or are in need of maintenance.
7. Based on the results of the inspection, initiate corrective action under Part 5.

F. Inspection Report
    1. Requirements to Complete Inspection Report: The Contractor or Contractor's representative must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
        a. The inspection date;
        b. Names and titles of the personnel making the inspections;
        c. A summary of inspection findings, covering at a minimum the observations made in accordance with Part 4.1.E;
        d. If the site is being inspected at the frequency specified in Part 4.1.B.1. and an inspection was conducted because of rainfall measuring 0.25 inch or greater, the applicable rain gauge or weather station readings that triggered the inspection must be included; and
        e. If it has been determined that it is unsafe to inspect a portion of the site, the reason it was found to be unsafe must be described, and the locations that this condition applied to must be specified.
    2. Record Keeping Requirements: Contractor is required to keep a current copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an onsite inspection or upon request by the County or CA Regional Water Quality Control Board. The inspection reports may be kept electronically if the records are:
        a. In a format that can be read in a similar manner as a paper record;
        b. Legally dependable with no less evidentiary value than their paper equivalent; and
        c. Accessible to the inspector during an inspection to the same extent as a paper copy stored at a site would be, if the records were stored in paper

form. All inspection reports completed for this part must be retained for at least 3 years from the date that the permit expires or is terminated.

4.2 INSPECTIONS BY REGULATORY AGENCIES

A. Allow County or Regional Water Quality Control Board or any authorized representative of these agencies, to conduct the following activities at reasonable times:
   1. Enter onto areas of your site, including any construction support activity areas, and onto locations where records are kept;
   2. Access and copy any records that must be kept under the conditions of this Section;
   3. Inspect the construction site, including any construction support activity areas covered by this Contract and any stormwater controls installed and maintained at the site; and
   4. Sample or monitor for the purpose of ensuring compliance.

PART 5 CORRECTIVE ACTION

5.1 “CORRECTIVE ACTIVE” DEFINED

A. Corrective actions are actions taken in compliance with this Section , which include:
   1. Repair, modify, or replace any stormwater control used at the site;
   2. Clean up and properly dispose of spills, releases, or other deposits; or
   3. Remedy a permit violation

5.2 REQUIREMENTS FOR TAKING CORRECTIVE ACTION

A. Contractor must complete the following corrective action in accordance with the deadlines specified in this Part. In all circumstances, Contractor must immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.

B. For any of the following conditions on the site, Contractor must install a new or modified erosion control measure and make it operational, or complete the repair, but no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, Contractor must document in their records why it is infeasible to complete the installation or repair within the seven (7) calendar day timeframe and document the schedule for installing the stormwater control(s) and making it operational as soon as practicable after the seven (7) day timeframe.
   1. A required storm water control was never installed, was installed incorrectly, or not in accordance with the requirements of Section 01 57 13.
   2. If the Contactor determines that erosion control measures installed are not effective enough for the discharge to meet applicable water quality standards; or
   3. Any of the prohibited discharges listed below are occurring or has occurred:
      a. Wastewater from washout of concrete or slurry, unless managed by an appropriate control.

b. Wastewater from washout and cleanout of any other construction materials, unless managed by an appropriate control.
c. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
d. Soaps, solvents, or detergents used in vehicle and equipment washing
e. Toxic or hazardous substances from a spill or other release

5.3 CORRECTIVE ACTION REQUIRED BY REGULATORY AGENCY

A. Contractor must comply with any corrective actions required by the County or State as a result of permit violations found during an inspection carried out under Part 4.2.

5.4 CORRECTIVE ACTION REPORT

A. For each corrective action taken in accordance with this Part, Contractor must complete a corrective action report, which includes the applicable information listed below. Note that these reports must be maintained in Contractor's records but do not need to be provided to any regulatory agency except upon request.
   1. Within 24 hours of discovering the occurrence of one of the triggering conditions in Part 5.02.B at the site, Contractor must complete a report of the following:
      a. Which condition was violated
      b. The nature of the condition identified; and
      c. The date and time of the condition identified and how it was identified.
   2. Within seven (7) calendar days of discovering the occurrence of one of the triggering conditions in Part 5.2.B at the site, Contractor must complete a report of the following:
      a. Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
      b. A summary of stormwater control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed
   3. Record Keeping Requirements: Contractor is required to keep a current copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an onsite inspection or upon request by the County or the CA Regional Water Quality Control Board. The inspection reports may be kept electronically if the records are:
      a. In a format that can be read in a similar manner as a paper record;
      b. Legally dependable with no less evidentiary value that their paper equivalent; and
      c. Accessible to the inspector during an inspection to the same extent as a paper copy stored at a site would be, if the records were stored in paper form. All corrective action reports completed for this part must be retained for at least 3 years from the date that the permit expires or is terminated.

PART 6 STAFF TRAINING REQUIREMENTS

6.1 STAFF TRAINING REQUIREMENTS

A. Prior to commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, Contractor must ensure that the following personnel understand the requirements of the applicable permits, this Section and their specific responsibilities with respect to those requirements:
   1. Personnel who are responsible for the design, installation, maintenance, and/ or repair of stormwater controls (including pollution prevention measures);
   2. Personnel responsible for the application and storage of treatment chemicals
   3. Personnel who are responsible for conducting inspections as required in Part 4.1; and
   4. Personnel who are responsible for taking corrective actions as required in Part 5.2.

B. Contractor is responsible for ensuring that all activities on the site comply with the requirements of this Specification. Contractor is not required to provide or document formal training for subcontractors or other outside service providers, but must ensure that such personnel understand any requirements of the applicable permits or these Specifications that may be affected by the Work they are subcontracted to perform.

C. At a minimum must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):
   1. The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
   2. The proper procedures to follow with respect to the Work’s pollution prevention requirements; and
   3. When and how to conduct inspections, record applicable findings, and take corrective actions.

END OF SECTION

SECTION 01 74 00

SITE AND AREA CLEANUP

PART 1 - GENERAL

1.1 DESCRIPTION

A. Maintain work areas free from accumulations of waste, debris, dust, and mud caused by Contractor's operations.

B. At completion of Work, remove all waste materials, tools, equipment, machinery, surplus materials; leave property clean; leave all rights of ways in a condition equal to that at the beginning of Work.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this item shall be included in the Mobilization/Demobilization Bid Item. No additional measurement or payment will be included for the requirements of this section.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PROTECTION

A. The Contractor shall contact Underground Service Alert (USA) (800) 227-2600 in accordance with the requirements of Section 01 50 00, “Temporary Facilities and Controls.”

B. The Contractor shall be solely responsible for the protection of site facilities, properties, structures, streets, and utilities. Any damage shall be repaired to its original condition or better, as determined by the Engineer, at the Contractor’s expense.

C. The Contractor shall protect benchmarks, survey control points, and existing structures not identified for removal from damage or displacement.

3.2 CLEARED MATERIAL

A. Clearing and grubbing shall consist of removal of all objectionable material within the limits of work shown on the Plans and as directed by the Engineer. Objectionable materials shall include but are not limited to all abandoned pipes, conduits, waste concrete, undergrowth and dead wood. All objectionable cleared material which originated on site shall become the property of the Owner and shall be stockpiled onsite per the direction of the Owner.

3.3 TOP SOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded without mixing with foreign materials for use in finish grading.

B. Stockpile and protect from erosion per sediment and erosion control plan.

3.4 DURING CONSTRUCTION

A. Execute cleaning to ensure that any private property, grounds and especially access roads and Owner and public properties are maintained free from accumulation of waste materials, dust, mud, and debris.

B. The Contractor shall keep all access roads clean and free of dust, mud and debris resulting from Contractor's operations.

C. All waste materials, debris and rubbish shall be disposed of at sites to be chosen by Contractor and at facilities properly permitted and licensed to accept such waste materials. Prior to dumping on any private property, a letter allowing such dumping shall be obtained from the property owner and presented to the Engineer and Humboldt County Department of Environmental Health for approval.

Senior REHS, Solid Waste Program
DHHS, Department of Environmental Health
100 H Street, Suite 100
Eureka, CA 95501
Fax: (707) 441-5699

Contractor shall have the sole responsibility of ensuring that disposal on private property conforms to and is in compliance with all necessary permitting and regulatory approval.

D. Secondary containment and spill response materials shall always be in place per the Spill Prevention, Control and Countermeasure plan detailed in Section 01 14 00 – Environmental Protection. In the event of a spill of hydrocarbons inside the collector, the spill shall be cleaned up with absorbent pads, and if deemed necessary by the Owner, the insides of the collectors shall be scrubbed with a surfactant suitable for use in potable water applications and cleaned to the satisfaction of the Owner. Contractor shall be responsible for collection and analysis of any water quality samples deemed necessary. Hydrocarbon spills outside the collector shall be cleaned with absorbent pads and other absorbent materials and any impacted soil or water removed and properly disposed of by the Contractor.

E. Contractor shall generally keep the collectors clean throughout the performance of the work and shall not allow debris, waste or other materials accumulate in the collector. The use of tobacco products or eating in the caisson shall be strictly prohibited.

3.5 AFTER CONSTRUCTION

A. Gravels and debris shall be completely removed from the insides of the collectors upon completion of lateral development, prior to disinfection. Gravels shall be placed in the excavation for the percolation pond unless otherwise directed by the Owner. Contractor shall not be required to haul gravels off-site. Other debris removed from the walls or floors of the collectors at the direction of the Owner, shall become property of the Owner and will be stockpiled by the Contractor on-site as directed by the Owner. Other debris generated during the construction by the Contractor shall be disposed of properly by the Contractor at a properly permitted disposal site.

B. The percolation pond shall be re-graded to approximate the original contours of the site as closely as possible. The removed and stockpiled topsoil shall be replaced over the site and the site re-seeded and mulched per Section 31 00 00 and 31 25 13.

C. All other sanitary and other temporary facilities, construction materials, equipment, and other debris shall be completely removed from the site and recycled or disposed of properly by the Contractor.

D. After all work is completed in the collector and all material removed from the collectors, but prior to the final pump testing, the collector shall be disinfected as detailed in Section 33 13 13 – Caisson Disinfection.

E. If, in the opinion of the Engineer, the Contractor has not sufficiently cleaned the project area, the Engineer shall issue a written notice to the Contractor stating that the Contractor shall clean the project area to the satisfaction of the Engineer within forty-eight (48) hours. If the Contractor does not properly clean up (in the opinion of the Engineer or the Owner), then the Owner shall have the option of using outside equipment to perform the Work and such cost will be withheld from the Contract. Site shall be left in a condition equal to or better than existed prior to construction.

END OF SECTION

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SECTION 02 01 00

SITE CONDITIONS

PART 1 - GENERAL

1.1 RELATED INFORMATION

A. Related information and requirements are included in the General Conditions and the individual Sections of these Specifications.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for this item shall be included in the Bid Item to which it relates. No additional measurement or payment will be included for the requirements of this section.

1.3 INFORMATION ON SITE CONDITIONS

A. Information obtained by the Engineer regarding site conditions, subsurface information, river location, existing facilities, and similar data are shown on the Plans and in the Specifications, including attachments. This information is based on best available information, but is in no way exhaustive, particularly with regard to subsurface conditions.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall satisfy themself as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, work in sensitive environment and uncertainties of weather, river level variations, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment facilities needed preliminary to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this contract. Submission of a bid shall be considered conclusive evidence that the bidder has familiarized themselves with the above items and is satisfied as to the conditions to be encountered in performing the work and requirements specified in the proposal.

B. The Contractor further shall satisfy themself as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site, any exploratory work done by the Owner, as well as from information presented by the Plans and Specifications made a part of this contract. Any failure by the Contractor to acquaint themself with all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

C. The Contractor shall anticipate underground obstructions such as utility lines, potentially high water table, varying soil conditions and debris. No extra payment will be allowed for the removal, replacement, repair, or possible increased cost caused by underground obstructions. Any such utilities or obstructions indicated on the plans show only the approximate location and must be verified in the field by the Contractor. The Owner and Engineer will endeavor to familiarize the Contractor with all known underground obstructions, but this will not relieve the Contractor from full responsibility in anticipating and locating all underground obstructions.

D. A copy of the “Report of Geophysical Investigation, Humboldt Bay Municipal Water District-Collector 2, Arcata California”, NORCAL Geophysical Consultants, Inc., November 20, 2020 has been provided as an attachment to these Contract Documents. It is expected that the Contractor will have familiarized themselves with this report and all other available subsurface data. The intent of the Geophysical investigation was to identify bedrock outcroppings or other large subsurface boulders to the extent feasible. The selection and design of the lateral locations was intended to avoid bedrock or large boulder outcroppings identified in the report. The Contractor is directed to Specification Section 15 21 00-Lateral Installation on how refusal or deflection associated with encountering boulders or bedrock will be addressed under this contract.

E. The Contractor shall note that many of the existing access roads and streets are gravel or residential in character and that heavy truck and equipment operations may cause roadway damage in excess of normal usage. Damage caused to the access roads or streets by Contractor's operations shall be repaired by the Contractor at no additional cost to the Owner.

END OF SECTION

SECTION 03 60 00

GROUT

PART 1 GENERAL

1.1 SUMMARY OF SECTION

A. The principal items specified herein are:
   1. Non-Shrink Grout: Non-Shrink grout is to be used unless another type is specifically referenced or as shown on the Drawings.
   2. Epoxy Grout
   3. Cement Grout

B. The Contractor shall provide all materials, equipment, and labor necessary to furnish and place grout and shall form, mix, place, cure, repair, finish, and do all other work as necessary to produce finished grout as shown on the Drawings and as specified herein.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for the placement of grout shall be included in the bid item to which it relates. No separate measurement or payment shall be made for the requirements of this section.

1.3 RELATED SECTIONS

Related work specified in other sections:

A. Section 15 21 00 Lateral Installation

1.4 REFERENCED CODES AND SPECIFICATIONS

The following standards apply:

A. Commercial Standards:
   1. ASTM C109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-In. or 50-mm Cube Specimens).
   2. ASTM C531 Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings.
   3. ASTM C579 Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings.
   4. ASTM C827 Test Method for Change in Height of Early Ages of Cylindrical Specimens from Cementitious Mixtures.
   5. ASTM D696 Test Method for Coefficient of Linear Thermal Expansion of Plastics.
   6. CRD-C-621 Corps of Engineers Specification for Non-shrink Grout.

1.5 SUBMITTALS

Submit the following in accordance with Section 01 33 00 Shop Drawings & Submittals:

A. The CONTRACTOR shall submit manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of non-shrink and epoxy grout used in the WORK.

PART 2 PRODUCTS

2.1 PREPACKAGED GROUTS

A. Non-Shrink Grout:
   1. Non-shrink grout shall be a prepackaged, inorganic, non-gas-liberating, non-metallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.
   2. Non-shrink grouts shall have a minimum 28-day compressive strength of 5,000 psi; shall have no shrinkage (zero percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C 827; and shall have no shrinkage (zero percent) and a maximum of 0.2-percent expansion in the hardened state when tested in accordance with CRD C 621.
   3. Application: Non-shrink grout shall be used for the repair of all holes and defects in concrete members, and at all locations where non-shrink grout is specified.

B. Epoxy Grout:
   1. Epoxy grout shall be a pourable, non-shrink, 100-percent solids system. The epoxy grout system shall have 3 components: resin, hardener, and specially blended aggregate, all premeasured and prepackaged. The resin component shall not contain any non-reactive diluents. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged.
   2. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.
   3. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75 degrees F.
   4. The epoxy grout shall develop a compressive strength of 5000 psi in 24 hours and 10,000 psi in 7 days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (zero percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.
   5. Application: Epoxy grout shall be used to embed all anchor bolts and reinforcing steel required to be set in grout, and for all other applications required in the Contract Documents.

2.2 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is specified, it shall mean a

grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.

2.3 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using appropriate containers. Shovel measurement will not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 EXECUTION

3.1 GENERAL

A. Where grout is to be placed against old concrete (any concrete which is greater than sixty (60) day of age), the surface of the old concrete shall be thoroughly cleaned and roughened.

B. Surfaces shall be thoroughly wetted by sprinkling prior to the placing of any grout, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing grout thereon. The surface shall be free from standing water, mud, and debris at the time of placing grout.

C. Base concrete shall have attained its design strength before grout is placed, unless otherwise authorized by the Engineer.

D. The surfaces of all metalwork to be in contact with grout shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the grout is placed.

E. All inserts or other embedded items shall conform to the requirements contained on the plans or in these specifications.

F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured where shown on the Project Drawings or by shop drawings or as required to support work floors or other items required in the work, and shall be acceptable to the Engineer before any grout is placed. Accuracy of placement is the responsibility of the Contractor.

G. No grout shall be placed until all water entering the space to be filled with grout has been properly cut off or has been diverted, and carried clear of the work. No grout shall be deposited underwater nor shall the Contractor allow still water to rise on any grout until the grout has attained its initial set. Water shall not be permitted to flow over the surface of any grout in such manner and at such velocity as will injure the surface finish or setting of the grout.

H. Corrosion Protection: Anchor bolts, pipe, dowels, and other ferrous items required to be embedded in concrete and grouted around, shall be so positioned and supported prior to placement of grout that there will be a minimum of two (2) inches clearance

between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

I. Anchor bolts shall be accurately set and shall be maintained in position by templates while being embedded in concrete.

J. All mixing, surface preparation, handling, placing, consolidation and other means of execution for prepackaged grouts shall be done according to the printed instructions and recommendations of the manufacturer.

K. The finish of the grout surface shall match that of the adjacent concrete.

3.2 CONSOLIDATION

A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

END OF SECTION

SECTION 15 21 00

LATERAL INSTALLATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: The Contractor shall provide all the labor, materials, tools and equipment required for projection of four, stainless steel collection laterals as shown on the plans and in accordance with these specifications. This work includes but is not limited to placement of equipment into caisson, providing floor or work surface required for work, coring of the caisson wall, port installation, grouting and sealing port penetration, 10-feet of stainless steel blank installation, sizing and installation of wire round stainless steel screens, projection pipe retrieval, final finishing of port, lateral development, disinfection, and removal of equipment from the caisson, pre-installation baseline testing, and final performance tests necessary to successfully install the laterals. All materials utilized shall be new unless otherwise specifically provided for in the specifications. All workmanship and material shall meet or exceed the industry standards usually applied to such work.

B. Geophysical Report: A copy of the “Report of Geophysical Investigation, Collector 2, Humboldt Bay Municipal Water District, Arcata California”, NORCAL Geophysical Consultants, Inc., November 20, 2020 has been provided as an attachment to these Contract Documents. It is expected that the Contractor will have familiarized themselves with this report and all other available subsurface data. The intent of the Geophysical investigation was to identify bedrock outcroppings or other large subsurface boulders to the extent feasible. The selection and design of the lateral locations was intended to avoid bedrock or large boulder outcroppings identified in the report. The Contractor is directed to Specification Section 15 21 00 – Lateral Installation on how refusal or deflection associated with encountering boulders or bedrock will be addressed under this contract.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for the work described in this section shall be included in the bid item to which it relates. No separate measurement or payment shall be made for the requirements of this section.

1.3 QUALITY ASSURANCE

A. Standards:

The materials and work performed in this Section shall conform to the applicable standards of:

1. The American National Standards Institute (ANSI).
   a. ANSI Type 304– Stainless Steel
2. National Science Foundation (NSF).
   a. NSF 61 – Drinking Water System Components – Health Effects
3. The American Society for Testing and Materials (ASTM).

   a. ASTM A312 – Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipe
   b. ASTM A774 – As-Welded Wrought Austenitic Stainless Steel Fittings
   c. ASTM A778 – Welded, Unannealed Austenitic Stainless Tubular Products
4. American Water Works Association, Inc. (AWWA).
5. Plumbing and Drainage Institute (PDI).
6. Underwriters Laboratories, Inc. (UL).
7. Uniform Plumbing Code (UPC).

B. Lateral pipe installations shall meet requirements of national, local, and state codes.

C. Qualifications of lateral well screen manufacturers:
   1. The material shall be the product produced by a supplier regularly engaged in the manufacturing of lateral pipe or well screen products. Preference will be given for well screen manufactured in the United States.

D. Qualification of Contractor:
   1. Contractor shall submit as part of their bid a description of their experience and qualifications for rehabilitation of radial collector wells by installing new (replacement) lateral well screens in an existing collector well structure. Contractor shall provide a narrative discussion of their expertise and experience to include, at a minimum, the following information:
      a. Resumes for key personnel who are proposed to be involved in this project, including: Project Manager, Project Engineer, Project Hydrogeologist and Lateral Installation Superintendent.
      b. Description of at least five projects to install new lateral well screens in an existing radial collector well in the previous ten years by the bidder's firm. Include contact information of owner's project coordinator where laterals were installed. Provide list of personnel included under item a, who worked on the referenced projects.
      c. The selection of Contractor shall be based on experience and price.
      d. The Owner reserves the right to disqualify and reject any bid from an unqualified bidder.
   2. The Contractor and any Subcontractor shall comply with all laws, ordinances and codes, and rules and regulations of the local and State authorities having jurisdiction over any of the work specified herein.
   3. Preference shall be given to the Contractor who can demonstrate the ability to successfully complete the project as described herein in a timely and efficient manner.
   4. In acceptance or rejection of installed materials, no allowance will be made for lack of skill on the part of installers.

1.4 SUBMITTALS

A. Shop Drawings: In accordance with the provisions of Section 01 33 00 – Shop Drawings and Submittals of these Specifications, submit complete shop drawings including layouts, elevations, details, valves, port assemblies, and lateral screen to the Engineer. After installing laterals, Contractor shall provide Owner with a table that lists screen slot sizes used for each segment of lateral screen installed for each of the four laterals installed, for example: Lateral One installed at elevation -30.9' has blank

installed 0-10', 0.100" slot size screen installed 5'-15', 0.125" slot size screen installed 15'-25', etc. listed in table format.

B. Material List: In accordance with the provisions of Section 01 33 00 of the Specifications, submit with the shop drawings a complete list of all materials and equipment proposed to be furnished and installed under this portion of the work, giving manufacturer's name, catalog number, and catalog cuts for each item where applicable.

C. Manufacturer's recommendations: Accompanying the materials list and shop drawings, submit four copies of the manufacturer's current recommended method of installation.

D. Certificates of Conformance: Submit manufacturer's certificate of conformance.

E. Method of Lateral Installation: Submit method of lateral installation and lateral development.

F. Method of Determining Lateral Deflection: Submit method for determining lateral deflection in the field as well as methods proposed to ensure deflection standards set forth in these specifications are achieved.

G. Initial and Final Performance Tests: Submit the Final Conditions Report detailing the lateral installation procedures, including new lateral locations and lengths, the screen slot size table for each lateral, development procedures, sand test results and Initial and Final Performance Test results.

1.5 GENERAL CONDITIONS

A. Unless noted otherwise, the Contractor shall furnish all labor, materials, services, permits, insurance, and equipment to carry out the activities associated with the installation of the new laterals.

B. Work shall be performed in accordance with the most stringent of applicable regulations, codes, ordinances and standards of governing authorities having jurisdiction and the requirements specified herein.

C. Provide and maintain environmental and occupational safety protective measures, equipment, and procedures at the work site. The Contractor shall be responsible for health and safety of Contractor's employees and for compliance with all applicable State and Federal OSHA requirements.
   1. Prior to commencement of work, all workers shall be instructed and shall be knowledgeable in the appropriate procedures of personal protection and confined space working requirements, and all other safety and personal protection requirements, equipment, and procedures associated with the type of work to be performed under this Contract.
   2. Contractor shall be solely responsible for enforcing worker protection requirements.
   3. Reporting Unusual Events: When an event of unusual and significant nature occurs at the site, Contractor shall prepare and submit a special report listing chain of events, persons participating, responses and similar pertinent

information. When such events are known or predictable in advance, advise the Owner at the earliest possible date.

4. Reporting Accidents: If a significant accident occurs at the site or anywhere else associated with this work, the Contractor shall prepare and submit appropriate reports to the Owner. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained.

1.6 PRODUCT HANDLING

A. Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the installed work and materials

B. The Contractor shall provide and use proper equipment, tools and facilities for the safe and proper handling and protection of the lateral pipe. Screens shall be handled in such a manner as to avoid damage to the pipe material, gaskets, coating, threads and all other components. All equipment and small loose pieces, tools, gaskets, etc. shall be adequately packed to prevent damage or loss during shipment or while in storage.

C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

D. When damaged screens cannot be repaired to the satisfaction of the Engineer, they shall be removed from the job and replaced at no additional cost to the Owner.

E. Screens shall be stored in a safe location, protected from the elements where damage therefrom could result.

F. The screen shall be carefully lowered in the caisson to prevent damage. Under no circumstances shall screen be dropped or dumped into the caisson.

PART 2 - PRODUCTS

2.1 GENERAL

A. These Specifications are intended to be performance-based specifications and may therefore contain specifications for materials not required for this project or may not specify certain materials which are applicable or necessary for a portion of the project.

B. The Contractor shall provide all equipment, personnel, materials, and services to satisfactorily complete this work in accordance with these specifications. All materials utilized shall be new unless otherwise specifically provided for in the specifications. All workmanship and materials shall meet or exceed the industry standards usually applied to such work. By bidding this work, the Contractor acknowledges that they understand the nature and extent of work required for such an installation.

C. Contractor will exercise care during rehabilitation of the well to avoid damage to existing piping, electrical controls, and other appurtenances that are not to be

removed. The Contractor shall provide acceptable erosion control for the site, complying with all requirements of any applicable permits secured for this project, and or Federal, State, or Local regulatory requirements, and prevent harmful materials, construction debris, and excessive suspended solids from entering the waterway.

D. The requirements specified herein shall be considered the minimum requirements for rehabilitation of the wells. The Contractor shall be responsible for satisfying any State regulation otherwise exceeding these specifications.

E. All pipe materials and appurtenances in contact with potable water shall be NSF 61 compliant.

F. All materials shall conform to sizes, capacity, quality and quantities as shown on the drawings or described in these Specifications. Materials shall be from new stock, delivered in good condition. No damaged stock shall be used.

G. Where no method of tests for materials is specified, the latest applicable test specified by ASTM shall be followed.

H. After delivery to the site, all materials shall be carefully unloaded, protected against damage, breakage, rusting, contamination, accumulation of foreign matter, disintegration and injury. The Contractor shall be responsible for all lost or damaged material supplied and such materials shall be replaced at no cost to the Owner.

2.2 LATERAL SCREENS

A. Lateral screens shall be ANSI Type 304 stainless steel, continuous slot, wire-wound construction, with flush joint connections as manufactured by Roscoe Moss, Johnson Screens, or approved equal. Screens shall be sized to provide the specified caisson capacity in accordance with the manufacturer's design and pipe-size type, with flush joint connection. Screens shall be a minimum of 12-inch nominal in diameter pipe size and of sufficient strength to resist external forces applied to it after installation and to minimize the likelihood of damage during installation. The screen must have a collapse strength of 300 psi minimum, and tensile strength of 26,000 pounds.

B. Lateral screen slot size shall be determined by the Contractor subject to approval by the Owner to ensure efficient and sand-free production of water. Slot sizes shall initially be estimated based upon formation samples obtained from previous test drilling and later finalized from materials encountered during lateral pipe projection. This will minimize down time associated with waiting for well screen deliveries. Each completed lateral shall include a 10-foot length of blank Schedule 20S (0.250" wall thickness), ASTM A312 or ASTM A778, Grade TP304L stainless steel pipe at the caisson end followed by 140 feet of lateral screen.

C. Pipe to be welded shall be beveled at an angle of 45 degrees. Fittings shall be butt welded grade TP304L wrought stainless steel schedule 20S in accordance with ASTM A774. Welding shall conform to the specification and recommendations in the "Power Piping Specification," ASME B31.1. Flanges shall be the same, angle face rings and stainless steel backing flanges in accordance with ASTM A774. Flange bolts shall be tightened sufficiently to slightly compress the gasket and effect a seal,

but not so tight to fracture or distort flanges. Anti-seize thread lubricant shall be applied to the threaded portion of all stainless steel bolts during assembly.

D. Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be fully and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed, after threading and before assembly, to remove all burrs. Threaded joints in stainless steel piping shall be made up with Teflon thread sealer and Teflon thread tape applied to all male threads. Following lateral installation, Contractor shall provide Owner with a table that lists slot sizes used for each segment of lateral screen installed for each lateral.

2.3 LATERAL WALL PORTS

A. Port assemblies shall be fabricated for projection of 12-inch diameter lateral screen in accordance with Contractor's design as approved by the Owner. Ports shall be fabricated from ANSI Type 304 stainless steel, ¼-inch wall thickness, and equipped with external and internal gaskets of suitable rubber material to securely anchor and seal the lateral pipe to the caisson connection.

2.4 LATERAL GATE VALVES

A. Gate Valves shall be a Type 304 or 316 Stainless Steel flanged gate valve, Class 150, with stem and handwheel. All gate valves shall be manufactured by Williams, Powell, Velan or approved equal. A tag shall be provided for each new valve that is installed.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspection:
   1. Prior to all work of this Section, carefully inspect the work site and verify that conditions have not changed and that this installation may properly commence.
   2. Verify that all screens may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Discrepancies:
   1. In the event of discrepancy, immediately notify the Engineer.
   2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 SAFETY

A. The Contractor is solely responsible for the safety of their employees and others that may be exposed to the work. They are responsible for conforming to applicable Federal and State OSHA regulations and to other Federal, State and local codes and ordinances as applicable.

B. The work inside of the caisson is classified as Confined Space work per Federal and State OSHA standards and the Contractor shall conform to all applicable Confined Space work requirements.

3.3 DEWATERING OF CAISSON

A. The Contractor shall dewater the caisson to perform the scope of work described herein according to Section 31 23 19 – Dewatering of these specifications.

B. The Contractor will be required to use divers to close all existing lateral valves prior to dewatering the caisson.

3.4 INSTALLATION

A. General: Install all screens in strict accordance with plans, typical sections, manufacturer's written recommendations, and as approved by the Engineer. Locations shown for new and existing laterals are approximate. New lateral locations can be changed slightly as approved by the Engineer to accommodate equipment. Contractor shall have the ability to modify equipment as necessary to accommodate existing and new laterals.

B. Installation of Floor: The rough finished floors of Collector 2 are uneven, and the installation of a working floor is likely necessary for lateral installation. Any bolts used during construction of the floor shall be burned off or otherwise removed upon project completion. Any remaining holes or gaps on the caisson shall be sealed with grout in conformance with Section 03 60 00 – Grout.

C. Lateral Screen and Ports:
   1. Final elevation and location of the lateral ports and laterals shall be determined on the basis of field conditions and as mutually agreed by the Contractor and Owner.
   2. Lateral projection pipe shall be sized to accommodate lateral well screen and in accordance with AWWA C200, *Standard for Steel Water Pipe 6 Inches and Larger*. Pipe shall be of sufficient strength to withstand the stresses of projection into and withdrawal from the aquifer.
   3. If the projection pipe reaches refusal or if there is an indication of excessive jacking pressure before the desired length is achieved, the length of the lateral shall be reduced accordingly. Lateral projection of less than 20 feet shall result in the abandonment of the lateral, as determined by the Engineer, at the Contractor’s expense.
   4. No extra payment will be made for projection pipe or sand line pipe that the Contractor is unable to retrieve.
   5. Each line of lateral screen shall begin with 10 feet of blank pipe extending from the inside of the wall of the caisson followed by 140 feet of lateral screen. This blank pipe shall conform to the requirements specified for stainless steel lateral pipe.
   6. Installation of the lateral screens shall proceed initially by jacking blank projection pipe through the wall port into the aquifer radially to the required distance from the caisson wall, or to refusal or indication of excessive jacking pressure. After the blank pipe has been projected, lateral screens shall be inserted into the entire length of the projection pipe and then the projection pipe shall be withdrawn.

7. No extra payment will be made for jacking / cutting heads that must be abandoned in the process.
8. During installation of the blank projection pipe, formation samples shall be obtained at 5-to-10-foot intervals. Sieve analyses shall be performed on select samples as necessary and copies of the analyses provided to the Owner. The Contractor shall use the sieve analysis information to determine well screen slot sizes. The Contractor has two options available for the sieve analysis:

    a. Option 1 – Onsite sieve analysis performed by a representative that is certified to perform the sieve analysis test;

    OR

    b. Option 2 – Onsite sieve analysis performed by non-certified personnel and split samples sent by the Contractor to a certified laboratory for verification of onsite testing at the rate of one split sample per 50-feet of lateral installed. The Contractor shall be responsible for retaining and paying for the services of the certified laboratory qualified to conduct the sieve analyses.

    c. Contractor shall provide detailed report indicating sieve analysis results, screen sizing results, and tabulate screen size for each interval of screen.
9. The Contractor shall provide during projection a suitable means to affect removal of aquifer material equal to a minimum of the volume of the pipe projected.
10. Each lateral shall be installed horizontally in a straight radial line throughout its full length. Maximum allowable deviation from horizontal shall be two lateral projection pipe diameters over the entire projected length of the lateral.
11. The Contractor shall monitor the position and deviation of the lateral bore pilot on a regular basis throughout the projection process and report their findings to the Owner. If at any time lateral deviation exceeds two pipe diameters, lateral projection shall cease and any remaining footage must be made up in another proposed lateral at no expense to the Owner.
12. If the Contractor chooses to measure deflection at the end of the installation of the lateral projection pipe and move on with installation of the screen prior to data being processed and approved, the Contractor shall pay for the cost of any laterals that do not conform to these Specifications.
13. At the conclusion of lateral installation, all installation equipment and appurtenances shall be removed from the interior end of the screen pipe, the control valve shall be affixed to the interior end, and the valve shall be closed to await development. Any remaining gaps in the caisson wall shall be sealed with grout in accordance with Section 03 60 00 Grout.

D. Lateral Valves:
    1. See plans for location of valves and appurtenances to be installed as a portion of the laterals.

E. Lateral Development:
    1. Upon completion of the lateral installation, the laterals and surrounding formation will be developed to optimize the well efficiency by removing fine sand and silt particles from the formation material adjacent to the well screens.
    2. Each lateral screen shall be developed by surging with water, air, or inert gas, or some combination of these methods. A detailed plan for lateral development shall be submitted to the Owner for approval prior to commencement of development.

3. In order to protect the existing laterals, the initial 20-feet of the new laterals shall be developed by being surged with water or low pressure air or other inert gas.
4. If used, inert gas development shall be similar to the Bore Blast system which uses a pressure-pulse redevelopment tool or approved similar method that provides a high-energy pulse to the screens and has been selected to ensure that development energy will penetrate the formation. The system shall not be operated at pressures in excess of 1000 psi unless prior approval is obtained from the Owner. The system shall be hydraulically advanced through the lateral at a controlled rate, and shall be attached to a “centralizing” sled fabricated to center it in the lateral screen. Progress of the development will be monitored periodically using an Imhoff Cone to measure sand content of the water discharging into the caisson. If sand content is stable, the development tool will continue to be advanced. If the sand content is not, the development will continue until such time as the sand content in the interval stabilizes, although development shall not exceed an average of 16 hours for an individual lateral. Sand and sediment removed during the development process shall be pumped from the well to the percolation pond.
5. If used, a high pressure rotating water jet shall operate at flows up to 50 gallons per minute at pressures of 2000 psi. Hydraulic pull in will maintain uniform rate of approximately 10 to 20 feet per hour and the jets shall be centralized in the laterals throughout the pull. Progress of the development shall be monitored periodically using an Imhoff Cone to measure sand content of the water discharging into the caisson. If sand content is stable, the development tool will continue to be advanced. If the sand content is not, the development will continue until such time as the sand content in the interval stabilizes, although development shall not exceed an average of 16 hours for an individual lateral. Sand and sediment removed during the development process shall be pumped from the well to the settling pond.
6. Development shall be continued until sand production from each screen has reached stability and cannot be substantially improved by further development.
7. Following lateral screen development, Contractor shall document development by conducting a Sand Test on each lateral.
    a. Contractor shall furnish equipment and measure sand production using a centrifugal sand separator or Rossum Sand Tester. Sand production less than 2 ppm by volume during performance testing will indicate complete development. Sand Test procedures shall generally follow those indicated below or per written manufacturer’s procedures as approved by the Engineer:
        1) Install lateral sand test piping on to one of the 12-inch gate valves
        2) Open the gate valve until stabilized flow rate is achieved (actual flow rates per lateral will be determined proportionally once all laterals have been installed.
        3) Allow lateral to flow at stabilized rate for 10 minutes.
        4) Open the sand tester to achieve a flow rate of 0.5 gpm
        5) Test for sand content, 15 minutes (according to Sand Sampler Directions).
        6) Visually monitor sand in 5 minute intervals during the 15 minutes sand testing.
        7) If test is less than 2 ppm, lateral passes.
        8) If test is greater than 2 ppm, allow flow to continue for 15 minutes

9) Conduct second test, if second test is below 2 and average of first and second test is below 3, test passes.
10) Document sand production on “Sand Production Form” (attached
11) If lateral does not attain 2 ppm sand rate, redevelop the lateral and retest.

8. All sediment and gravels that accumulate in the caisson during the development of the laterals shall be pumped to the percolation pond. Any available gravel and sand spoils will be retained by the District.

3.5 DISINFECTION

A. Prior to performance testing, the collector caisson shall be thoroughly cleaned of all foreign substances, including tools, grease, oil, and debris of any kind.

B. Following cleaning, the submerged portion of the caisson including the laterals shall be disinfected per Section 33 13 13 – Caisson Disinfection.

3.6 TESTS

A. Performance Testing:
1. The Contractor shall conduct two separate performance tests to supplement lateral installation. The first performance test shall be performed before beginning construction (Initial Condition), and the second shall be performed post-construction (Final Condition). Each performance test shall be comprised of two test methods: a Multiple Rate Step Test and a Constant Rate Test. The Initial Condition performance tests will be used to establish a baseline production yield, and the Final Condition tests will be used to evaluate the effectiveness of rehabilitation procedures and to determine maximum and minimum yield.
2. Testing will be conducted utilizing the collector’s existing pump(s) at a rate as determined by the Contractor in consultation with the Engineer. The Contractor shall monitor the rate of flow throughout the duration of testing. Pump curves for the existing pumps can be provided to the Contractor, if desired.

3. Contractor shall provide all equipment necessary to conduct the performance flow tests, with the exception of the Owner's pumps, including water level recorders and a certified flow meter.
4. The District will provide flow data from their SCADA system for the Contractor's use during performance tests. Any additional information (e.g. drawdown, etc.) shall be gathered by the Contractor.
5. Flow meter used for the performance testing shall be certified for measuring flows in excess of 7,500 gpm. Flow meter shall not be an orifice type meter, and Contractor shall provide a copy of the flow meter calibration and certification for the meter performed within 90 calendar days of the use of the meter on this project.
6. The Contractor shall provide and install automatic water level recorders in the collector and adjacent observation wells within 1,500 feet of the collector to continuously monitor water levels during the performance tests. In addition, water level measurements shall be obtained by hand at periodic intervals during the test at each location. All measurements of water level and drawdown shall be accurate within 0.01 foot.
7. The Contractor shall obtain hourly readings of the elevation of the Mad River at the site during performance testing.
8. The Contractor shall also obtain temperature and specific conductance readings of discharged water at 30-minute intervals during all performance testing.
9. All testing and data evaluation shall be performed under the direct supervision of a qualified hydrogeologist or Professional Engineer experienced in the design, maintenance, and testing of horizontal collectors.
10. After drawdown has substantially stabilized, the Contractor shall measure the relative velocity of the flow from each of the laterals using remote velocity measuring equipment.

B. Multiple Rate Step Test:
   1. To conduct the multiple rate step test, the collector being tested shall be pumped at 4 successively higher pumping rates, with each rate held constant for one hour. Final pumping rate shall be approximately 25% above the design rate of the well. The collector being tested shall be allowed to recover for a minimum of 12 hours before starting the multiple rate step test.
   2. Water levels shall be measured in the collector and any adjacent observation wells during pumping and recovery at a minimum of 5-minute intervals.
   3. The level of the Mad River level shall be measured every 60 minutes during the pumping and recovery period and the measurements recorded.

C. Constant Rate Test:

   1. Following the multiple rate step test, the well shall be allowed to recover for at least 24 hours before the constant rate test is run. The constant rate test shall consist of 48 hours pumping and 24 hours recovery time. The optimum rate for the test shall be determined by the Contractor in consultation with the Owner.
   2. Water levels shall be measured in the collector well and each of the monitoring wells at a minimum of 5-minute intervals.
   3. Additionally, the Mad River level shall be measured every 60 minutes during the pumping and recovery period and measurements recorded.

4. Prior to shut off and at least four hours following the start of test, an underwater inspection of the collector shall be conducted. The inspection shall include the following work items:
    - Color photographs and video of the section of each new lateral nearest the caisson interior.
    - Measurement of relative flow rate and efficiency of each new and existing lateral.

D. Reporting Requirements:

1. The Contractor shall furnish to the Engineer copies of the field data, calculations, and graphs, plotted to scale of the development activities, the multiple rate step test, and the constant rate test, at the completion of the testing. Contractor shall evaluate hydraulic conductivity, transmissivity, storativity, and specific capacity. Contractor shall analyze the data for the above-described parameters using Engineer-approved methods. Methods shall be submitted to the Engineer for review and approval in accordance with Section 01 33 00 – Shop Drawings & submittals. The test report including the above information, shall be submitted to the Engineer for review and approval in accordance with Section 01 33 00 – Shop Drawings and Submittals.
2. Following completion of performance testing, a Final Conditions Report shall be submitted detailing the lateral installation procedures and results. The Report shall discuss results of the Initial Condition performance testing, flows measured in each existing lateral, underwater inspection and long-term sustained yield projected for the Initial Condition under maximum and minimum recharge conditions. The Report shall detail the lateral installation procedures and include As-Built drawings with the new lateral locations and lengths, a screen slot size table for each lateral, development procedures, sand test results, and the Final Performance Testing results including flows measured in each lateral (new and existing), underwater inspection, and the long-term sustained yield projected for the collector under maximum and minimum recharge conditions, as well as recommendations for the continued operation and maintenance of the collector.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Earthwork shall consist of any excavation and/or grading necessary for the following: providing access to the collector, installation of temporary dewatering pipe, and construction of the percolation pond as shown on the Drawings.

B. A thorough attempt has been made to show the type, location, and number of all existing utilities; however, no guarantee is made as to the location or number of such utilities. The Contractor shall repair all utilities damaged in the progress of his work. The Contractor shall be prepared at all times with labor, equipment, and materials to make repairs on damaged mains or utilities.

C. Existing utility lines, trees, fences, pipelines or other conduits, embankments, and structures in the vicinity of the work shall be supported and protected from injury by the Contractor during the construction and until the completion of the work. The Contractor shall be liable for all damages to such structures, as herein provided, and shall save and keep the Owner harmless from any liability or expense for injuries, damages, or repairs to same.

1.2 RELATED SECTIONS

Related work specified in other sections:

A. Section 01 57 13 – Erosion Control

B. Section 31 23 19 - Dewatering

C. Section 31 25 13 – Hydroseeding and Revegetation

1.3 MEASUREMENT AND PAYMENT

A. Measurement and Payment for the requirements of this section shall be paid for under the Percolation Pond Bid Item. No additional measurement or payments will be made for the requirements of this section.

1.4 QUALITY ASSURANCE

A. Qualifications of workers: Provide sufficient skilled workers and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

1.5 SUBMITTALS

A. Product Data: Manufacturer’s literature and data including, where applicable, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following:
   1. Imported materials
   2. Rip-rap
   3. Geotextile Fabric

1.6 GRADES, LINES, LEVELS, AND PERMANENT MARKERS

A. Staking: The Owner shall stake the final location of the percolation pond.

B. Responsibility for correctness: Contractor will be held responsible for the correctness of the layout and for establishing the location of possible buried utility lines. In the event there is any conflict between actual conditions and the drawings, Contractor shall notify the Engineer immediately and shall not proceed with the work until directed by the Engineer.

C. Preservation of markers: All stakes, boundary lines, corner markers, bench marks or survey markers, etc., which have been or may be established in any part of the site, shall be carefully preserved and respected by the Contractor and shall be restored at the Contractor's expense if lost or destroyed as a result of his operations.

1.7 ACCURACY OF DATA

A. Site data given herein and on the drawings are as exact as could be secured, but their absolute accuracy cannot be guaranteed. Exact locations, distances, elevations, etc., shall be finally governed by field conditions and the Engineer's instructions.

PART 2 - PRODUCTS

2.1 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. The Contractor shall complete all excavation regardless of type, nature, or condition of the materials encountered. The Contractor shall make his own estimate of the kind and extent of the various materials to be excavated in order to accomplish the work.

2.2 COMPACTION EQUIPMENT

A. All compaction shall be by mechanical means unless the Contractor can demonstrate other means that will accomplish required compaction to the satisfaction of the Engineer. Compaction equipment shall be of suitable type and adequate to obtain the densities specified and approved. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort.

2.3 NATIVE FILL MATERIAL

A. Suitable native material shall be used for pond berm construction. Native material used for berm construction shall be free from large rocks (maximum dimension greater than 6 inches), root balls, organic materials, or other deleterious materials.

2.4 RIP-RAP

A. Rip-rap stones used for energy dissipator construction shall be of 1-foot diameter.

2.5 GEOTEXTILE FABRIC

A. Requirements:
   1. Material: per Drawings.

PART 3 - EXECUTION

3.1 GENERAL EXCAVATION

Perform all excavation of every description, regardless of the type, nature, or condition of material encountered, as specified, shown, or required to accomplish the construction. The Contractor shall control excavations and stockpiling in a manner to prevent water from entering the excavations. Material for fill, backfill, or for protection of excavations from surface drainage shall be neatly placed and kept shaped so as to cause no interference with public travel.

3.2 PERCOLATION POND BERM CONSTRUCTION

A. During excavation of the percolation pond, the first 12 inches of topsoil is to be set aside and replaced upon project completion.

B. The intent of the pond construction is to balance the cut and fill in the construction of the pond to obtain a pond capacity of approximately 1.5 million gallons. Excavated material shall be used to construct the pond berms. Large rocks (maximum dimension greater than 6 inches), root balls, organic materials, or other deleterious materials shall not be used in berm construction.

C. Topsoil and deleterious materials not used in berm construction shall be stockpiled onsite as directed by Owner and shall be covered with plastic and surrounded by a silt fence.

D. The moisture content of the fill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have a placement moisture content less than or equal to the optimum moisture content. Backfill material with a placement moisture content in excess of the optimum moisture content shall be removed and reworked until the moisture content is uniformly acceptable throughout the entire lift.

E. Backfill shall be placed in complete horizontal lifts. The maximum lift thickness after compaction shall not exceed twelve (12) inches. The Contractor shall decrease this lift thickness, if necessary, to obtain the desired compaction.

F. At no time shall cut or fill slopes exceed a 2:1 horizontal to vertical slope.

G. The top of the pond berm shall be at the same elevation all around the perimeter of the pond.

H. All fill shall be compacted to a minimum 90% maximum dry density per ASTM D1557.

I. Percolation pond is to be backfilled upon project completion. The ground shall be re-graded to match existing grade, and disturbed areas shall be revegetated per Section 31 25 13 – Hydroseeding and Revegetation.

3.3 PERCOLATION POND INLET AND OUTLET

A. Inlet: the percolation pond inlet shall discharge into an energy dissipator constructed of rip-rap as specified in this Specification and of sufficient size so that water from the discharge pipe always flows onto the energy dissipator and does not erode any portion of the pond. Geotextile fabric as specified in this Section shall be placed beneath the energy dissipator.

B. Outlet:
   1. The percolation pond outlet shall be embedded within the pond berm so that the top of the pipe is two feet below the top of the berm.

3.4 SITE GRADING

Upon completion of Work, all areas disturbed by the Contractor shall be graded by the Contractor to match pre-construction grades and seeded and mulched to restore to pre-construction condition. Contractor shall collect pre-construction photographs to document pre-construction conditions. Finished grading shall be approved by the Engineer.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Design, construction, operation and maintenance of effective dewatering operations.
   2. Dewatering pumping control
   3. Layout of dewatering pipe
   4. Disposal of water pumped out of the caissons during construction
   5. Removal and relocation of equipment and clean-up of sites

1.2 MEASUREMENT AND PAYMENT

A. Measurement and payment for the work described in this section shall be included in the bid item to which it relates. No separate measurement or payment shall be made for the requirements of this section.

1.3 RELATED SECTIONS

Related work specified in other sections:

A. Section 01 14 00 – Environmental Protection

B. Section 31 00 00 – Earthwork

C. Section 31 25 13 – Hydroseeding and Revegetation

1.4 QUALITY ASSURANCE

A. Monitoring. The District shall monitor background turbidity levels in the Mad River and turbidity levels in the river when Contractor is discharging water to the Pump Station #6 forebay. Contractor shall coordinate discharging to the Pump Station #6 forebay with the District, so the District can take samples at appropriate times. Contractor shall visually monitor turbidity in Collector 2 when planning on discharging or actively discharging to the Pump Station #6 forebay and cease pumping immediately if there is a visibly noticeable increase in turbidity in water in the collector. At no time shall background turbidity levels in the Mad River be increased by more than 10%, as measured in samples taken by the District, due to dewatering operations. Contractor shall perform all monitoring as specified in Section 01 57 13 – Erosion Control.

1.5 SUBMITTALS

A. Dewatering Plan: Submit shop drawings and data showing the intended plan for dewatering operations to Engineer for review and approval. Contractor may use the dewatering plan given in the Drawings, but has the option of designing their own

dewatering plan that meets the intended use. The plan should contain at a minimum the sizes of pumps, location of percolation pond, percolation pond overflow detail, and dewatering pipe layout inside and outside the caisson.

B. Product Data: Submit data for each of the following:
   1. Dewatering Pumps: Indicate sizes, capacities, priming methods, and engine or motor characteristics.
   2. Pumping equipment for control of discharge.

PART 2 PRODUCTS

2.1 COMPONENTS OF THE DEWATERING SYSTEM

A. Contractor is responsible for dewatering the workspace within the caisson to the extent required to perform the necessary work. The intent of the dewatering system as shown on the Drawings is to discharge “clean” water to the Pump Station #6 forebay, and to discharge sediment-laden water to the percolation pond for disposal.

B. Provide units of standard manufacture and in good working order. Remove from the job site unserviceable parts and equipment. Major equipment for which repair parts are unavailable from local suppliers shall be considered not acceptable.

C. The Owner will provide and has sufficient Yelomine piping, valves, and fittings to construct the above-ground dewatering piping layout shown on the Drawings. The piping, valves, and fittings will be available for use by the Contractor. The Owner will stage these materials at the location shown on the Drawings. Contractor is responsible for installation, maintenance, disassembly, and moving the materials back to the original staging location upon project completion. The Owner may be willing to purchase additional fittings that are warranted by field conditions, but purchasing of additional fittings must be approved by the Owner prior to acceptance. The Owner will not purchase additional fittings or appurtenances due to Contractor modifications of the dewatering plan shown in the Drawings.

D. All dewatering pipe necessary inside the caisson shall be provided by the Contractor, and shall include all necessary supports, valves, clamps, and other appurtenances as necessary for the successful dewatering of the caisson as necessary to perform the Work.

E. Contractor is responsible for pumps, dewatering pipe inside the caisson, labor, materials, equipment, and fuel related to pumping water out of each caisson.

F. Contractor is responsible for the construction of a percolation pond with approximately 1.5 million-gallons of capacity (with two feet of freeboard), and hydraulically connecting the pond to the existing overflow drainage trench for the percolation pond. See the Drawings and Section 31 00 00 Earthwork for more detail.

PART 3 EXECUTION

3.1 PREPARATION

A. Modifications: The intent of this the contract documents is a performance-based system, with successful performance being a system that allows for successful and safe construction and compliance with all permit requirements, water quality criteria, and applicable Local, State and Federal laws. The dewatering system can be as shown on the contract plans or can be replaced or modified at the Contractor's discretion; however, no additional payment shall be made for this line item due to Contractor's modification of the system shown. It should be noted that the intent of the system as shown is to discharge less turbid water (water that will increase the background turbidity in the Mad River by less than 10%) to the Pump Station #6 Forebay, and discharge all other water to the percolation pond for infiltration and disposal.

B. The Owner may utilize gravels from the construction operation and shall be responsible for removing and hauling any such gravels. Contractor shall assume that all other gravels, sands and silts generated during construction activities and not utilized by the Owner can be buried in the percolation pond or some similar method upon completion of construction and will not have to be hauled off site. Alternative utilization of the gravels and sand by the Contractor shall be approved by the Owner prior to implementation.

C. Coordination. Contractor shall not layout or install dewatering installations beyond the Limits of Disturbance shown on the Drawings. Avoid interference with access or other necessary activities.

D. Barricades, Shelters, and Safety. Provide protection for vital parts of the employed dewatering system from accidental damage, and erect signs and barricades to isolate hazardous areas.

E. Above-ground dewatering pipe and associated fittings and valves will be provided by the Owner, unless the Contractor chooses to modify the dewatering plan that is given in the Contract Plans.

F. Contractor shall provide all piping and appurtenances as required inside the caisson for proper dewatering operations. Contractor shall support pipe as necessary inside and outside of the caisson to ensure personnel, pipe or neighboring equipment or structures are not damaged due to pipe movement.

G. Contractor shall be solely responsible for dewatering pipe installation, maintenance, and disassembly.

H. All above-ground pipe, fittings, valves, etc. are to be anchored with sand bags or by another method as necessary to restrict thrust and prevent damage to fittings and piping. Contractor shall be responsible for replacing any pipe, fittings, valves, or other appurtenances owned by the Owner that are damaged during the course of the project. Cutting of any sticks of yellow mine pipe shall not be allowed unless prior approval is granted by the Owner.

3.2 PERFORMANCE

A. The intent of the dewatering system is to discharge “clean” water to the Pump Station #6 forebay, and to discharge sediment-laden water to the percolation pond. Water that is in the caisson in the morning after not pumping for a night may generally be “clean” and can be pumped to the forebay, so long as it does not increase background turbidity levels in the Mad River by more than 10%. Other “clean” water that accumulates within the caisson when laterals are not actively being projected can be pumped to the forebay, so long as it does not increase background turbidity levels in the Mad River by more than 10%. Sediment-laden water that accumulates within the caisson when laterals are being actively projected shall be routed to the percolation pond for disposal.

B. Contractor is solely responsible for ensuring that dewatering operations do not increase background turbidity levels in the Mad River by more than 10%, as determined by samples taken by the District.

C. Contractor shall provide and maintain ample means to promptly and effectively remove water from all areas of work, to prevent the entry of harmful quantities of water into the caisson and to dispose of the water removed. Avoid environmental damage and nuisance.

D. Remove equipment when no longer required for dewatering or water controlling operations. Maintain operation of monitoring systems until their removal is approved. Remove all temporary works and dewatering facilities in a manner satisfactory to the Owner and the permits for the Project.

3.3 DEWATERING PUMPING CONTROL

A. For dewatering pumping outside normal working hours, engines shall be equipped and/or shielded in a manner to keep noise to a minimum.

B. Diesel generators shall not be utilized unless they are provided with sound barriers or enclosures, as necessary, to comply with local ordinances.

C. Provide a backup generator and all equipment necessary to provide a backup electrical power source in the event of primary generator failure.

3.4 CLEANUP

A. Upon completion of the Work in this Section, remove rubbish and debris and leave the entire area affected by the work in a neat, clean and acceptable condition.

B. Contractor is responsible for disassembling the above-ground Yelomine pipe, valves, and fittings upon project completion and stockpiling them on-site as directed by the Owner.

END OF SECTION

SECTION 31 25 13

HYDROSEEDING AND REVEGETATION

PART 1 GENERAL

1.1 WORK

A. The work consists of sowing seed, placing mulch, and anchoring mulch in designated areas as specified.

B. The Contractor shall obtain seed and actively seed and mulch areas with a Native Seed Mix where earthwork and/or grading and ground disturbance has occurred and reseed any disturbed areas or areas where active seeding did not germinate within the Three-Month Seed Establishment Warranty Period.
   1. All areas where the Contractor's grading operation, trucks, and other equipment have significantly reduced or harmed the existing grass, weed, brush, or other plant cover shall be considered to have been disturbed and shall require seeding.

C. Cover all sloped areas steeper than 4 (horizontal):1 (vertical) which are disturbed by the Contractor's operations with straw and excelsior blankets after hydroseeding as specified herein.

D. The Contractor *is not* responsible for seed maintenance beyond the Three-Month Seed Establishment and Warranty Period unless the minimum percent survivability has not been achieved (see Seed Establishment and Warranty Period section).

E. After active seeding commences, Contractor shall guarantee work for a minimum duration of three (3) months with minimum 70% survivability or greater of seed species used in the seeding application.

F. Contractor shall provide all material, labor, and equipment necessary to satisfy all work as shown on the Drawings and specified herein. The work of this section includes but is not limited to:
   1. Flag Revegetation Areas
   2. Active Seeding
   3. Inspection
   4. Supplemental Seeding
   5. Clean-up

1.2 MEASUREMENT AND PAYMENT

A. Measurement and Payment for the requirements of this section shall be paid for under the bid item to which it relates. No separate measurement or payment will be made for the requirements of this Section.

1.3 RELATED SECTIONS

A. Section 01 57 13 – Erosion Control

B. Section 01 74 00 - Site and Area Cleanup

C. Section 02 01 00 - Site Conditions

D. Section 31 00 00 - Earthwork

E. Section 31 23 19 – Dewatering

1.4 REFERENCES

A. Seed material standards: "American Standard for Nursery Stock," 2004-edition; American Association of Nurserymen.

1.5 DEFINITIONS

A. Mulch: Certified weed free imported wood chips or certified weed free rice straw.

1.6 QUALITY ASSURANCE

A. Seed shall be delivered to the site tagged and labeled in accordance with the California Agricultural Code and shall be acceptable to the County Agricultural commissioner. Bag tag figures shall be evidence of purity and germination. Time since date of seed test shall not exceed nine (9) months.

B. Seed shall be free of pathogens, invasive seeds, and non-native insects. Seed shall comply with federal and state laws requiring inspection for seed diseases and infestations inspection certificates, as required by law, shall accompany each shipment of seeds and shall be submitted to the Engineer.

C. In the event that the Contractor chooses to retain a seed supplier, an experienced seed supplier shall be able to provide local genotypes of seed species at the minimum recommended quantities for restoration. Potential seed suppliers include, but are not limited to:

North Coast Native Nursery
P.O. Box 744
Petaluma, CA 94953
(707) 769-1213

Humboldt Fish Action Council
4701 W End Rd
Arcata, CA 95521
(707) 822-3834

Pacific Coast Seed, Inc.
6144 A Industrial Way
Livermore, CA 94550
(925) 373-4417

Freshwater Farms
5851 Myrtle Ave

Oaktown Native Seed Nursery
P.O. Box 634
Alameda, CA 94501
(510) 534-2552 or (510) 387-9744

Yerba Buena Nursery
19500 Skyline Blvd.
Woodside, CA 94062
(650) 851-1668

Samara Restoration
5260 Dow's Prairie Rd
McKinleyville, CA 95519
(707) 357-3493

Sunmark Seeds International, Inc.

Eureka, CA 95503
(707) 444 8261

PO Box 1210
Fairview, OR 97024
(503) 241-7333

1.7 SUBMITTALS

A. The Contractor is responsible for supplying and obtaining the seed stock at the recommended minimum quantities. The Contractor shall submit a signed certification from each source of supply for all materials indicating that the material meets the Specification requirements. All seed and seed material shall be native seed from within the northwest coastal ecoregion of California or southwest Oregon.

B. A letter, signed certification or appropriate lot tag, from propagule provider stating scientific name, common name, quantity and origin of seed material to confirm that it meets the requirements described in this Seed Application Specification.

C. Manufacturer's receipt that describes the provenance and constituents of mulch and certifies that it meets the specification described in this Section. Receipt shall certify that mulch does not contain noxious weeds or originate from a Sudden Oak Death host seed species derived from a quarantined county.

D. Manufacturer's specification sheets shall be provided for all erosion matting or blankets.

1.8 TIMING AND COORDINATION

A. The Contractor shall provide all equipment, labor, and materials required to perform the required maintenance as described in this specification during the Three-Month Seed Establishment and Warranty Period.

B. The Contractor shall inform the Engineer ten (10) working days prior to implementation of this Specification Section.

C. Contractor shall be responsible for the proper storage, handling, and protection of seed materials once they are delivered to Project site. Contractor shall maintain seed stock in a healthy condition at all times.

D. Order and Timing of Work: The following approximate order of work and timeframes are assumed for the work.
   1. Layout of seeding areas.
   2. All disturbed areas shall be hydroseeded. Timing of seed application shall be in accordance with Part 3 of this Specification.

E. After completion of active seeding, the Contractor shall request an inspection and approval to begin the Three-Month Seed Establishment and Warranty Period. The Three-Month Seed Establishment and Warranty Period shall begin upon written notice of acceptance by the Engineer and continue for a minimum of three (3) months.

F. Completion of Three-Month Seed Establishment and Warranty Period shall be confirmed in writing by the Engineer.

PART 2 PRODUCTS

2.1 GENERAL

A. Materials not conforming to these Specifications and requirements shall remain the property of Contractor and shall be removed from Project site at no additional cost to the Owner.

2.2 MATERIALS

A. All products shall be in conformance with the specifications listed below. Any changes to products to be used shall be approved, in writing, by the Engineer prior to job site delivery.

B. Seed: Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. In addition, the container shall be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained.
   1. All seed shall be in conformance with the California State Seed Law of the Department of Agriculture. Seed shall be of a quality that weed seed shall not exceed 0.5 percent of the aggregate of Pure Live Seed (percent germination x percent purity) and other material.
   2. Seed shall be minimum seventy-six (76) percent Pure Live Seed (PLS = percent purity x percent germination).
   3. Prior to seeding at the request of the Engineer, the contractor shall provide a letter of certification, original Association of Official Seed Analysts (AOSA) seed test results and calculations.
   4. Legume seed shall be inoculated with inoculate specific to its needs within two (2) hours prior to seeding. Inoculants shall not be used later than the date indicated on the container or as otherwise specified. All inoculated seed shall be labeled to show weight of seed, date of inoculation, and the weight and source of inoculated materials. All legume seed shall be pellet-inoculated. Inoculant sources shall be species specific and shall be applied at a rate of two (2) pounds of inoculant per one hundred (100) pounds of seed.
   5. The Contractor shall retain supplemental seed in anticipation of incidental seeding for non-performing areas.

C. Fiber: Hydroseed mix fiber material shall be wood cellulose fiber containing no growth or germination-inhibiting factors. Natural wood cellulose fiber shall have the property of dispersing readily in water and shall have no toxic effect when combined with seed or other material. The homogenous slurry or mixture shall be capable of application with power spray equipment. A green colored dye which is non-injurious to seed growth shall be used. Wood cellulose fiber shall be packaged in new label containers marked by the manufacturer to show the air-dry weight content. The fibrous mulch in its air-dry state shall contain no more than 15% by weight of water.

D. Stabilizing Emulsion/Tackifier: Stabilizing emulsion shall be an organic substance supplied in powder form and shall be psilium-based and packed in clearly marked bags stating the contents of each package. The film shall be nonflammable and shall have an effective life of at least one (1) year. Stabilizing emulsion shall be nontoxic to seed or animal life. In the cured state, the stabilizing emulsion shall not be re-emulsified. The material shall be registered with and licensed by the State of California, Department of Food and Agriculture, as an “Auxiliary Soil Chemical.” Stabilizing emulsion shall be miscible with water at the time of mixing an application. Stabilizing emulsion shall not be applied during rainy weather or when soil temperatures are below forty (40) degrees Fahrenheit.

E. Mycorrhizal Inoculum: Endo (arbuscular) mycorrhizal inoculum shall be registered by the California Department of Food and Agriculture and consist of spores, mycelium and mycorrhizal root fragments in a solid carrier suitable for handling by hydro-seeding.
   1. The carrier shall be the material in which the inoculum was originally produced, and may include organic materials, vermiculite, perlite, calcined clay, or other approved materials consistent with mechanical application and with good plant growth.
   2. Each endomycorrhizal inoculum shall carry a supplier's guarantee of eighty thousand (80,000) propagules minimum per kilogram. The minimum propagule count shall be shown on each label provided. If more than one (1) fungal species is claimed by the supplier, the label shall include a guarantee for each species of mycorrhizal fungus claimed.
   3. Endomycorrhizal fungal species shall be suitable for the pH of the soil at the planting site. If the inoculum consists of a mixture of species, no more than 20% of the claimed propagule count shall consist of fungal species known to be unsuitable for the pH of the soil at the planting site.
   4. A sample of approximately twenty-eight (28) grams (one ounce) of inoculum will be taken from each inoculum container by the Contractor. The number of propagules will be determined by laboratory testing. Propagules shall include live spores, mycelial fragments and viable mycorrhizal root fragments.
   5. Endomycorrhizal inoculum shall be stored, transported and applied at temperatures of less than 32° C (90° F).

F. Mulch: Mulch shall be derived from certified weed-free rice straw or approved imported weed free wood chips. Material shall be free of salt, foreign and deleterious materials.
   1. Materials for imported wood mulch shall not contain noxious weeds or originate from a Sudden Oak Death host seed species derived from a quarantined county. Imported wood mulch shall not be produced from tree trimmings that contain leaves, seeds, inflorescences, or small twigs.

G. Rice Straw: Shall be three (3) to eight (8) inches in length. The contractor shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw from outside the county in which it is to be used is delivered to the site of the work. Straw that has been used for animal/livestock bedding is prohibited.

H. Weed mat: No use of plastic monofilament for erosion control that wildlife may become entrapped in is allowed. Erosion control blankets or matting shall consist of a

wood machined mat of curled wood excelsior of 80% six (6) inch or longer fiber length, or a combination of agricultural straw and coconut fiber matrix, stitch bonded with biodegradable thread to a standard photodegradable polypropylene netting. Blankets shall have a consistent thickness, with the fibers evenly distributed over the entire area of the blanket. The blanket materials shall not contain any chemical additives.

1. Erosion control blankets or matting shall consist of rolls either four (4) feet wide or eight (8) feet wide and shall be Curlex Blankets as manufactured by American Excelsior Company, SC150 Extended-Term Blanket as manufactured by North American Green, or approved equal.

I. Water: Water shall be clean, and free of deleterious material. Water shall be suitable for agricultural use and shall be free of harmful substances and salts that would adversely affect seed growth or vigor.

J. Seed Quantities: Seed quantities are listed in Table 1:

Table 1: Seed Mix

Common Name	Scientific Name	Pure Live Seed (pounds/acre)
small fescue	*Vulpia microstachys*	4.00
California fescue	*Festuca californica*	1.00
California brome	*Bromus carinatus*	9.00
blue wild rye	*Elymus glaucus*	8.00
red fescue	*Festuca rubra*	10.5
Yarrow	*Achillea millefolium*	0.50
meadow barley	*Hordeum brachyantherum*	3.00
tufted hairgrass*	*Deschampsia cespitosa*	4.00

PART 3 – EXECUTION

3.1 SEEDING

A. No seeding or container planting shall take place until the Engineer has approved the subsoil and topsoil grading and preparation.
   1. On slope areas, no straw or erosion control blankets shall be installed until the Engineer has first approved the hydroseeding where the blankets are to be placed.

B. Seeding Methods: Hydroseeding, Broadcast, cultipaker/ringroller over broadcast seed, may be employed.

C. Soil Preparation: levels, profiles and contours shall be maintained. All dirt clods shall be removed by rolling or other means. The minimum thickness of topsoil after grading shall be six (6) inches. Changes in grade shall be made gradual. Slopes shall be blended into level areas. Foreign materials, weeds, undesirable plants and their roots shall be removed from the subsoil prior to placement of the topsoil.

D. Broadcast seeding with a Cyclone Type Seeder: Seed shall be broadcast using manually operated cyclone-type spreaders or by hand. After seedbed preparation has been completed, seeds shall be applied over disturbed areas by uniformly broadcast seeding the seed mix at the specified seeding rate.

E. Hydroseeding: Mixture shall be prepared on site. Slurry shall consist of a homogenous mixture of fiber, stabilizing emulsion, and water (used as the mixing agent); add seed immediately before hydroseeding. Agitate the mixture for 3-15 minutes to allow for uniform mixing of the specified ingredients and applied immediately and emptied from tank within one-half (1/2) hour after addition of the seed to the mix. The slurry shall be colored with a nontoxic water soluble dye to aide in identification of treated areas and to ensure uniform application. No mixture shall be left in the seeder for more than eight (8) hours. Application shall not occur when rainfall is expected within twenty-four (24) hours.
   1. Material shall be as follows (Table 2):

Table 2 Hydroseeding Materials: Three Step Hydraulic Straw Treatment

Material	**Per Acre (Slope Measurement)**
Fiber	1,000 pounds (unless otherwise specified by manufacturer based on site conditions)
Stabilizing Emulsion	As specified by manufacturer based on site conditions
Seed	Species specified herein; 40/bs/acre
Fertilizer	1200 BioSol natural fertilizer or approved equal
Water	As needed for application

Step 1:

1) The application shall be applied at a rate of one-thousand (1000) pounds of 100% wood fiber per acre and the specified quantity of seed per acre, plus tackifier.
2) If tackifying straw is used during hydroseeding, fiber in the hydromulch slurry can be reduced to seven-hundred fifty (750) pounds per acre. Straw shall be applied at one-thousand (1,000) pounds per acre. If using Hydrostraw with a tacking agent, then the tackifier is not necessary.
3) The mixture shall be applied so that no gaps exist between the hydromulch matrix and the soil, and no holes greater than fifty (50) millimeters in the matrix. Apply specified slurry in a sweeping motion to form a uniform application.

3.2 MULCH

A. Placed to prevent erosion and allow for seed germination.

B. Mulch treatments shall be uniformly spread in areas where broadcast seeding implementation method has been used. Broadcast seeding, performed immediately after crimped straw installation, is allowed.

C. Where specified for areas that will be seeded, the following amounts of approved weed free wood chips or rice straw mulch.

% Slope	Pounds per Acre

0 – 10%	500
10 – 20%	1,000
20 – 30%	1,500
>30%	2,000

D. Contractor shall spread mulch uniformly over the area. If a mulch blower is used, the strands shall not be shredded less than eight (8) inches in length to allow anchoring. Anchor mulch immediately after placing to minimize loss by wind and water. Use a mulch anchoring tool that is a series of straight notched disks specifically designed for the purpose, to crimp the mulch to a depth of two (2) to three (3) inches. To maintain proper seed depth, a regular farm disc shall not be used to crimp mulch.

E. Application rate for straw shall not be less than two hundred (200) pounds of straw per one-thousand (1,000) square feet.

F. Under suitable conditions (where it cannot be anchored by rollers or crimping equipment and where approved by Engineer) rice straw shall be uniformly spread at the specified rates. The straw may be pneumatically applied as long as the resulting straw in predominately three (3) to six (6) inches in length. The straw shall be treated with tackifier before it can blow or float off the site but in no case shall straw be left untreated for more than two (2) hours.

G. Contractor shall not use binders that can damage shoes and/or clothing. Contractor shall apply tackifier at rates recommended by the manufacturer for the mulch anchoring.

H. The contractor shall clean up areas of straw which are blown from the site, and the areas shall be retreated at no additional expense.

3.3 FIELD QUALITY CONTROL

A. Contractor shall inspect project site and become familiar with any access requirements, access restrictions, and any other site conditions.

B. Preparation: Contractor shall only commence revegetation work once a notice to proceed has been received from the Engineer.

C. Contractor shall coordinate with the Engineer to confirm the locations of each seeding area prior to implementation.
   1. Each revegetation area shall be flagged by Contractor at the direction of the Engineer and constitute the limits of that seeding area

D. Contractor shall not commence Three-Month Seed Establishment and Warranty Period work until approval has been received from Engineer.

E. Contractor shall notify Engineer a minimum of ten (10) working days prior to the following inspections, unless otherwise noted herein:
   1. Inspections.
   2. Installation of supplemental seeding.

F. Progress inspections: Periodic progress inspections may be made by Engineer.

3.4 IRRIGATION

A. All areas shall be irrigated after the initial installation, unless directed otherwise by the District or Engineer.

B. Methods: Water may be provided by hand spraying water from a water truck or other water system, sprinklers are not recommended. Water may be sourced from surface and/or groundwater sources that are available (and permitted) and approved by the District. No high-pressure or fire hoses may be used for irrigation.

C. Maintain adequate moisture depth in soil to ensure vigorous growth; hand water as required.

D. Frequency and Duration: Watering shall occur once every ten (10) to fourteen (14) days, during the dry season (May-October) and/or a prolonged period of late rain in the fall.

E. Contractor shall inspect seeded areas for signs of water stress and water accordingly during the Three-Month Seed Establishment and Warranty Period and only under the direction of Engineer.

3.5 INSPECTIONS

A. The Contractor shall conduct bi-weekly (two 2) times per month for a total of six (6) inspections) on-site inspections during the Seed Establishment and Warranty Period. Inspection shall include, at a minimum, assessment of damaged, injured, or non-performing seeded areas, need for supplemental seeding, non-native invasive and competitive weed removal to be performed by the HBMWD, need for additional mulch or irrigation, potential repairs to erosion controls. An inspection report including data collected and assessment of the seed establishment as described herein shall be provided to the Engineer within five (5) working days of each inspection.

B. Contractor shall be required to correct any deficiencies to Engineer’s satisfaction by reseeding areas that fail to grow by the end of the Three-Month Establishment and Warranty Period if a minimum of seventy (70) percent vegetative establishment of the actively seeded species is not achieved.

3.6 SUPPLEMENTAL REVEGETATION

A. Replacement seeding shall occur in areas of bare soil in accordance to these specifications. Seeds must be of the same quality as specified in section 2 of this Specification and installed per section 3.1-Seeding.

B. After seeding, mulch mixture shall be lightly compacted into the soil surface to help ensure good soil/seed contact.

C. Supplemental revegetation areas shall be marked on the Record Drawings.

3.7 NONNATIVE INVASIVE AND COMPETITIVE WEED CONTROL

A. The Contractor is not responsible for weeding, maintenance, or invasive species control. The Engineer shall coordinate with the HBMWD if nonnative invasive and competitive seed or weed species persist or become established within the seeding or planted areas to determine the appropriate removal timing and method.

3.8 CLEAN-UP

A. Establish cleaning areas for vehicles and equipment moving between known infested and uninfested weed areas. Inspect and clean vehicles and equipment, prior to moving between known infested sites and uninfested areas, to help reduce the spread of weeds and invasive species.

3.9 REVEGETATION ESTABLISHMENT AND WARRANTY

A. A. Revegetation Establishment Period: Contractor shall notify Engineer at least one (1) week prior to completion of all seeding and planting related work for the initial inspection. The approval shall signify that the live material has been satisfactorily installed and the “Three-Month Revegetation Establishment and Warranty Period” may begin.
   1. If the inspection reveals deficiencies in the revegetation areas, Engineer shall give the Contractor a list of deficiencies to be corrected by the Contractor.

   2. If the inspection reveals deficiencies in the revegetation areas before the end of Three-Month Revegetation Establishment and Warranty Period, Engineer shall give the Contractor a list of deficiencies to be corrected by the Contractor.

B. Protect revegetation areas against damage during Three-Month Revegetation Establishment and Warranty Period until Final approval. If any seeded area becomes damaged or injured, remedy or replace immediately as directed by Engineer at no additional cost to District.

C. Guarantee and Replacement:
   1. Guarantee all revegetation areas to be in good health and in thriving condition until the end of the maintenance period or until active growth is evident for three (3) months from date of acceptance.
   2. Replace any seeded areas, which fail to establish normal healthy growth or are missing during the first three (3) months. Additionally, replace seeding stock based on the success criteria within Three-Month Revegetation Establishment and Warranty Period at no additional cost to District.

D. Replenish mulch (if applicable) and maintain adequate soil moisture at all times during Three-Month Revegetation Establishment and Warranty Period.

E. At the conclusion of Three-Month Revegetation Establishment and Warranty Period, the seeded areas shall be compared to the “Three-Month Revegetation Establishment and Warranty Period Success Criteria” below. These success criteria must be met for sign-off of completion of the Revegetation Establishment and Warranty Period and to relieve Contractor of maintenance requirements.

Three-Month Establishment and Warranty Success Criteria

Seeded Areas	Minimum of 70% survivability of seeded grass species and/or native and naturalized grass species known from the project area. No more than five percent relative cover of target invasive* seeds. No large un-vegetated bare spots or erosional areas greater than 100 square feet.
* Invasive species are defined as those listed by the California Invasive Species Council (Cal-IPC) or HWMA with a rating of high or moderate	

F. Final Inspection and Acceptance: Final inspection will be conducted upon completion of maintenance replacements, and corrective work. Five (5) working days' notice shall be given. If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of Engineer, maintenance shall continue at the Contractor's expense until such time and work has been successfully completed.

END OF SECTION

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SECTION 33 12 16

VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Gate Valves

1.2 MEASUREMENT AND PAYMENT

A. 12” Stainless Steel Gate Valves:
   1. Measurement and Payment for this item shall be on a per each valve installed and accepted basis. Payment shall include full compensation for all labor, equipment, materials, and supervision to install four 12-inch stainless steel gate valves (two valves provided by Owner, two valves provided by Contractor) as shown on the plans, complete and in place including but not limited to the gate valve, stem, handwheel, bolts, nuts, and a tag as shown on the plans and in accordance with these specifications and as directed by the Owner and Engineer.

B. Alternate Bid Item for 12” Stainless Steel Gate Valves
   1. Measurement and Payment for this item shall be on a per each valve installed and accepted basis, above and beyond the Base Bid Schedule quantity. Additional measurement will be made for valves placed on laterals installed above and beyond the four laterals/valves included in the base contract. Payment shall include full compensation for all labor, equipment, materials and supervision to provide and install five 12-inch stainless steel gate valves as shown on the plans, complete and in place including but not limited to the gate valve, stem, handwheel, bolts, nuts, and a tag as shown on the plans and in accordance with these specifications and as directed by the Owner and Engineer.

1.3 RELATED SECTIONS

Related work specified in other sections:

A. Section 15 21 00 - Lateral Installation

1.4 REFERENCED CODES AND SPECIFICATIONS

The following standards apply:

A. The American National Standards Institute/National Sanitary Federation (ANSI/NSF-61)

B. American Water Works Association Inc. (AWWA):
   1. C509 - Resilient-Seated Gate Valves for Water Supply Service

1.5 SUBMITTALS

A. Section 01 33 00 – Shop Drawings and Submittals

B. Shop drawings: Submit complete shop drawings including layouts, elevations, and details to the Engineer.

C. Material list: Submit with the shop drawings a complete list of all materials and equipment catalog number, and catalog cuts for each item where applicable.

D. Valve Data: Submit the following
   1. Valve dimensional assembly drawings
   2. Valve cross section drawings.
   3. Head loss, Cv, and calculated port area.
   4. Provide valve torque seating, un-seating, and dynamic torque at 10 degree increments.
   5. Test certifications, Seat leakage, Hydro-static, coating thickness.

E. Operations and Maintenance Manuals: Submit copies of the manufacturer’s current operation and maintenance manuals.

F. Manufacturer's recommendations: Accompanying the materials list and shop drawings, submit copies of the manufacturers' current recommended method of installation.

1.6 DESIGN REQUIREMENTS AND OPERATING CONDITIONS

A. Valve Working Pressure:
   1. Minimum 150 psi unless otherwise specified or shown.

B. Product Handling:
   1. Use all means necessary to protect the materials of this section before, during, and after installation and to protect the installed work and materials of all other trades.
   2. The Contractor shall provide and use proper implements, tools and facilities for the safe and proper handling and protection of the material.
   3. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer, and at no additional cost to the Owner.
   4. When damaged material cannot be repaired to the satisfaction of the Engineer, it shall be removed from the job.
   5. Material shall be stored in a safe location, protected from the elements.

1.7 QUALIFICATIONS/RESPONSIBILITY/SAFETY

A. Qualifications of manufacturers:
   1. The material shall be the product of a supplier regularly engaged in the manufacturing of pipe and plumbing products.
   2. All materials shall be new and of current manufacture and shall be guaranteed against defects of workmanship in accordance with Part B-26 of the General Conditions.

B. Qualification of installers:
   1. For the actual assembly, installations, and testing of the work of this section, use only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work and with the installation recommendations of the manufacturers of the specified items.

PART 2 PRODUCTS

2.1 GENERAL

A. All materials shall conform to sizes, capacity, quality and quantities as shown on the Plans or described in these Specifications. Materials shall be from new stock and delivered in good condition; no damaged stock shall be used.

B. Where no method of tests for materials is specified, the latest test specified by ASTM shall be followed.

C. After delivery to the site, all materials shall be carefully unloaded, protected against breakage, rusting, accumulation of foreign matter, disintegration and injury. The Contractor shall be responsible for all lost or damaged material supplied and work done under this Contract.

2.2 BOLTS, GASKETS, GLANDS, NUTS

A. Bolts, gaskets, glands, nuts, and miscellaneous accessories required to install all valves shall be furnished. All nuts and bolts shall be 316 stainless steel. Gaskets for flanged connections shall be suitable for the pressure, temperature, and chemical characteristics of the fluid handled. The gasket materials shall also be suitable for the pipe system physical characteristics and materials and shall conform to NSF-61 requirements. Gaskets shall extend from the inside diameter of the flange to at least the inside edge of the bolt holes or they may extend beyond the bolt circle.

B. Dissimilar Materials – Provide dielectric bolts and NBR gaskets where flanges of dissimilar materials are joined

2.3 CORROSION RESISTANT CAST STAINLESS STEEL GATE VALVES

A. Manufacturer:
   1. Kata Valve
   2. Powell Valves
   3. Velan, Inc.
   4. Substitutions: Section 01 33 00 – Shop Drawings and Submittals

B. 316 stainless steel body in accordance with AWWA C509 and C515 except as modified herein.

C. Each valve shall have a smooth unobstructed waterway free from any sediment pockets.

D. Gate valves shall be leak-tight at their rated pressure.

E. Gate valves shall have a rising 316 stainless steel stem, opened by turning left (counterclockwise).

F. Stem: Rising

G. Stem seals shall be the O-ring type incorporating a minimum of two rings as required by AWWA C509.

H. Low-friction torque-reduction thrust washers or bearings shall be provided on the stem collar.

I. Wedge (gate) shall be fully encapsulated with a bonded-in-place Nitrile elastomer covering. Minimum thickness of the rubber seating area shall be 6.35mm (1⁄4").

J. All bolts and nuts used in the construction of gate valves shall be Type 316 stainless steel.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:
   1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
   2. Verify that all materials may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Discrepancies:
   1. In the event of discrepancy, immediately notify the Engineer.
   2. Do not proceed with installation in area of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

A. General:
   1. Installation of valves and appurtenances shall be installed as shown on the Contract Drawings and as specified herein.
   2. Install all materials in strict accordance with the manufacturer's recommendations.
   3. Before installation, carefully clean valves of all foreign material, adjust stuffing boxes, and inspect valves in open and closed positions. Install valves in accordance with the applicable portions of these Specifications. All valves shall be installed with the stem vertical. Installation practices shall conform to manufacturer's recommendations.
   4. Support and restrain all valves where necessary, free from distortion or strain on valve or connecting pipe. Do not use pipe to support valve.
   5. Prior to installing flanged valves, the flange faces shall be thoroughly cleaned. After cleaning, insert the gasket and tighten the nuts progressively and uniformly. If flanges leak under pressure, loosen the nuts, reseat or replace the gasket, re-

tighten the nuts, and retest the joint. Joints must be watertight at test pressures before acceptance.

6. Thoroughly clean threads of screwed joints by wire brushing, swabbing, or other approved method. Apply approved joint compound to threads prior to making joint. Joints shall be watertight at test pressures before acceptance.

3.3 VALVE IDENTIFICATION

A. Provide all valves with a stamped valve tag with valve ID. Provide valve chart indicating valve tag number, location of valve, service and normal position of valve, valve manufacturer, size, and pressure rating.

3.4 ADJUSTMENT

A. Check and adjust valves and accessories for smooth operation. Lubricate in accordance with manufacturer’s recommendation.

B. Pack all gate valve stuffing boxes with an excess of packing (30%) for future adjustment.

PART 4 TESTING

4.1 TESTS

A. General: Upon completion of this portion of the work, and prior to acceptance by the District, make all required tests and perform all required disinfection and bacteriological testing.

B. Hydrostatic Testing: Valves and related materials will be tested prior to acceptance. Joints shall show no visible leakage under hydrostatic head test pressure. Repair joints that show signs of leakage prior to final acceptance. If there are any special parts of control systems or operators that might be damaged by other testing, they shall be properly protected. The Contractor will be held responsible for any damage caused by the testing.

C. Functional Testing:
   1. Valves which are normally closed shall satisfactorily be closed, opened, and closed by the District's representative.
   2. Valves which are normally open shall satisfactorily be opened, closed, and opened by the District's representative.

END OF SECTION

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SECTION 33 13 13

CAISSON DISINFECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Caisson disinfection. It should be noted that the requirements of AWWA C652-Disinfection of Water-Storage Facilities shall be generally followed by the Contractor for disinfection of the caissons, however, final potable water disinfection in the Owner's water delivery system occurs after the caisson and as such, final residual chlorine and bacteriological testing are not required under this Section.

1.2 MEASUREMENT AND PAYMENT

A. Measurement and Payment for this work will be made under the Lateral Installation Bid Item. No separate measurement or payment will be made for the requirements of this specification section.

1.3 REFERENCES

A. American Water Works Association:
   1. AWWA B300 - Hypochlorites.
   2. AWWA B301 - Liquid Chlorine.
   3. AWWA C652 - Disinfection of Water Storage Facilities.

1.4 SUMBITTALS

A. Submit the following per the requirements of Section 01 33 00 – Shop Drawings and Submittals.

B. Disinfection Procedure: Submit procedures, proposed chemicals, application procedures, and treatment levels for review. The disinfection of the interior of each caisson shall conform to Chlorination Method 2 set forth in the latest version of AWWA C652.

C. Manufacturer's Certificate:
   1. Certify disinfectants meet or exceed AWWA Standards requirements.

1.5 CLOSEOUT SUBMITTALS

A. Disinfection Report (to be included in the Final Conditions Report outlined in Section 15 21 00 – Lateral Installation):
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant start and time of completion.
   3. Test locations.
   4. Name of person collecting samples.

5. Initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C652.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store disinfectants in cool, dry place away from combustibles such as wood, rags, oils and grease.

B. Handle disinfectants with caution; protect skin and eyes from contact; avoid breathing vapors; wear gloves, aprons, and goggles. Appropriate breathing protection shall be used at all times when handling disinfectants and when inside the caisson after it has been disinfected.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Furnish personnel working inside caisson during disinfection with personal protection equipment to comply with Federal and State regulations for work conducted in the atmosphere created within the caisson during disinfection procedure.

B. Repair damage caused by disinfectant solution and disinfection procedures.

PART 2 PRODUCTS

2.1 DISINFECTANTS

A. Materials shall comply with the requirements of the Safe Drinking Water Act and other federal regulations for potable water applications.

B. Chlorine Forms: In accordance with AWWA C652, Section 4. A solution of at least 200 mg/L available chlorine shall be used.

PART 3 EXCECUTION

3.1 EXAMINATION

A. Conduct inspection of caisson interior before beginning disinfection. Disinfection shall be performed after the complete installation of laterals and valves and measurement of deflection in the laterals and acceptance of the Work, but prior to the performance of the final performance testing detailed in Section 15 21 00 - Lateral Installation.
   1. Scaffolding, lateral installation equipment, screen, pipes, tools, rags and other materials not part of the structural or operating facilities of the collector shall be removed and the caisson cleaned per the requirements of Section 01 74 00 - Site and Area Cleanup.
   2. The Owner reserves the right to require cleaning of the collector floor and walls with a high-pressure water system if excessive dirt, grease, petroleum products or other contaminants associated with the Contractors work remain on the walls

and floors of the caisson after the removal of equipment and initial cleaning detailed in Section 01 74 00-Site and Area Cleanup.

3. Verify caisson pipe connections are properly made and clear of obstructions.

3.2 APPLICATION

A. Chlorination Method 2, as specified in Section 4.3.2 of the latest version of AWWA C652, shall be used:
   1. A solution of at least 200 mg/L available chlorine shall be applied directly to the surfaces of parts of the caisson that would be in contact with water when the caisson is full of water.
   2. The chlorine solution may be applied with suitable brushes or spray equipment. The solution shall thoroughly coat surfaces to be treated, including the walls, valves, etc.
   3. The disinfected surfaces shall remain in contact with the strong chlorine solution for at least 30 minutes, after which water shall be admitted into the caisson. The caisson shall be filled to its highest level, at which point it can be delivered to the transmission system, and the final performance testing can be conducted.

END OF SECTION

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PART 5
APPENDICES

APPENDIX A – MONITORING WELL BORING LOGS

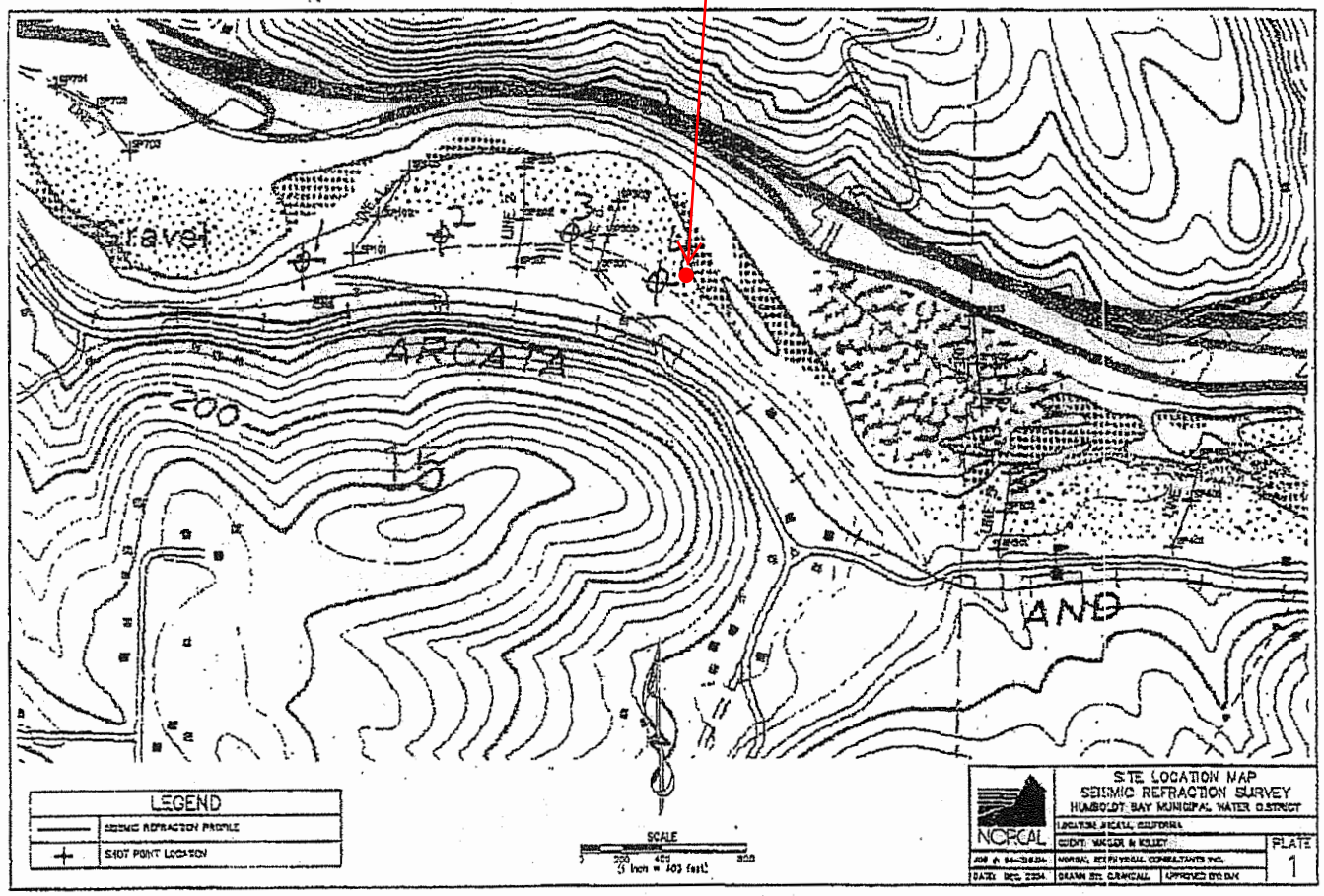
APPENDIX B – NORCAL GEOPHYSICAL REPORT (2020)

APPENDIX C – COLLECTOR 1/1A AND COLLECTOR 3 SIEVE ANALYSES

APPENDIX D – PERMITS

APPENDIX E – SITE PHOTOS

APPENDIX A – MONITORING WELL BORING LOGS


Collector 2
gravel
ARCATA
200
AND
LEGEND
SEISMIC REFRACTION PROFILE
SHOT POINT LOCATION
SCALE
1 inch = 400 feet
SITE LOCATION MAP
SEISMIC REFRACTION SURVEY
HUMBOLDT BAY MUNICIPAL WATER DISTRICT
NCRCAL
PLATE
1

TRIPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. MW-1

Date Work Began 2-24-05, Ended 2-26-05

Local Permit Agency Humboldt County Environmental Health

Permit No. 504-201-011 Permit Date 1-20-05

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 1087252

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD air rotary FLUID water

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	Silt and fine sand
5	10	Sand and gravel
10	40	Gravel w/sand, minor fines
40	50	Clayey silty sand w/gravel
50	100	Sand and gravel, minor fines
100	105	Clayey silty sand w/gravel
105	112	Franciscan bedrock
	107	Depth to competent bedrock

RECEIVED
MAY 10 2005
WK-EUREKA

TOTAL DEPTH OF BORING 112 (Feet)

TOTAL DEPTH OF COMPLETED WELL 106 (Feet)

WELL OWNER

Name Humboldt Bay Municipal Water Dist

Mailing Address c/o Winzler & Kelly Engineer

633 Third Street, Eureka, CA 95501

CITY STATE ZIP

WELL LOCATION

Address 7270 Westend Road, Arcata

City Arcata

County Humboldt

APN Book 504 Page 201 Parcel 011

Township 6N Range 1E Section 15

Lat 40 | 54 | 49 N Long 124 | 02 | 12 W

DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH

NORTH

WEST See attached map EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)

WATER SUPPLY

___ Domestic ___ Public

___ Irrigation ___ Industrial

MONITORING X

TEST WELL ___

CATHODIC PROTECTION ___

HEAT EXCHANGE ___

DIRECT PUSH ___

INJECTION ___

VAPOR EXTRACTION ___

SPARGING ___

REMEDIATION ___

OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 35 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL n/a (Ft.) & DATE MEASURED

ESTIMATED YIELD * 170+ (GPM) & TEST TYPE air lift

TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN n/a (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	11	11¼					Steel	6	.188	
11	20	7⅞	X				Steel	6	.188	
20	40	7⅞		X			Steel	6	.188	1/8
40	70	7⅞	X				Steel	6	.188	
70	100	7⅞		X			Steel	6	.188	1/8
100	106	7⅞	X				Steel	6	188	
106	112	6¾					Open hole			

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	2	X			Concrete
2	14		X		Granular
					& Chips

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

X Other site map

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Diamond Core Drilling, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. Box 491925 Redding CA 96049
ADDRESS CITY STATE ZIP

Signed [signature] 4-27-05 512406
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

TRIPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. MW-2

Date Work Began 2-23-05, Ended 2-24-05

Local Permit Agency Humboldt County Environmental Health

Permit No. 504-201-011 Permit Date 1-20-05

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 1087253

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD air rotary FLUID water

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	15	Sandy gravel
15	25	Silty sand and gravel
25	35	Sand and gravel
35	40	Silty sand
40	50	Silty sand w/gravel
50	70	Sand w/gravel, minor fines
70	100	Silty sandy gravel
100	104	Clay and sand w/gravel
104	106	Competent Franciscan bedrock

TOTAL DEPTH OF BORING 106 (Feet)

TOTAL DEPTH OF COMPLETED WELL 104 (Feet)

WELL OWNER

Name Humboldt Bay Municipal Water Dist.

Mailing Address c/o Winzler & Kelly Engineer

633 Third Street, Eureka, CA 95501

CITY STATE ZIP

WELL LOCATION

Address 7270 Westend Road

City Arcata

County Humboldt

APN Book 504 Page 201 Parcel 011

Township 6N Range 1E Section 15

Lat 40 (DEG.) 54 (MIN.) 50 (SEC.) N Long 124 (DEG.) 03 (MIN.) 06 (SEC.) W

LOCATION SKETCH

NORTH

WEST

See attached map

EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)

___ DESTROY (*Describe Procedures and Materials Under "GEOLOGIC LOG"*)

USES (✓)

WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial

MONITORING X
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER n/a (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL n/a (Ft.) & DATE MEASURED ___

ESTIMATED YIELD * 150+ (GPM) & TEST TYPE air lift

TEST LENGTH n/a (Hrs.) TOTAL DRAWDOWN n/a (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	11	11½	X				Steel	6	.188	
11	18	7½	x				Steel	6	.188	
18	50	7½		x			Steel	6	.188	1/8
50	70	7½	x				Steel	6	.188	
70	95	7½		x			Steel	6	.188	1/8
95	104	7½	x				Steel	6	.188	
104	106	6¼					Open hole			

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	2	x			Concrete
2	14		x		Granular
					& Chips

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
X Other site map

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Diamond Core Drilling, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. Box 491925 Redding CA 96049
ADDRESS CITY STATE ZIP

Signed [signature] 4-27-05 512406
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

NOT FOR PUBLIC USE CONFIDENTIAL WATER CODE SEC 10752

TRIPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. MW-3

Date Work Began 2-22-05, Ended 2-23-05

Local Permit Agency Humboldt County Environmental Health

Permit No. 504-201-011 Permit Date 1-20-05

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 1087254

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD air rotary FLUID water

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	15	Sand and gravel
15	25	Sandy gravel, minor fines
25	70	Sand and gravel w/fines
70	75	Clay w/sand and gravel
75	90	Sandy gravel w/fines
90	100	Sand and gravel w/fines
100	105	Clay w/sand and gravel
105	108	Clay w/sand and gravel
108	110	Competent Franciscan bedrock

TOTAL DEPTH OF BORING 110 (Feet)

TOTAL DEPTH OF COMPLETED WELL 108 (Feet)

WELL OWNER

Name Humboldt Bay Municipal Water Dist.

Mailing Address c/o Winzler & Kelly Engineer

633 Third Street, Eureka, CA 95501

CITY STATE ZIP

WELL LOCATION

Address 7270 Westend Road

City Arcata

County Humboldt

APN Book 504 Page 201 Parcel 011

Township 06N Range 1E Section 15

Lat 40 ° 54 ' 48 " N (DEG. MIN. SEC.) Long 124 ° 02 ' 97 " W (DEG. MIN. SEC.)

LOCATION SKETCH

NORTH

WEST — See attached map — EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR ___ Deepen ___ Other (Specify)

___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)

WATER SUPPLY ___ Domestic ___ Public ___ Irrigation ___ Industrial

MONITORING X

TEST WELL ___

CATHODIC PROTECTION ___

HEAT EXCHANGE ___

DIRECT PUSH ___

INJECTION ___

VAPOR EXTRACTION ___

SPARGING ___

REMEDIATION ___

OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE not able to be measured

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED

ESTIMATED YIELD * ___ (GPM) & TEST TYPE

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	11	11					Steel	6	.188	
11	18	7⅞	X				Steel	6	.188	
18	70	7⅞		X			Steel	6	.188	1/8
70	80	7⅞	X				Steel	6	.188	
80	100	7⅞		X			Steel	6	.188	1/8
100	108	7⅞	X				Steel	6	.188	
108	110	6¼					Open hole			

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	2	X			Concrete
2	14		X		Granular
					& Chips

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

X Other site map

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Diamond Core Drilling, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS P.O. Box 491925 CITY Redding STATE CA ZIP 96049

Signed [signature] 4-27-05
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED

512406
C-57 LICENSE NUMBER

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

TRIPLICATE
Owner's Copy
Page 1 of 1
Owner's Well No. MW-4
Date Work Began 2-21-05, Ended 2-22-05
Local Permit Agency Humboldt County Environmental Health
Permit No. 504-201-011 Permit Date 1-20-05

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1087255

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD air rotary FLUID water

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	10	Sandy gravel, minor fines
10	30	Silty sandy gravel
30	40	Silty sand w/gravel
40	55	Sandy gravel w/fines
55	65	Silty sand w/gravel
65	82	Silty sand and gravel
82	93	Franciscan bedrock

TOTAL DEPTH OF BORING 93 (Feet)
TOTAL DEPTH OF COMPLETED WELL 93 (Feet)

WELL OWNER
Name Humboldt Bay Municipal Water Dist
Mailing Address c/o Winzler & Kelly Engineer
633 Third Street, Eureka, CA 95501
CITY STATE ZIP

WELL LOCATION
Address 7277 Westend Road
City Arcata
County Humboldt
APN Book 504 Page 201 Parcel 011
Township 6N Range 1E Section 15
Lat 40 ° 54 ' 63 " N Long 124 ° 02 ' 70 " W
DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH
NORTH
WEST — See attached map — EAST
SOUTH
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)
X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING X
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH TO FIRST WATER n/a (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 14 (Ft.) & DATE MEASURED 2-22-05
ESTIMATED YIELD * n/a (GPM) & TEST TYPE
TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	11	11½	X				Steel	6	.188	
11	15	7½	X				Steel	6	.188	
15	30	7½		X			Steel	6	.188	1/8
30	45	7½	X				Steel	6	.188	
45	80	7½		X			Steel	6	.188	1/8
80	93	7½	X				Steel	6	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	2	X			Concrete
2	11½		X		Granular
					& Chips

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
X Other site map
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME Diamond Core Drilling, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS P.O. Box 491925 CITY Redding STATE CA ZIP 96049
Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 4-27-05 C-57 LICENSE NUMBER 512406

DWR 188 REV. 05-03
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX B – NORCAL GEOPHYSICAL REPORT (2020)

Geophysical Report

Geophysical Investigation
Collector 2
Humboldt Bay Municipal Water District
Arcata, California

November 20, 2020
NORCAL JOB NO. NS205099

Prepared for:

718 Third Street
Eureka, CA 95501

Prepared by:

NORCAL Geophysical Consultants, Inc. 321A Blodgett Street Cotati, California 94931
P (707) 796-7170 F (707) 796-7175 norcalgeophysical.com

November 20, 2020

718 Third Street
Eureka, CA 95501

Subject: Geophysical Investigation
Collector 2
Humboldt Bay Municipal Water District
Arcata, California

NORCAL Project No. NS205099

Attention: Mr. Nathan Stevens

The attached report presents the findings of a geophysical investigation performed by NORCAL Geophysical Consultants Inc., a Terracon Company, for GHD at the Humboldt Bay Municipal Water District (HBMWD) Collector 2 location in Arcata, California. The work was authorized under GHD Purchase Order Number 38005588, dated October 8, 2020. NORCAL Professional Geophysicists Hunter S. Philson (CA PGp No. 1094), David T. Hagin (CA PGp No. 1033) and Staff Geophysicist Sage J. Wagner conducted the investigation on October 13-15, 2020.

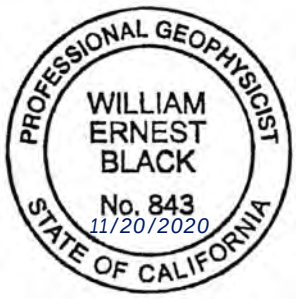
The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide our services for this project. If you have any questions or require additional geophysical services, please do not hesitate to call on us.

Sincerely,
NORCAL Geophysical Consultants, Inc.

Hunter S. Philson
California Professional Geophysicist
PGp No. 1094

William E. Black
California Professional Geophysicist
PGp No. 843



Geophysical Report

Geophysical Investigation
HBMWD Collector 2
Arcata, California

November 20, 2020

1.0 INTRODUCTION

This report presents the results of a geophysical investigation performed to aid in design for proposed improvements to HBMWD Collector 2. The site is situated on the Mad River in Arcata, California. According to information provided by GHD, there are plans to install new stainless-steel laterals that project radially from Collector 2 at depths as great as 80-feet below the river bed. The new laterals must be jacked horizontally into sediments and cannot be installed in bedrock. The objectives of the geophysical investigation are to determine the depth to bedrock near Collector 2, and to approximate the thickness and character of the overlying sediments.

2.0 SITE CONDITIONS

The following description of site conditions is derived from our site visit, our review of publicly available geologic and topographic maps, and additional documentation provided by GHD.

Table 1: *Project Description*

Item	Description
Site Information	Collector 2 is a Ranney collector type well on the south side of Mad River approximately 2,000-ft upstream of the HBMWD facilities located at 7270 West End Road in Arcata, California.
Existing Improvements	The area around Collector 2 is mostly unimproved, except for a small network of dirt access roads and fencing along the southern boundary. A monitoring well (MW-4) is located about 200-ft west of Collector 2.
Current Ground Cover	Ground cover varies throughout the site, ranging from thick vegetation to grassy lawns to gravels and cobbles in the exposed river bed. A path was cleared through the thick vegetation prior to the geophysical investigation.
Site Geology	Available geologic maps (USGS 2000; CGS 2010) and the well log from nearby MW-4 indicate that the site geology consists of Quaternary age alluvial deposits overlying Franciscan bedrock. The site is within the Mad River Fault Zone.
Depth to Bedrock	According to information provided by GHD, bedrock in Collector 2 is suspected to be slightly greater than 64-ft below mean sea level (msl). The well completion report for MW-4 indicates bedrock at 82-ft below ground surface, which corresponds to about 44-ft below msl.

Item	Description
Existing Topography	The survey area topography is generally flat, with elevations gradually increasing away from the river toward the southwest. Surface elevations range in from about 24-ft above mean sea level (msl), which is the general elevation of the river, to 45-ft above msl. Survey elevations were provided by Gutierrez Land Survey in the "Topographic Survey – H.B.M.W.D. Collector #2" map dated October 16, 2020. The Basis of Bearings is based on control point numbers 301 and 399 as shown on the "Cross Section Index" map prepared by Points West Surveying Co., dated September 12, 2017. The coordinate system used is California Zone 1 (NAD 27).

3.0 SCOPE OF SERVICES

As stated in Section 1.0, the objectives of the geophysical investigation are to determine the depth to bedrock near Collector 2 and to approximate the thickness and character of the overlying sediments. To achieve these objectives, we used an approach consisting of three different geophysical techniques as follows:

- Multi-channel analysis of surface waves (MASW)
- Seismic refraction (SR)
- Electrical resistivity profiling (ERP).

The MASW and SR methods were used to measure S-wave and P-wave velocities, respectively, to determine the thickness of overburden and to determine the depth and character of the underlying bedrock. The ERP method was used to further characterize the overburden as it relates to fine and coarse grain materials, and to detect lateral changes that may relate to faulting.

4.0 METHODOLOGY

We used the three geophysical methods listed In Section 3 to acquire data along two mutually perpendicular traverses situated adjacent to Collector 2, as shown on **Plate 1 – Site Location Map**. The locations of the MASW, SR and ERP surveys are depicted with orange, red and blue lines, respectively. The surveys parallel to the river are labelled MASW-1, SR-1 and ER-1. The surveys perpendicular to the river are labelled MASW-2, SR-2 and ER-2.

The MASW and SR methods were used to define the seismic properties of the subsurface. The MASW method measures shear wave (S-wave) velocity beneath the line, whereas the SR method measures compressional primary wave (P-wave) velocities. S-wave and P-wave velocities can be abbreviated using "Vs" and "Vp", respectively. Typically, lower Vs and Vp correlate with sediments and higher Vs and Vp indicate bedrock. However, Vp is uniquely influenced by shallow groundwater because compressional waves travel through fluids and shear waves do not. Consequently, shallow groundwater can sometimes mask the true bedrock interface in Vp profiles. Therefore, Vs is usually the best bedrock indicator in areas with shallow groundwater.

The ERP method was used to define the electrical structure of the subsurface. Electrical resistivity is defined as "the resistance of a volume of material to the flow of electricity," and is the inverse of conductivity. Within alluvial deposits, higher resistivity zones typically represent coarse-grained sediments such as sand and gravel, whereas lower resistivity zones generally correlate with fine-grained materials such as clay and silt. The grain size of the sediments is important in evaluating the groundwater development potential because coarse-grained sediments are more permeable than fine-grained units, and allow for higher rates of groundwater flow.

Detailed descriptions of the geophysical methodology, the instrumentation we used, our data acquisition, analysis and interpretation procedures as well as the general limitations of the method are provided in **Appendix A – Multi-channel Analysis of Surface Waves**, **Appendix B – Seismic Refraction** and **Appendix C – Electrical Resistivity Profiling**.

5.0 RESULTS

The results of the geophysical surveys are illustrated on **Plates 2 and 3 – Geophysical Profiles**. Each plate contains three color contoured cross-sections (profiles) stacked vertically, one above the other. The top, middle, and bottom profiles depict the MASW, SR, and ER results, respectively. On each profile the vertical axis represents elevation above msl and the horizontal axis represents station distance from the westernmost end of each line. The color contours represent the values of measured geophysical properties, as illustrated by the color scale adjacent to each profile. The geophysical properties measured by the MASW, SR and ER surveys are S-wave velocity (Vs), P-wave velocity (Vp) and electrical resistivity (ER), respectively.

6.0 INTERPRETATION

Our interpretation of the MASW, SR and ER profiles are provided below. The interpretation is based on our knowledge of the local geology, our visual observations of the site conditions, our experience with numerous previous geophysical surveys, and the depth-to-bedrock information from Collector 2 and MW-4, as outlined in Section 2.0 above.

6.1 MULTI-CHANNEL ANALYSIS OF SURFACE WAVE (MASW) PROFILES

The MASW-1 and MASW-2 profiles (top illustrations on Plates 2-3) indicate S-wave velocities (Vs) that gradually increase from about 500-ft/s near the ground surface to as high as 3,500-ft/s at depths as great as 115-ft below ground surface (bgs). Our interpretation of the relationship between Vs and lithology is listed in Table 2 below:

Table 2: *General S-Wave Velocity (Vs) Lithology Correlation*

Vs Range (ft/s)	Color Shading	Assumed Lithology
500 – 2,000	brown - tan	Quaternary alluvium of varying degrees of compaction
> 2,000	green - blue	Franciscan bedrock of varying degrees of weathering, or zones of highly compacted sediments

We interpret the deepest 2,000-ft/s Vs contour as representing the approximate depth to competent bedrock. The interpreted depth to bedrock, represented by a dark dashed line, is superimposed on the SR and ER profiles for comparison purposes.

Based on this interpretation, the thickness of overlying sediments varies from 85- to about 113-ft on the MASW profiles. The Vs contours along MASW-1 suggest that bedrock has an apparent dip towards the southeast and is located about 65- to 75-ft below msl near Collector 2. This is consistent with reports that bedrock is located slightly below the lowest lateral (64-ft below msl) in Collector 2. On the other hand, the bedrock depth measured in MW-4 (44-ft below msl) appears to be about 25-ft shallower than the interpreted depth to bedrock along MASW-2. However, this discrepancy could be explained by the 38-ft lateral offset between MW-4 and MASW-2.

Portions of the MASW profiles display Vs inversions, or decreases in velocity with depth. Velocity inversions, which are undetectable with traditional SR techniques, suggest the presence of less competent material underlying more competent material. The inversions could be caused by changes in the makeup of the subsurface material, its compaction or other subsurface variations. For example, the higher Vs contours (> 2,000-ft/s) that are located above the interpreted bedrock interface on both MASW profiles likely represent localized zones of highly compacted sediments and/or massive boulders.

6.2 SEISMIC REFRACTION PROFILES

The profiles for SR-1 and SR-2 (middle illustrations on Plates 2-3) depict P-wave velocities (Vp) that gradually increase from less than 2,000-ft/sec near the ground surface to over 9,000-ft/s at depths as great as 100-ft below ground surface (bgs). Our interpretation of the relationship between Vp and lithology is listed in Table 3 below:

Table 3: *General P-Wave Velocity (Vp) Lithology Correlation*

Vp Range (ft/s)	Color Shading	Assumed Lithology
< 4,000	brown - tan - green	Unsaturated and less consolidated alluvium
> 4,000	blue - magenta	Saturated alluvium of varying degrees of compaction; possible Franciscan bedrock at the highest velocities and greatest depths

Since groundwater is very shallow adjacent to Mad River, the Vp contours along SR-1 and SR-2 are highly influenced by saturation. We interpret the groundwater table as corresponding approximately with the 4,000-ft/s contour on both SR profiles, which is generally located around 25-ft above msl. This also correlates closely with the river level (24-ft above msl) at the time of the survey. As indicated by the interpretation above, the Vp of saturated sediments overlaps with Vp values typical of bedrock. Therefore, the SR profiles are not able to distinguish between bedrock and the overlying saturated sediments at this site. Based on the interpreted bedrock surface from MASW, we suspect the highest Vp values (>8,000-ft/s) mostly coincide with highly compacted and saturated gravels rather than Franciscan bedrock.

5.3 ELECTRICAL RESISTIVITY PROFILES

The ER profiles for ER-1 and ER-2 (bottom illustrations on Plates 2-3) illustrate electrical resistivity variations ranging from about 2 to 2,500 ohm-m within the upper 90-ft of the subsurface. Our general interpretation of the relationship between ER and lithology is listed in Table 4 below. The interpretation is based on descriptions of sediments in nearby well completion logs and our experience with previous surveys:

Table 4: *General ER Lithology Correlation*

Electrical Resistivity (ohm-m)	Contour Colors	Assumed Lithology
10 – 180	blue	Alluvium with more fine-grained sediments such as clay with sand or silty sands.
180 – 500	green	Well mixed alluvium with fine- and coarse-grained sediments such as silt and sand with gravel, or silty sand and gravel.
500 – 2,500	yellow - orange - red	Alluvium with more coarse-grained sediments such as sandy gravels or sands/gravels with minor fines.

Based on the lithologic correlation given above, the ER profiles display resistivity variations that are very typical of coarser- and finer-grained lenses and layers within an alluvial sequence. The yellow- to red-colored areas likely represent pockets of cleaner sands and gravels, whereas the blue- and green-colored contours indicate mixtures of coarse and fine-grained sediments. The depth of investigation for the ER survey (90-ft) may be too shallow to image bedrock at this site. Bedrock typically appears as a monolithic higher resistivity zone at the bottom of the ER profile.

ER-1 displays a significant lateral change between stations 270- to 330-ft. These types of pronounced lateral changes in subsurface electrical properties are often associated with faults. The interpreted fault is depicted by the yellow dashed line centered at station 290-ft. We have superimposed it on MASW-1 and SR-1 for reference purposes. A similar feature was not detected on ER-2, so the strike of the interpreted fault is not known but assumed to be subparallel to ER-2. If this is correct, the interpreted fault strikes roughly perpendicular to the Mad River Fault Zone and thus may represent an offset transform fault between two nearby thrust faults.

Adjacent to the interpreted fault, there are large high and low resistivity anomalies on the northwest and southeast sides, respectively. The high resistivity anomaly is likely a large gravel deposit centered at station 270-ft roughly 45-ft below sea level. We would typically classify the low resistivity anomaly centered at station 330-ft as clay- and silt-rich sediments. However, the location of the anomaly is suspiciously centered on Collector 2. It is possible that this low resistivity anomaly is an artifact caused by metallic components of Collector 2 and its existing laterals.

APPENDIX A:

Multi-Channel Analysis of Surface Waves (MASW)

APPENDIX A:

Multi-Channel Analysis of Surface Waves (MASW)

1.0 METHODOLOGY

The Multichannel Analysis of Surface Waves (MASW) technique was used to measure variations in surface wave velocity as a function of frequency, and to model these data to determine subsurface S-wave velocities (Vs) versus depth and distance along lines MASW-1 and MASW-2, shown by the orange dashed lines on Plate 1.

When seismic energy is generated at or near the ground surface, seismic waves are produced. Those that travel along the ground surface are referred to as ground roll or surface waves. When a vertical impact seismic energy source is used, the resulting surface waves account for more than two-thirds of the energy that is produced. As a result, surface waves are the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersive properties that body waves (those that propagate below the surface) lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. This is referred to as dispersion. Since surface waves travel at 0.9 times the velocity of shear waves, it is possible to determine subsurface S-wave velocities by analyzing the dispersion of surface waves. Furthermore, since S-wave velocities are directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Computer software and processing techniques developed by researchers at the University of Kansas have made it possible to analyze surface waves using many shot points and geophones. This is referred to as multichannel analysis of surface waves (MASW). Surface wave data are gathered in much the same way as high resolution seismic reflection data. Seismic energy generated by vertical impacts on the ground surface is detected by an array of closely spaced geophones (spread). The energy source and the geophones are sequentially moved along a profile as the survey progresses.

The data gathered from each shot point are analyzed to determine the variation in surface wave velocity versus frequency (dispersion curve). Computer software then invert the dispersion curve to determine the variation in S-wave velocity versus depth. The data gathered from multiple shot points and geophone locations can be collated to produce a two-dimensional (2D) cross-section showing the variation in Vs with depth and distance beneath a line.

2.0 DATA ACQUISITION

Prior to data collection, we distributed 48 geophones at 7-ft intervals in collinear arrays along the two geophysical traverses. We used Oyo ***Geospace*** geophones with a natural frequency of 8-Hz. These were coupled to the ground surface by a metal spike affixed to the bottom of each

geophone case. The geophone separation, number of geophones and total array length were determined according to the desired resolution, the desired depth of investigation and the available access. Seismic energy was produced by multiple impacts with an ATV-mounted 100-lb accelerated weight drop, or a 16-pound sledgehammer, against an aluminum strike plate placed on the ground surface. For each traverse, we began the data acquisition with the shot point positioned two geophone-spacings (14-ft) from the first geophone and produced seismic energy with geophones 1-24 active. We then moved the shot point to the position of the first geophone and produced seismic energy with geophones 3-26 active. We repeated this procedure, moving along the line at two-geophone intervals (10- to 12-ft), until the shot point was adjacent to geophone number 23 and geophones 25-48 were active. This resulted in numerous MASW soundings along MASW-1 and MASW-2.

The seismic waveforms produced at each shot point were recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph in combination with an Input/Output ***Rotalong*** switch (Roll Box). This device enabled us to activate any contiguous 24-geophones with the 48-geophone array for each recording (e.g. 1-24, 2-25, 25-48, etc.). The recorded data were archived for subsequent processing and displayed on the computer screen in the form of seismograms for quality assurance purposes. The ***Geode*** and Roll Box are shown in Figure 1.

Figure 1: *Geode (left) and Rota-Long-Switch (right).*

3.0 DATA ANALYSIS

The MASW data were processed using the software package ***SurfSeis 5.0*** which was developed by the Kansas Geological Survey. Using this software, the data from each recording station were processed to develop dispersion curves indicating the variation in surface wave velocity as a function of frequency. These dispersion curves were then inverted to compute one-dimensional (1D) models indicating Vs as a function of depth. The software then collated the 1D models to produce a 2D cross-section representing Vs as a function of depth and distance beneath the seismic line, as shown on Plates 2-3.

By convention, the MASW technique defines the location of each 1D model as being coincident with the center of a geophone array. Consequently, MASW profiles do not have corresponding Vs data near the beginning and the end of the traverses. With a typical profile composed of multiple 24-geophone arrays, this equates to the first and last 12 geophones of the traverse. In other words, there is a minimum absence of data 84-ft (12 geophones) off both ends of the MASW profiles. This explains why MASW-2 could not extend northeast to Collector 2.

4.0 LIMITATIONS

The MASW technique works best in materials that produce high-amplitude ground roll and significant dispersion between the body (P- and S-) waves and surface waves. Consequently, low velocity surface materials such as sediments tend to provide higher quality MASW data than regions with shallow or exposed bedrock.

APPENDIX B:

Seismic Refraction

APPENDIX B:

Seismic Refraction

1.0 METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional (P) wave seismic energy at the surface. The P-waves propagate into the earth and are refracted along interfaces caused by a uniform, continuous, downward increase in velocity. A portion of the P-wave energy is typically refracted to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances and elevation data to determine the depth, thickness, and P-wave velocity (Vp) of subsurface seismic layers.

2.0 DATA ACQUISITION

We collected SR data along two lines designated as Line SR-1 and SR-2, as shown by the red lines on Plate 1. GHD personnel determined the location and orientation of each line. However, in some cases it was necessary to adjust these parameters to accommodate site access. We acquired the SR data using 24-geophones and 7-shot points distributed in a collinear array (spread). The geophones were distributed at 20-ft intervals. The shot-points were placed 20-ft off each end of the geophone arrays, in the center of the geophone array and multiple points in between. This resulted in spreads with total lengths (end shot point to end shot point) of 500-ft.

3.0 INSTRUMENTATION

The seismic waveforms produced at each shot point were recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph, as pictured in Figure 1, and Oyo ***Geospace*** geophones with a natural frequency of 8 Hz. The geophones were coupled to the ground surface by a metal spike affixed to the bottom of each geophone case. Seismic energy was produced at each shot point by multiple impacts with a ATV-mounted 100-pound accelerated weight drop, or a 16-pound sledge hammer, against a metal strike plate placed on the ground surface. The seismic waveforms were digitized, processed and amplified by the Geode, transmitted via a ruggedized Ethernet cable to a field computer and algebraically summed (stacked) until sufficient signal to noise ratio was achieved. The data were displayed on the computer's LCD screen in the form of seismograms, analyzed for quality assurance and archived for subsequent processing. These images were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in the array.

Figure 1: *Geometrics Geode 24-channel engineering distributed array seismograph with 12-volt battery power source.*

4.0 DATA ANALYSIS

The seismic refraction data were processed using the software package ***SeisImager,*** written by Oyo Corporation (Japan) and distributed by Geometrics Inc. This package consists of two programs titled ***Pickwin,*** Version 5.2.1.3 (2016) and ***Plotrefa,*** Version 3.1.0.5 (2016). For each seismic line we used ***Pickwin*** to view the seismic records and identify first arriving P-wave energy at each geophone and to determine the shot point to geophone travel time associated with each arrival. We then used ***Plotrefa*** to assign elevations to each geophone and to plot the shot point to geophone travel times versus their distance (Station) along the line. A sample Time versus Distance (T-D) graph is shown in Figure 2. After examining the T-D graph we assigned velocity layers (1-3) to each travel time and then computed a 2D model using ***Plotrefa's*** time-term routine. This resulted in a 2D layered cross-section (profile) illustrating Vp versus depth and distance. A sample 2D time-term model is shown in Figure 3.

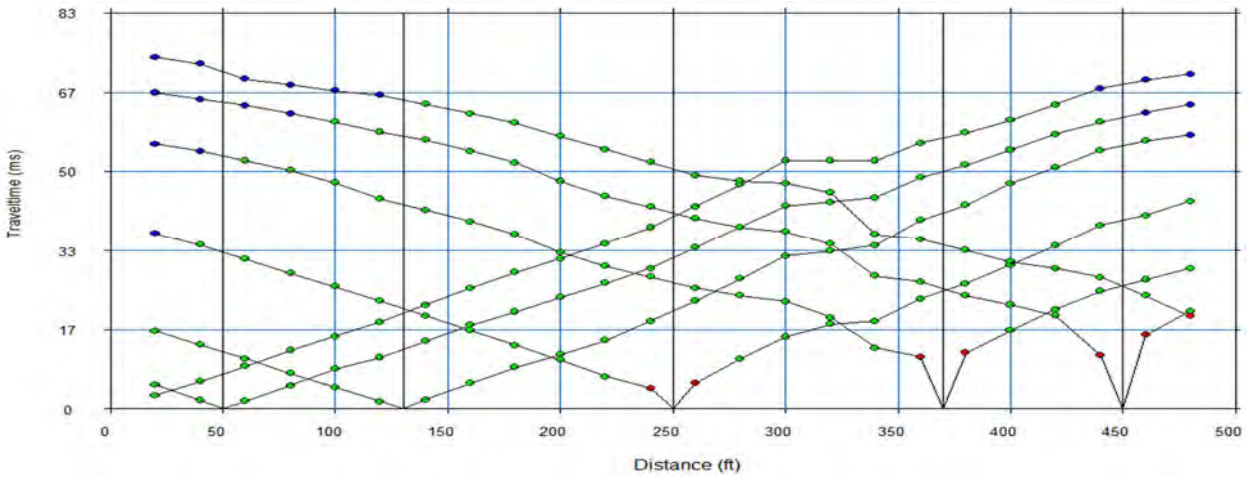


Figure 2*: SR-1 Time-Distance Graph. Red circles represent layer 1 (V1), green circles represent V2 and blue circles represent V3.*

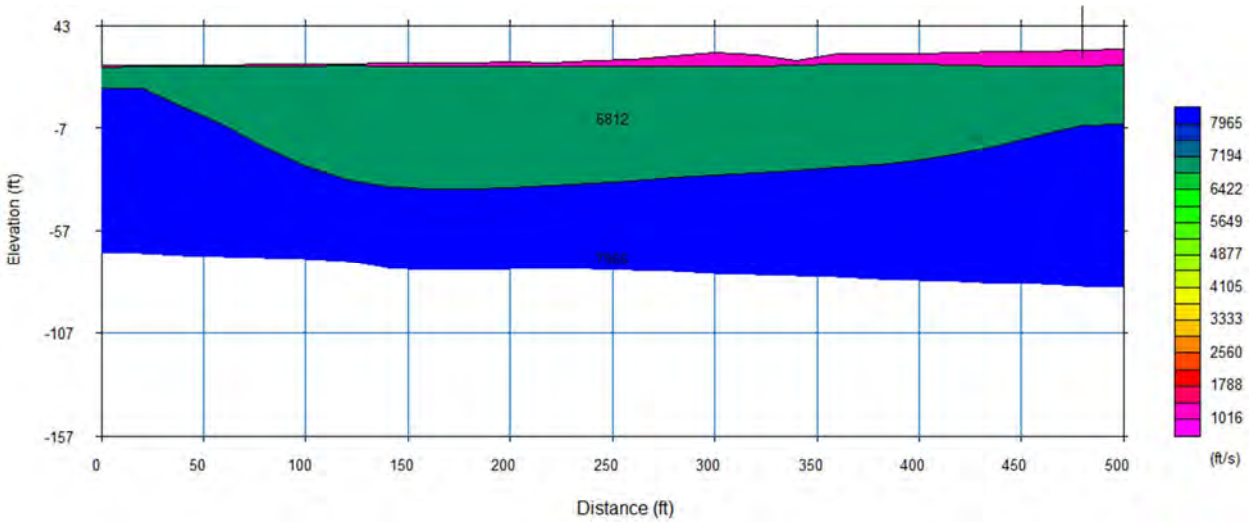


Figure 3: *SR-1 Time-Term Seismic Velocity Model. Velocities are labeled and indicated by the color bar on the right.*

Finally, we used the time term model as input to ***Plotrefa's*** tomographic routine. This routine divided the input model into cells according to the geophone spacing and depth range and assigned a velocity to each cell. It then used a ray tracing routine to compute synthetic travel times through the model from each shot point to every geophone. The synthetic travel times were compared with the observed travel times to determine the goodness of fit. If the fit was not within certain assigned parameters, the program then adjusted the velocity in each cell and reran the ray tracing. This procedure was repeated through as many as 20 iterations to achieve the optimum fit between observed and synthetic travel times.

Once the tomographic processing was complete, we used the computer program ***Surfer 16 (2019)*** by Golden Software to construct a color contoured 2D cross-section (profile) illustrating the results for each seismic line, as shown on Plates 2-3.

5.0 INTERPRETATION

The SR profiles described above are models of the subsurface based on P-wave velocities. How these velocities and their subsurface distribution relate to geology is a matter of interpretation. This interpretation can be based on experience and a general knowledge of the local geology. However, the best results are achieved when the models can be correlated with subsurface information provided by other means such as onsite observations, borehole geological and/or geophysical logs, trench logs or projections based on mapped surface geology. This type of information is referred to as "ground truth".

In any case, the resulting seismic velocity profile represents a model of the subsurface that must be interpreted by the best means available. Thus, the interpreted profile is conceptual in nature, and is not expected to represent an exact depiction of the subsurface.

6.0 LIMITATIONS

Based on the physical properties of refraction (Snell's Law), for a seismic wave to be refracted toward the surface, the seismic interface must represent a significant downward increase in seismic velocity. When the opposite is true, often referred to as a velocity inversion, the seismic energy will be refracted downward and the lower layer will not be detected at the surface. As a result, the calculated depths of any deeper higher velocity layers may be over-estimated. Furthermore, some layers may be truncated, or too thin to detect. These are referred to as "hidden layers".

If the seismic source used for the survey does not produce sufficient energy to propagate through the entire spread at detectable levels, the first arriving P-waves at each geophone may not be visible on the seismic records. Additionally, extraneous seismic energy sources such as wind, traffic or nearby machinery may create "noise" on the recorded waveforms that may mask the first arrivals.

In noisy conditions many repeated impacts, or "stacks", may be necessary to achieve an acceptable signal to noise ratio. Stacking consists of algebraically summing waveforms from repeated impacts. This causes the repeatable portion of the signal to be enhanced while the random, non-repeatable portion ("noise") tends to cancel out.

Another common external noise source is overhead power lines. If the cable is laid out parallel to the lines, electrical noise may be induced in the cable. Possible internal noise sources may include, but are not limited to, faulty geophone connections due to dirt or moisture, or use of an unsuppressed power supply.

Finally, seismic refraction processing algorithms are based on the assumption that the seismic velocity layers are isotropic. That is, that the velocity is uniform within the length and breadth of each layer. Another assumption is that the velocity distribution does not change in a direction transverse to the seismic line. In other words, that there is true 2D symmetry. If these conditions are not met, the actual subsurface conditions will vary from those represented by the seismic model.

APPENDIX C:

Electrical Resistivity Profiling

APPENDIX C:
Electrical Resistivity Profiling

1.0 METHODOLOGY

1.1 DEFINITION AND APPLICATIONS

Electrical resistivity (ER) is the resistance of a volume of material to the flow of electrical current. The ER method is often used to measure the variation in ER with depth beneath a fixed point (1D), beneath a transect (2D) or beneath a rectangular grid (3D). This information can be valuable in determining stratigraphic and lithologic variations and other subsurface conditions that may relate to the depth and thickness of groundwater aquifers (permeable layers), the thickness of landfills, fault detection and, in some cases, the depth to bedrock.

1.2 ELECTRICAL RESISTIVITY PROFILING

There are many electrode configurations (arrays) that can be used to measure ER beneath a transect (line). These methods are commonly referred to as Electrical Resistivity Profiling (ERP). For this survey, we used one of the most commonly used electrode configurations, the dipole-dipole array. In its simplest form, this consists of four electrodes distributed at even intervals in a collinear fashion. For each reading, electrical current (***I***) is input to the ground through one pair of electrodes (transmitter dipole) and the resulting potential drop (***V***) is measured across a second pair of electrodes (receiver dipole). The separation between electrodes (***a***) is the same for both dipoles and the separation between dipoles is always a multiple (***n***) of that distance. A simplified diagram of the dipole-dipole array is shown in Figure 1.

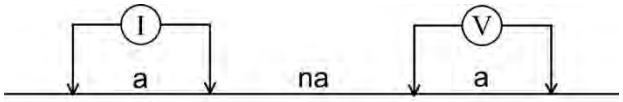


Figure 1: *Dipole-Dipole Array Diagram*

The values measured using this configuration are termed “apparent” resistivity (ρa) because they represent the resistance to the flow of electricity of a volume of material rather than a discrete layer. With the dipole-dipole array, apparent resistivity is calculated according to the following equation:

$$\rho_A = \frac{V}{I} \pi a n(n+1)(n+2).$$

Moving the array along a line and measuring ρa at even intervals (multiples of ***a***) results in a data set that can be used to construct a cross-section (profile) depicting variations in ER versus depth and distance. The depth of investigation of the profile can be increased by increasing both ***a*** and ***n*** by even multiples of ***a.***

Modern geophysical instrumentation makes it possible to collect dipole-dipole data using a large number of closely spaced electrodes and a wide range of ***a*** and ***n*** values. An example of how dipole-dipole data are obtained in this manner is illustrated by the three dipole-dipole diagrams shown in Figure 2. The rectangles at the top of each diagram represent electrode locations (42 in this case). The red and blue rectangles represent the electrodes used for the transmitter dipole for a particular set of measurements. The green rectangles represent the electrodes used for multiple receiver dipoles for that set of measurements. The dark blue circles represent the data points obtained when the dipole length (***l***) is equal to the electrode separation (***a***), the red circles represent data points obtained when ***l*** is equal to 2***a*** and the light blue circles represent the data points obtained when ***l*** is equal to 3***a***. In each diagram, the farthest right (diagonal) column of circles represents data points obtained from the active (colored) dipoles shown at the top of the diagram. Note how the matrix of data points is being filled-in from left to right and top to bottom with each successive diagram. Note also that as the dipole length and spacing increases the depth of investigation also increases but with a corresponding decrease in resolution.

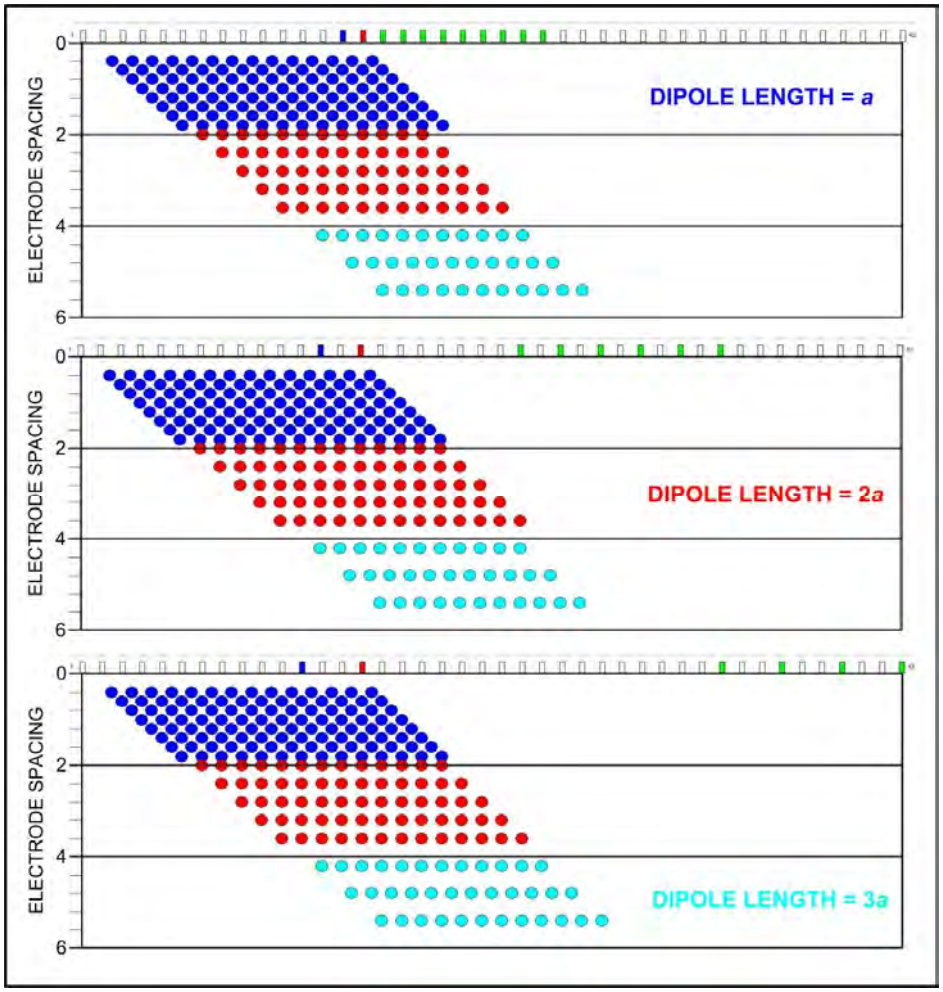


Figure 2: *Dipole-dipole diagrams for dipole lengths of 1, 2, and 3 times the electrode separation (a).*

2.0 DATA ACQUISITION

We collected ERP data using a variation of the dipole-dipole array shown above. A total of 56 stainless steel stakes (electrodes) were distributed along each resistivity traverse at 8-ft intervals. This resulted in total array lengths of 440-ft. At each electrode station, the 10-inch long electrode was driven into the ground and attached to the appropriate connector (take-out) on a multi-conductor cable that was, in turn, connected to the ER instrumentation (Section 3.0). The lines were designated Lines ER-1 and ER-2, as depicted by the two blue lines shown on Plate 1. The location and orientation of the ER lines were determined by GHD and site accessibility.

We collected the ERP data using a ***SuperSting R8*** manufactured by Advanced Geosciences, Inc. of Austin, TX. This is a micro-processor controlled instrument that transmits current at outputs ranging from 1 to 2,000 milliamps (mA). The instrument measures the potential drop (voltage) caused by the current influx and converts the data to values of apparent resistivity (ρa). A command file programmed into the instrument directs the switch box to activate certain electrodes for each reading according to the selected electrode configuration and many other parameters that are determined by the operator. The resulting data are stored in the instruments internal memory and can be downloaded to a computer for subsequent processing and archival. A photograph of the instrumentation is shown in Figure 3.

Figure 3: *SuperSting R8 (yellow box), two 56-electrode switch boxes (black), WiFi tablet (foreground) and two communication cables on reels.*

3.0 DATA PROCESSING

Once data acquisition was complete, we downloaded the ER data from the ***SuperSting R8*** to a computer using the computer program ***AGISSADMIN*** by AGI. The data were archived and then inverted using the computer software ***EarthImager 2D,*** also by AGI.

The resistivity data inversion proceeded as follows:

1) A starting resistivity model was constructed based on the apparent resistivity (ρa) distribution.

2) A virtual survey (forward modeling) was carried out for a predicted data set over the starting model and the initial root mean squared (RMS) error at the zero-th iteration was calculated.

3) A linearized inverse problem was solved based on the current model and data misfit for a model update ($\Delta\mathbf{m}$).

4) The resistivity model was updated using the formula: $\boldsymbol{m}_{i+1} = \mathbf{m}_i + \Delta\mathbf{m}$, where **m** consists of electrical conductivity of all model blocks in the finite element mesh and *i* is the iteration number.

5) A forward model (virtual survey) was run based on the updated model for an updated predicted data set.

6) A new RMS was calculated for the error between the predicted data and the measured data.

7) Steps (3) to (6) were repeated until the programmed stop criteria were satisfied, at which point the inversion was stopped.

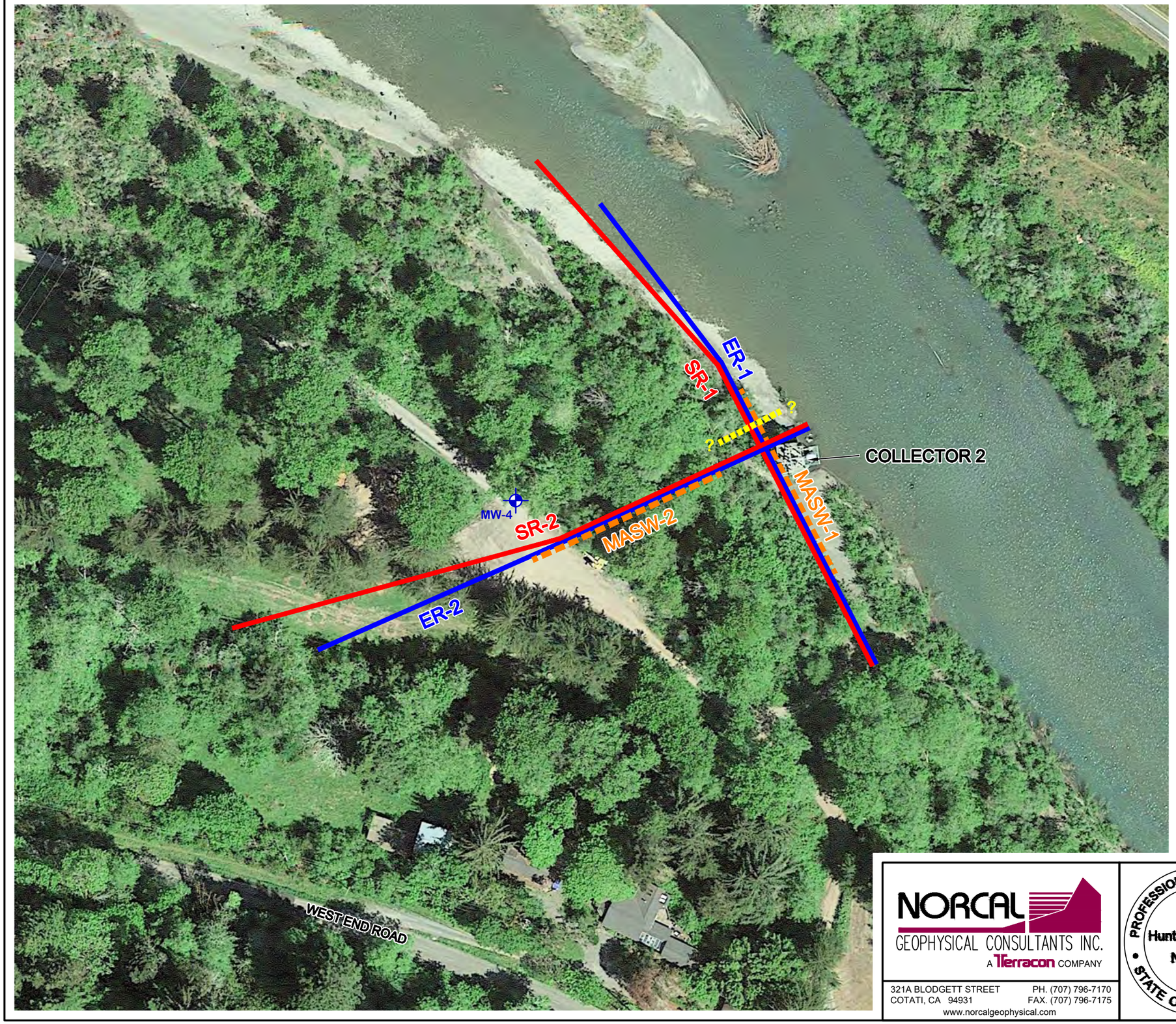
Following each run of the inversion routine we reviewed the inversion diagrams produced by the software (not shown) to determine the degree of fit. If the RMS was considered to be too high, we would use routines included in ***EarthImager*** to filter the data by removing noisy data points. Typically, we removed no more than 10% at a time. We would then rerun the inversion process. This procedure was continued until an inverted model with acceptably low RMS was produced.

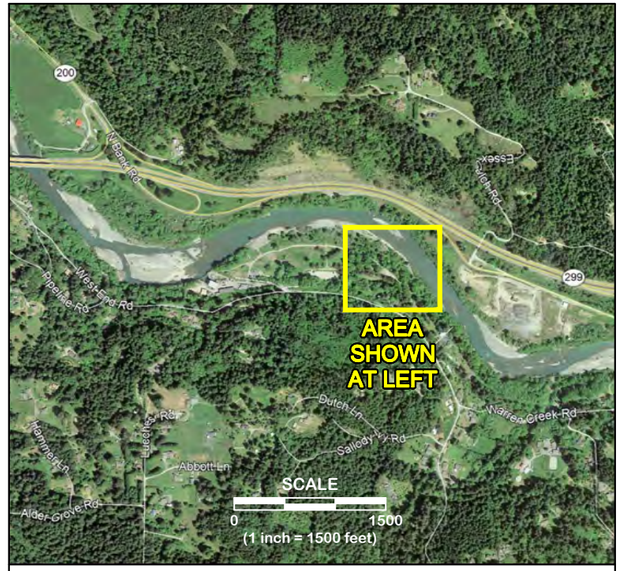
4.0 ELECTRICAL RESISTIVITY PROFILE

We used the computer program ***Surfer 16.0***, by Golden Software, to grid and contour the (x,y,z) data output by ***EarthImager 2D***. This resulted in a color contoured electrical resistivity cross-section (profile) depicting the variation in electrical resistivity versus depth and distance beneath the ER line. The vertical axis of the profile represents elevation in feet (above mean sea level) and the horizontal axis represents distance (Station) in feet from the beginning of the line (westernmost end). A color bar shown on the right-hand side of the plate indicates the relation between contour color and electrical resistivity. The electrical resistivity values are contoured on a logarithmic scale.

5.0 LIMITATIONS

A common feature of all electrical methods is that the models derived from the electric imaging are not unique. That is, depending on the subsurface geo-electric structure, there may be many models that will produce essentially the same apparent resistivities. This is known as the *principal of equivalence*. To overcome this limitation, computer software programs include routines for evaluating the equivalence of a given model relative to the observed resistivity values, resulting in a model that provides the closest fit to the observed data. Another limitation is about the surface conditions. If the ground surface is too resistive, the system may have problems transmitting sufficient electrical current into the subsurface to obtain reliable measurements. This situation can be remedied through the application of salt water at the base of each electrode. Conversely, if the ground surface is highly conductive, the potentials measured become negligible, resulting in a very low signal-to-noise ratio and therefore unreliable data.





VICINITY MAP

SCALE
0 40 80 160
(1 inch = 80 feet)

LEGEND

	SEISMIC REFRACTION LINE
	ELECTRICAL RESISTIVITY LINE
	MASW LINE
	SUSPECTED FAULT
	MONITORING WELL

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PROFESSIONAL GEOPHYSICIST
Hunter S. Philson
No. 1094
STATE OF CALIFORNIA

SITE LOCATION MAP
GEOPHYSICAL SURVEY
HBMWD COLLECTOR 2

LOCATION: MAD RIVER, ARCATA, CALIFORNIA

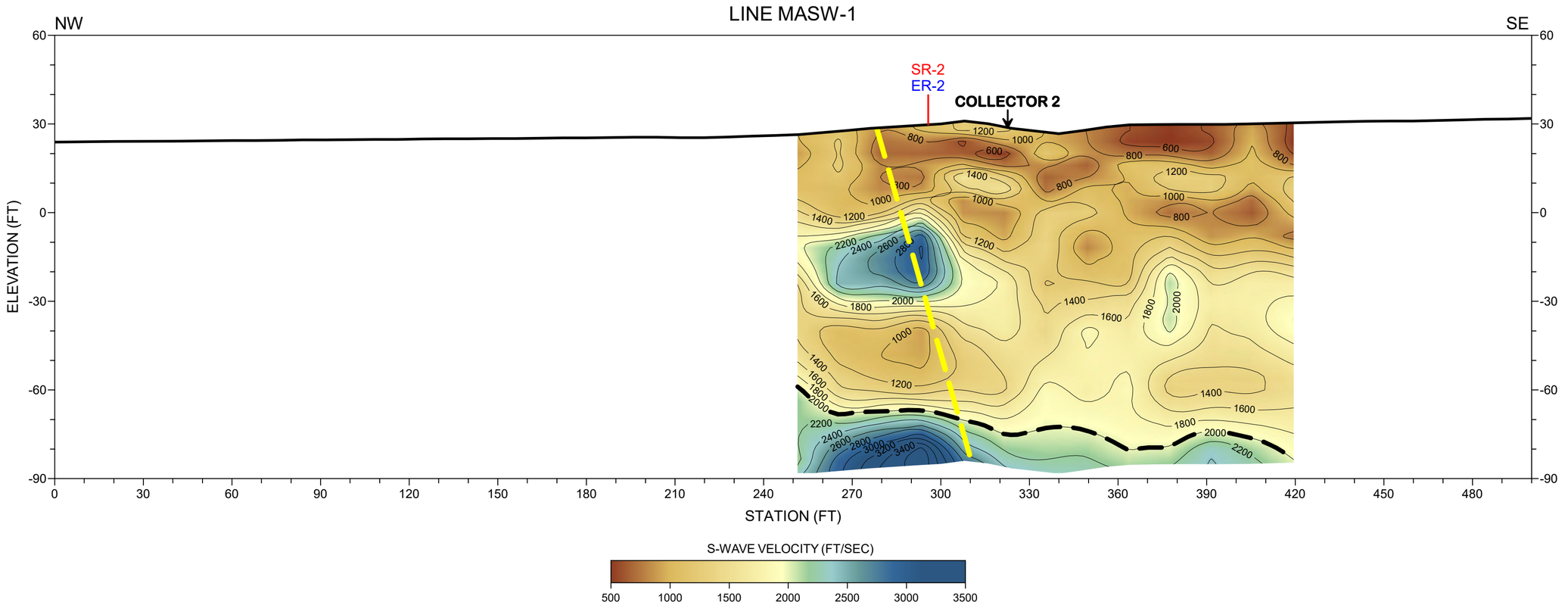
CLIENT: GHD

JOB #. NS205099 | DATE: NOVEMBER 2020 | PLATE 1

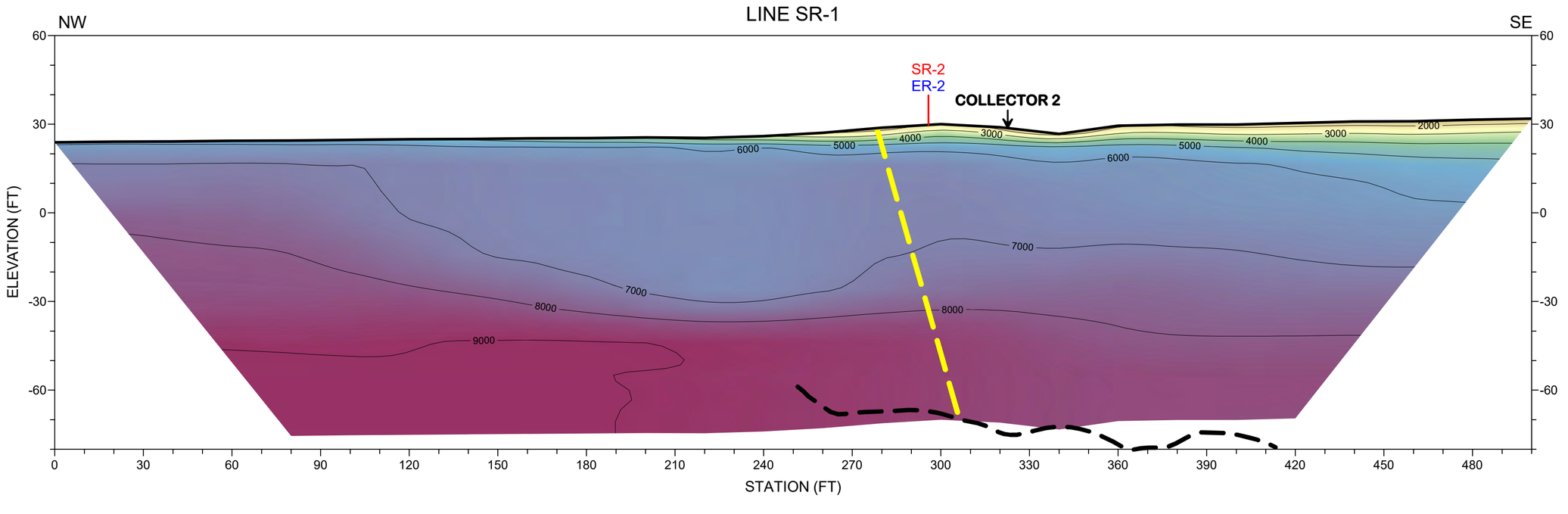
DRAWN BY: G.RANDALL | APPROVED BY: HSP

Hunter Philson 11/20/2020

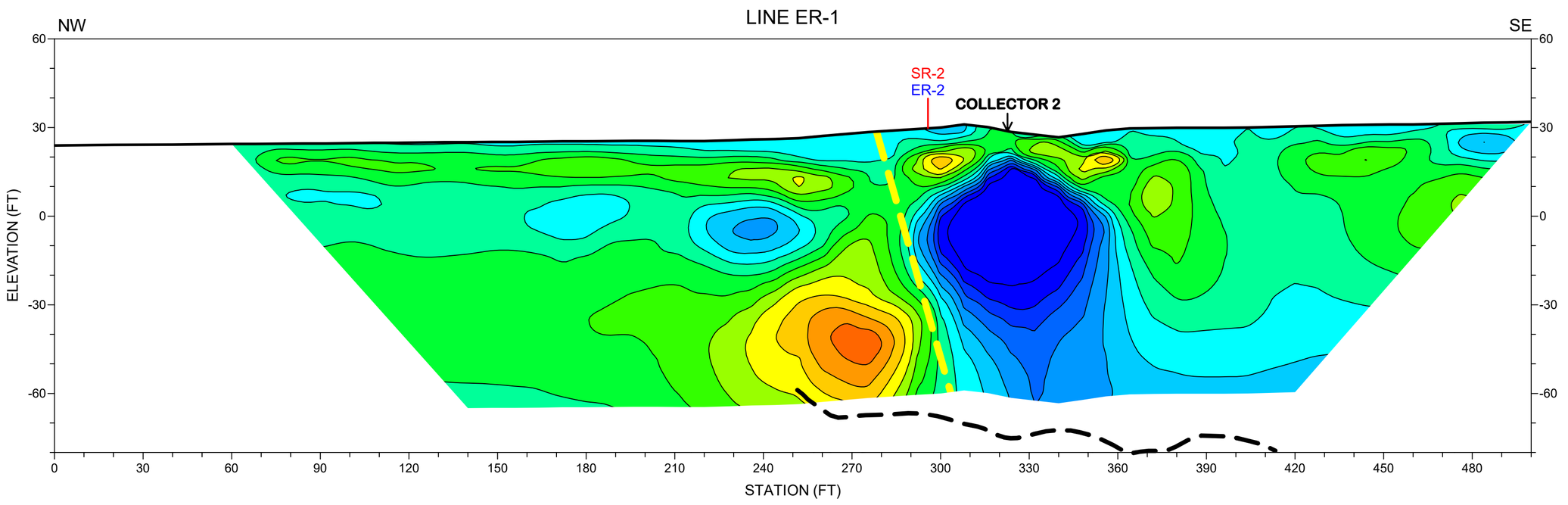
LINE MASW-1



LINE SR-1



LINE ER-1



LEGEND	
———	GROUND SURFACE
— — —	INTERPRETED DEPTH TO BEDROCK (BASED ON MASW PROFILE)
— — —	SUSPECTED FAULT

SCALE
0 30 60
(1 inch = 30 feet)

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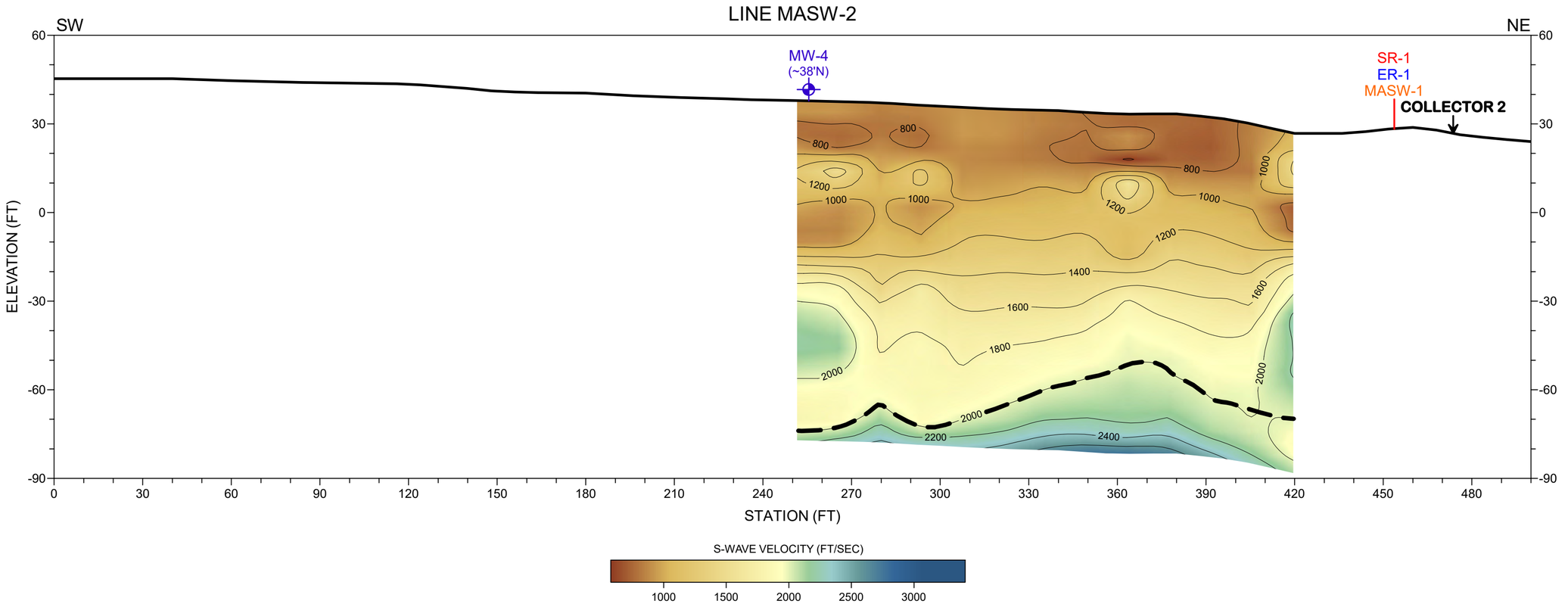
No. 1094
STATE OF CALIFORNIA

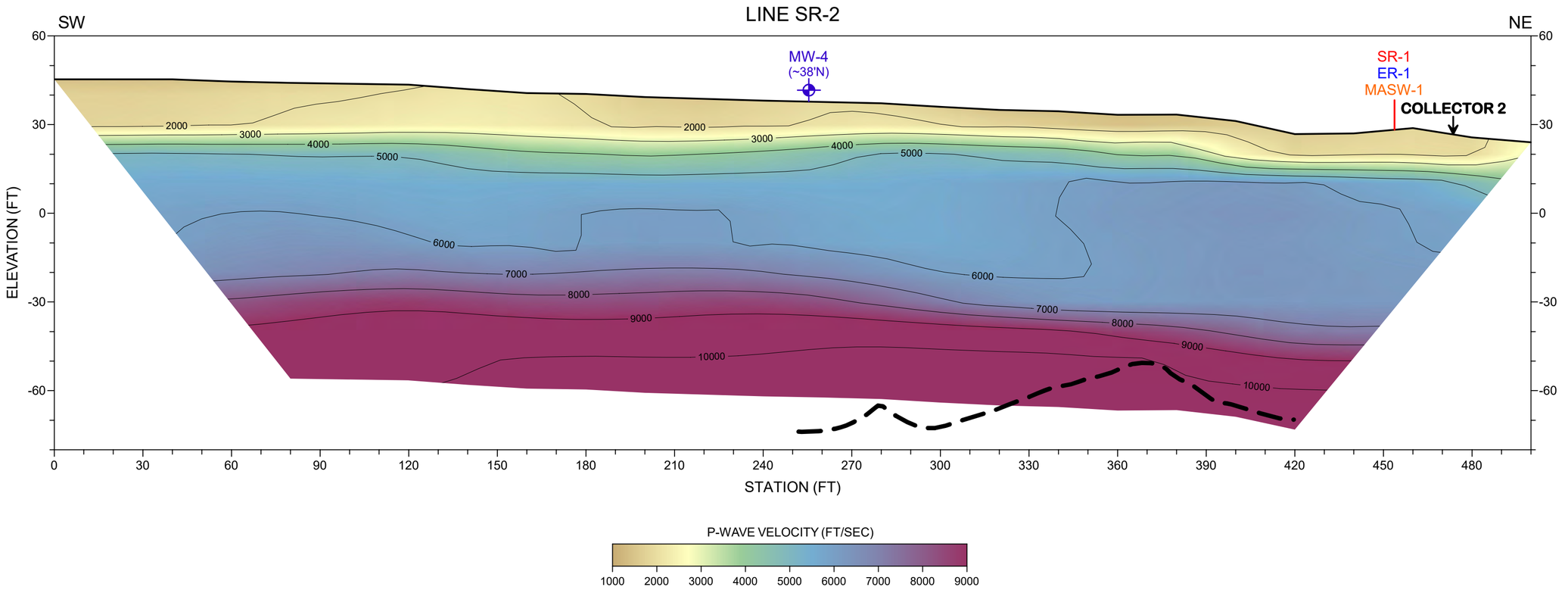
GEOPHYSICAL PROFILES LINES SR-1, MASW-1, ER-1 HBMWD COLLECTOR 2

LOCATION: MAD RIVER, ARCATA, CALIFORNIA
CLIENT: GHD
JOB #: NS205099 | DATE: NOVEMBER 2020 | PLATE 2
DRAWN BY: G.RANDALL | APPROVED BY: HSP
11/20/2020

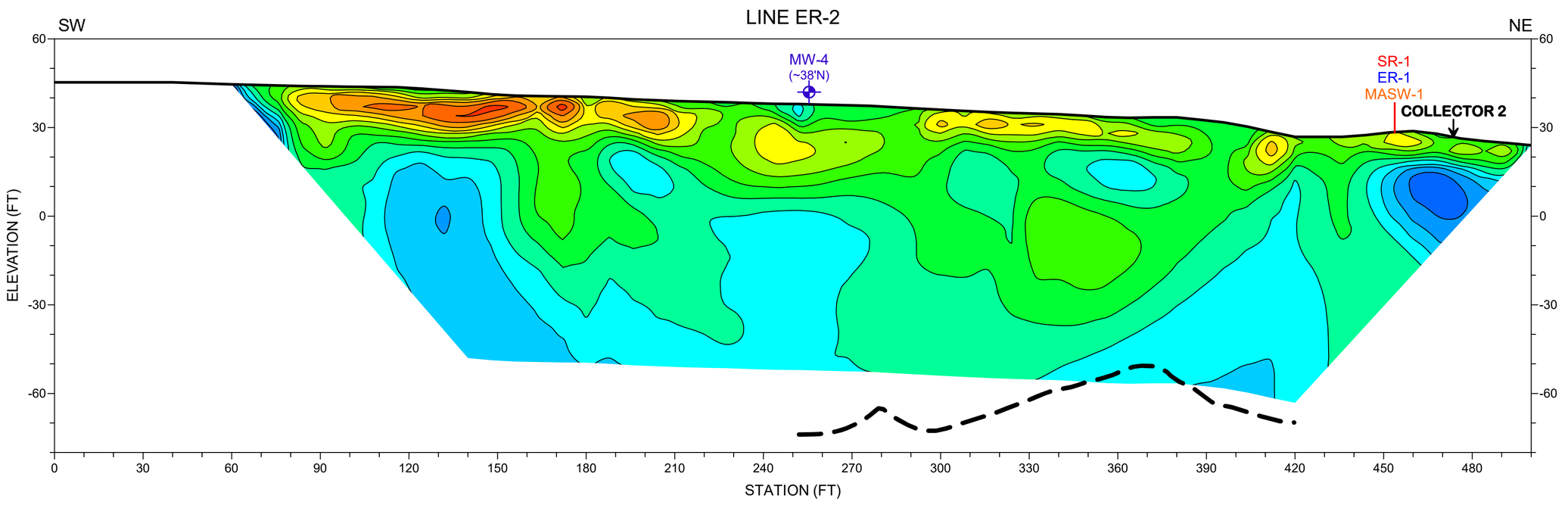
LINE MASW-2



LINE SR-2



LINE ER-2



LEGEND	
———	GROUND SURFACE
– – –	INTERPRETED DEPTH TO BEDROCK (BASED ON MASW PROFILE)
⊕	MONITORING WELL

SCALE
0 30 60
(1 inch = 30 feet)

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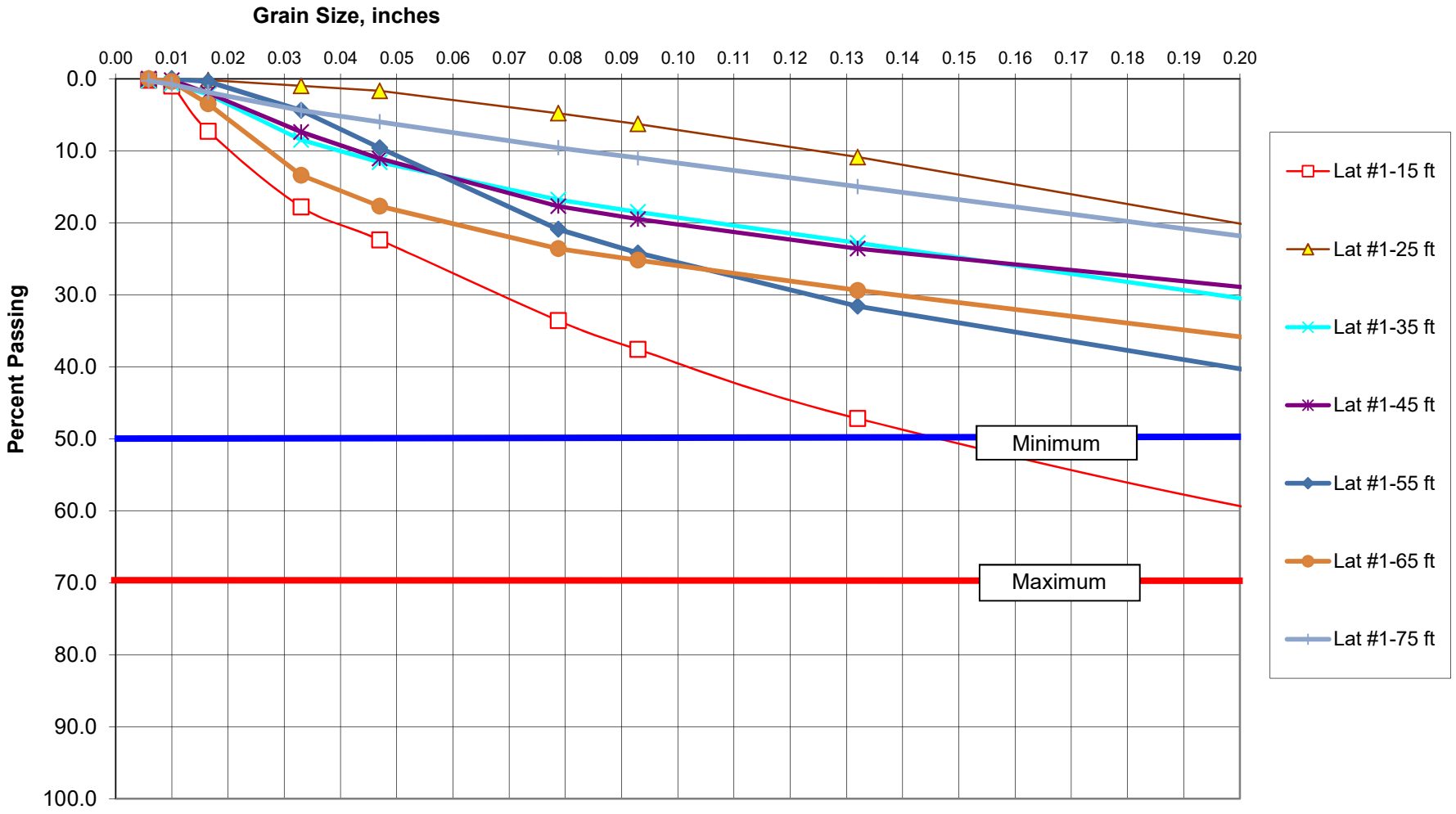
GEOPHYSICAL PROFILES
LINES SR-2, MASW-2, ER-2
HBMWD COLLECTOR 2

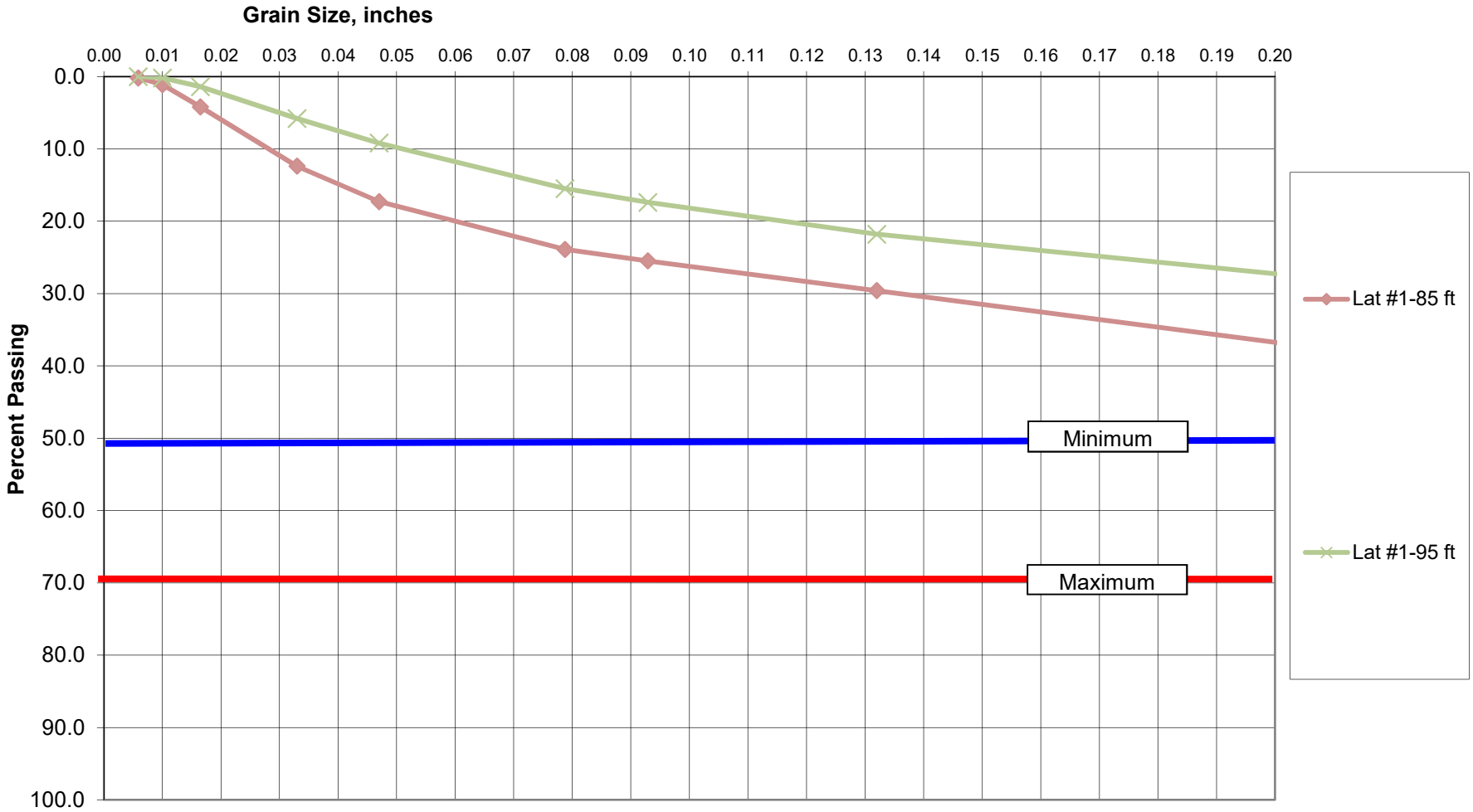
LOCATION: MAD RIVER, ARCATA, CALIFORNIA
CLIENT: GHD
JOB #: NS205099 | DATE: NOVEMBER 2020 | PLATE 3
DRAWN BY: G.RANDALL | APPROVED BY: HSP
11/20/2020

APPENDIX C – COLLECTOR 1/1A AND COLLECTOR 3 SIEVE ANALYSES

Sieve Analyses-Collector Well
Radial Collector Well No. 1
HBMWD - Arcata, CA
Lateral #C1



Sieve Analyses-Collector Well
Radial Collector Well No. 1
HBMWD - Arcata, CA
Lateral #C1



Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 1
Interval: 15 **Feet** **Pipe No. :** 3

Initial Wt. 1276 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	232	232	18.3%	81.7%
3.5	5.600	0.223	244	476	37.6%	62.4%
6	3.353	0.132	193	669	52.8%	47.2%
8	2.360	0.094	121	790	62.4%	37.6%
10	1.999	0.079	51	841	66.4%	33.6%
16	1.194	0.047	141	982	77.6%	22.4%
20	0.838	0.033	59	1041	82.2%	17.8%
40	0.419	0.017	133	1174	92.7%	7.3%
60	0.254	0.010	79	1253	99.0%	1.0%
100	0.150	0.006	10	1263	99.8%	0.2%
Pan			3	1266	100.0%	0.0%
		Total	1266	grams		
		Difference	10	0.8%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 1
Interval: 25 **Feet** **Pipe No. :** 5

Initial Wt. 1760 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	861	861	50.6%	49.4%
3.5	5.600	0.223	450	1311	77.1%	22.9%
6	3.353	0.132	204	1515	89.1%	10.9%
8	2.360	0.094	78	1593	93.7%	6.3%
10	1.999	0.079	27	1620	95.2%	4.8%
16	1.194	0.047	52	1672	98.3%	1.7%
20	0.838	0.033	12	1684	99.0%	1.0%
40	0.419	0.017	14	1698	99.8%	0.2%
60	0.254	0.010	3	1701	100.0%	0.0%
100	0.150	0.006	0	1701	100.0%	0.0%
Pan			0	1701	100.0%	0.0%
		Total	1701	grams		
		Difference	59	3.4%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 1
Interval: 35 **Feet** **Pipe No. :** 7

Initial Wt. 1933 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	956	956	49.9%	50.1%
3.5	5.600	0.223	331	1287	67.2%	32.8%
6	3.353	0.132	192	1479	77.2%	22.8%
8	2.360	0.094	82	1561	81.5%	18.5%
10	1.999	0.079	33	1594	83.2%	16.8%
16	1.194	0.047	99	1693	88.4%	11.6%
20	0.838	0.033	60	1753	91.5%	8.5%
40	0.419	0.017	120	1873	97.8%	2.2%
60	0.254	0.010	28	1901	99.3%	0.7%
100	0.150	0.006	9	1910	99.7%	0.3%
Pan			5	1915	100.0%	0.0%
		Total	1915	grams		
		Difference	18	0.9%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 1
Interval: 45 **Feet** **Pipe No. :** 9

Initial Wt. 2151 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1246	1246	58.4%	41.6%
3.5	5.664	0.223	237	1483	69.5%	30.5%
6	3.353	0.132	149	1632	76.4%	23.6%
8	2.388	0.094	86	1718	80.5%	19.5%
10	1.999	0.079	39	1757	82.3%	17.7%
16	1.194	0.047	141	1898	88.9%	11.1%
20	0.838	0.033	78	1976	92.6%	7.4%
40	0.419	0.017	117	2093	98.0%	2.0%
60	0.254	0.010	38	2131	99.8%	0.2%
100	0.150	0.006	4	2135	100.0%	0.0%
Pan			0	2135	100.0%	0.0%
		Total	2135	grams		
		Difference	16	0.7%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 1
Interval: 55 **Feet** **Pipe No. :** 11

Initial Wt. 2083 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	923	923	44.5%	55.5%
3.5	5.600	0.223	261	1184	57.1%	42.9%
6	3.353	0.132	235	1419	68.4%	31.6%
8	2.360	0.094	154	1573	75.8%	24.2%
10	1.999	0.079	68	1641	79.1%	20.9%
16	1.194	0.047	234	1875	90.4%	9.6%
20	0.838	0.033	108	1983	95.6%	4.4%
40	0.419	0.017	82	2065	99.6%	0.4%
60	0.254	0.010	9	2074	100.0%	0.0%
100	0.150	0.006	0	2074	100.0%	0.0%
Pan			0	2074	100.0%	0.0%
		Total	2074	grams		
		Difference	9	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 1
Interval: 65 **Feet** **Pipe No. :** 13

Initial Wt. 1985 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	969	969	49.4%	50.6%
3.5	5.600	0.223	250	1219	62.2%	37.8%
6	3.353	0.132	166	1385	70.6%	29.4%
8	2.360	0.094	82	1467	74.8%	25.2%
10	1.999	0.079	31	1498	76.4%	23.6%
16	1.194	0.047	115	1613	82.3%	17.7%
20	0.838	0.033	85	1698	86.6%	13.4%
40	0.419	0.017	194	1892	96.5%	3.5%
60	0.254	0.010	62	1954	99.6%	0.4%
100	0.150	0.006	7	1961	100.0%	0.0%
Pan			0	1961	100.0%	0.0%
		Total	1961	grams		
		Difference	24	1.2%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 1
Interval: 75 **Feet** **Pipe No. :** 15

Initial Wt. 1805 grams **26**

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1101	1101	61.2%	38.8%
3.5	5.600	0.223	267	1368	76.1%	23.9%
6	3.353	0.132	161	1529	85.0%	15.0%
8	2.360	0.094	71	1600	89.0%	11.0%
10	1.999	0.079	26	1626	90.4%	9.6%
16	1.194	0.047	65	1691	94.0%	6.0%
20	0.838	0.033	28	1719	95.6%	4.4%
40	0.419	0.017	45	1764	98.1%	1.9%
60	0.254	0.010	19	1783	99.2%	0.8%
100	0.150	0.006	10	1793	99.7%	0.3%
Pan			5	1798	100.0%	0.0%
		Total	1798	grams		
		Difference	7	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 1
Interval: 85 **Feet** **Pipe No. :** 17

Initial Wt. 1798 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	739	739	41.4%	58.6%
3.5	5.600	0.223	352	1091	61.1%	38.9%
6	3.353	0.132	166	1257	70.4%	29.6%
8	2.360	0.094	73	1330	74.5%	25.5%
10	1.999	0.079	29	1359	76.1%	23.9%
16	1.194	0.047	118	1477	82.7%	17.3%
20	0.838	0.033	87	1564	87.6%	12.4%
40	0.419	0.017	147	1711	95.8%	4.2%
60	0.254	0.010	55	1766	98.9%	1.1%
100	0.150	0.006	17	1783	99.8%	0.2%
Pan			3	1786	100.0%	0.0%
		Total	1786	grams		
		Difference	12	0.7%		

Layne Ranney Collector Wells

Sieve Analysis Results

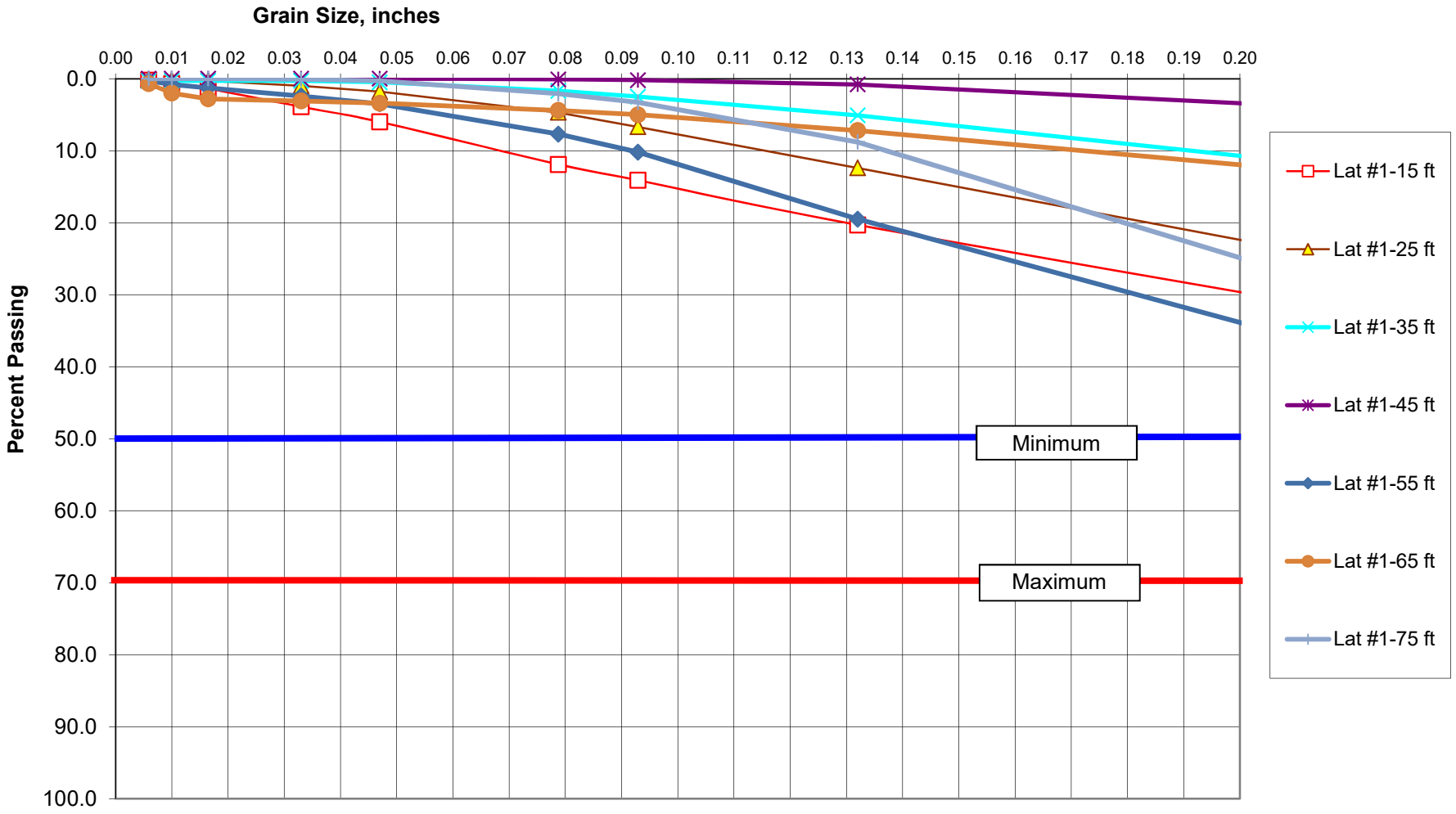
Client:	**HBMWD - Arcata, CA**	**Job No. :**	**39759**
Well ID:	**1**		
Lateral Number:	**1**		
Interval:	**95** **Feet**	**Pipe No. :**	**19**

Initial Wt. 2014 grams

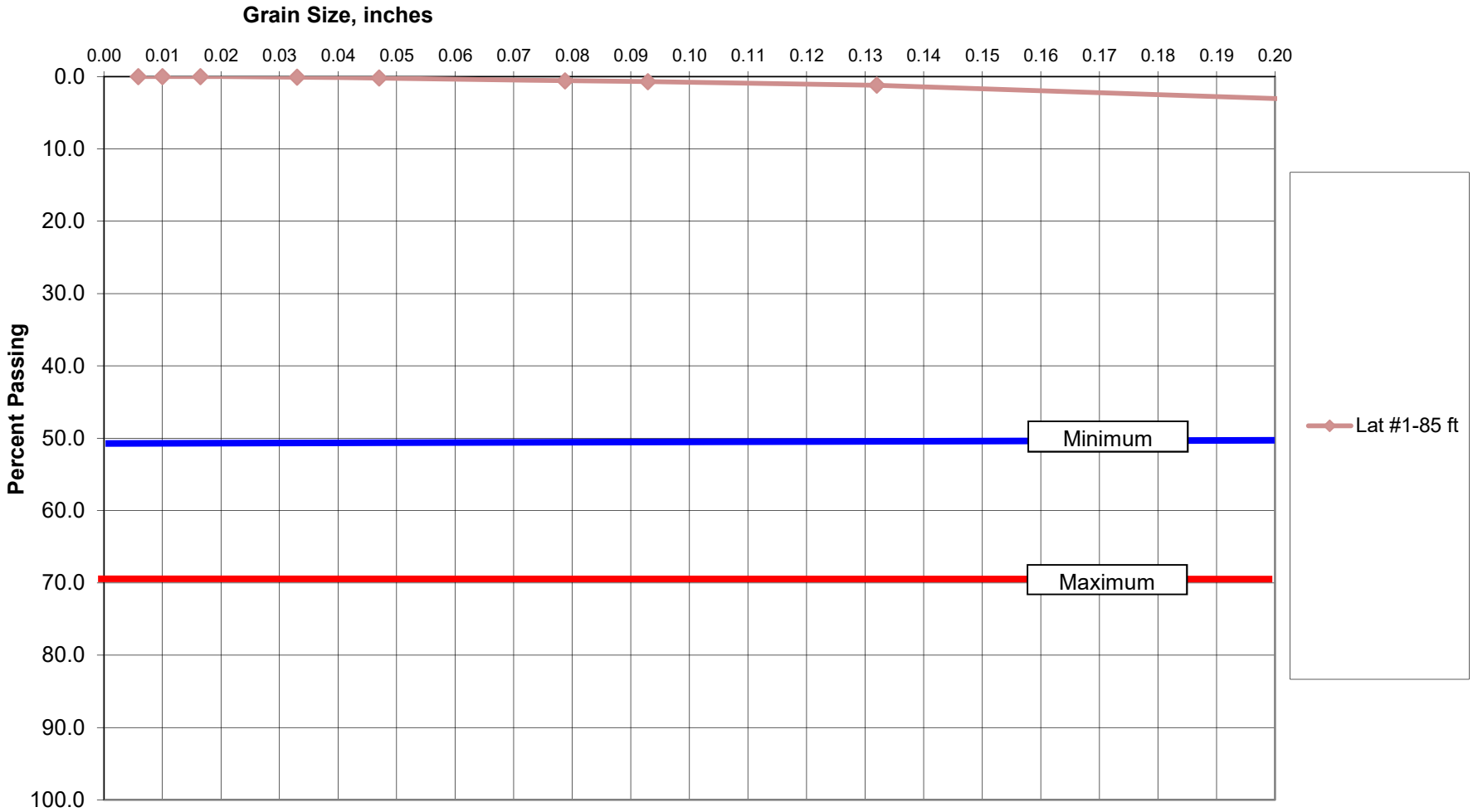
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1227	1227	61.2%	38.8%
3.5	5.600	0.223	199	1426	71.1%	28.9%
6	3.353	0.132	141	1567	78.2%	21.8%
8	2.360	0.094	89	1656	82.6%	17.4%
10	1.999	0.079	39	1695	84.5%	15.5%
16	1.194	0.047	125	1820	90.8%	9.2%
20	0.838	0.033	69	1889	94.2%	5.8%
40	0.419	0.017	88	1977	98.6%	1.4%
60	0.254	0.010	23	2000	99.8%	0.2%
100	0.150	0.006	5	2005	100.0%	0.0%
Pan			0	2005	100.0%	0.0%
		Total	2005	grams		
		Difference	9	0.4%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Radial Collector Well No. 1
HBMWD - Arcata, CA
Lateral #C2



Sieve Analyses-Collector Well
Radial Collector Well No. 1
HBMWD - Arcata, CA
Lateral #C2



Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 2
Interval: 15 **Feet** **Pipe No. :** 3

Initial Wt. 1760 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	825	825	47.0%	53.0%
3.5	5.600	0.223	361	1186	67.6%	32.4%
6	3.353	0.132	213	1399	79.7%	20.3%
8	2.360	0.094	108	1507	85.9%	14.1%
10	1.999	0.079	40	1547	88.1%	11.9%
16	1.194	0.047	102	1649	94.0%	6.0%
20	0.838	0.033	37	1686	96.1%	3.9%
40	0.419	0.017	45	1731	98.6%	1.4%
60	0.254	0.010	12	1743	99.3%	0.7%
100	0.150	0.006	8	1751	99.8%	0.2%
Pan			4	1755	100.0%	0.0%
		Total	1755	grams		
		Difference	5	0.3%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 2
Interval: 25 **Feet** **Pipe No. :** 5

Initial Wt. 1844 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1003	1003	54.5%	45.5%
3.5	5.600	0.223	370	1373	74.6%	25.4%
6	3.353	0.132	239	1612	87.6%	12.4%
8	2.360	0.094	105	1717	93.3%	6.7%
10	1.999	0.079	36	1753	95.3%	4.7%
16	1.194	0.047	53	1806	98.2%	1.8%
20	0.838	0.033	15	1821	99.0%	1.0%
40	0.419	0.017	13	1834	99.7%	0.3%
60	0.254	0.010	3	1837	99.8%	0.2%
100	0.150	0.006	2	1839	99.9%	0.1%
Pan			1	1840	100.0%	0.0%
		Total	1840	grams		
		Difference	4	0.2%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 2
Interval: 35 **Feet** **Pipe No. :** 7

Initial Wt. 1837 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1316	1316	71.7%	28.3%
3.5	5.600	0.223	292	1608	87.6%	12.4%
6	3.353	0.132	135	1743	94.9%	5.1%
8	2.360	0.094	47	1790	97.5%	2.5%
10	1.999	0.079	14	1804	98.3%	1.7%
16	1.194	0.047	22	1826	99.5%	0.5%
20	0.838	0.033	4	1830	99.7%	0.3%
40	0.419	0.017	1	1831	99.7%	0.3%
60	0.254	0.010	0	1831	99.7%	0.3%
100	0.150	0.006	0	1831	99.7%	0.3%
Pan			5	1836	100.0%	0.0%
		Total	1836	grams		
		Difference	1	0.1%		

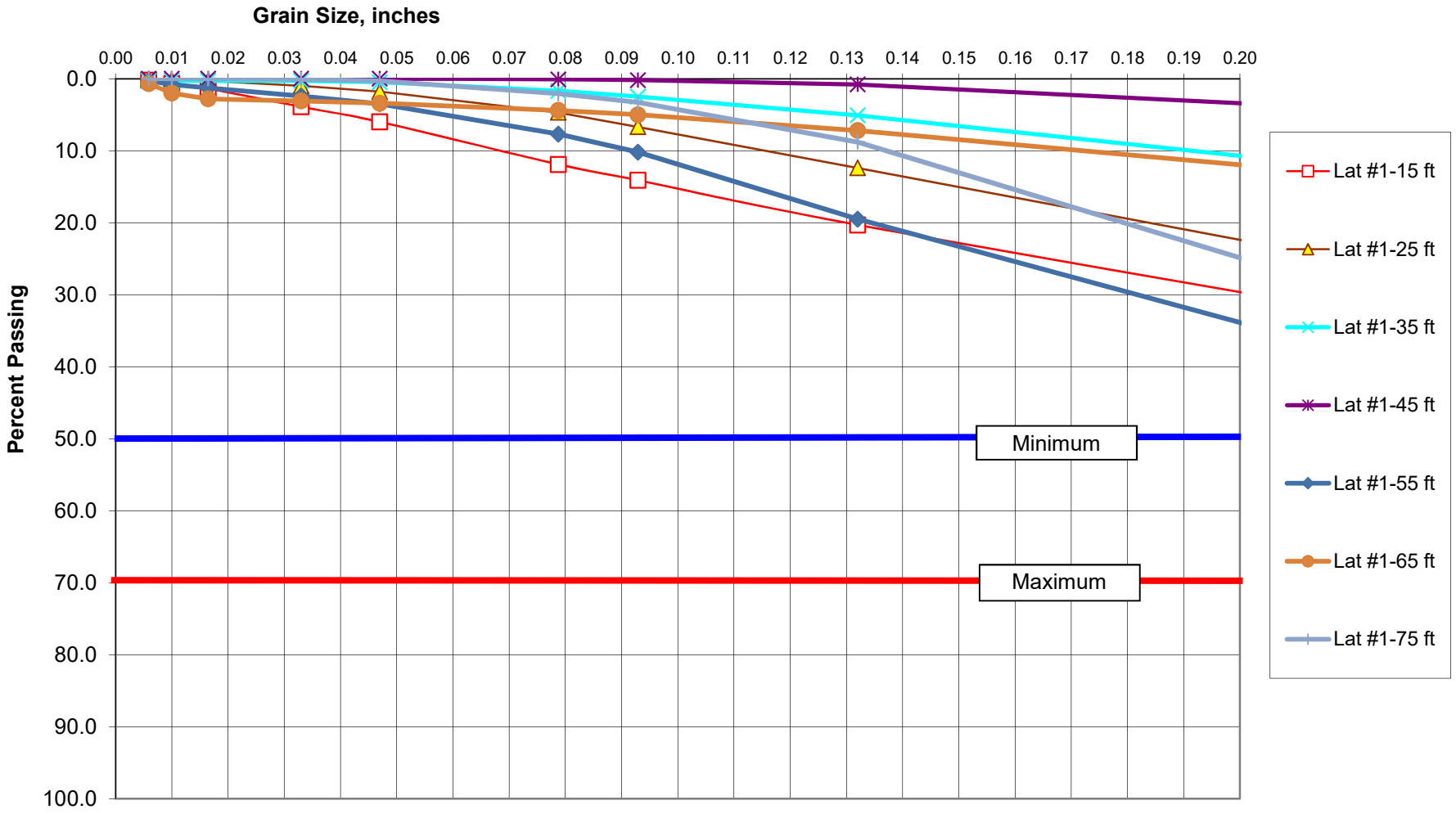
Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 2
Interval: 45 **Feet** **Pipe No. :** 9

Initial Wt. 1753 grams

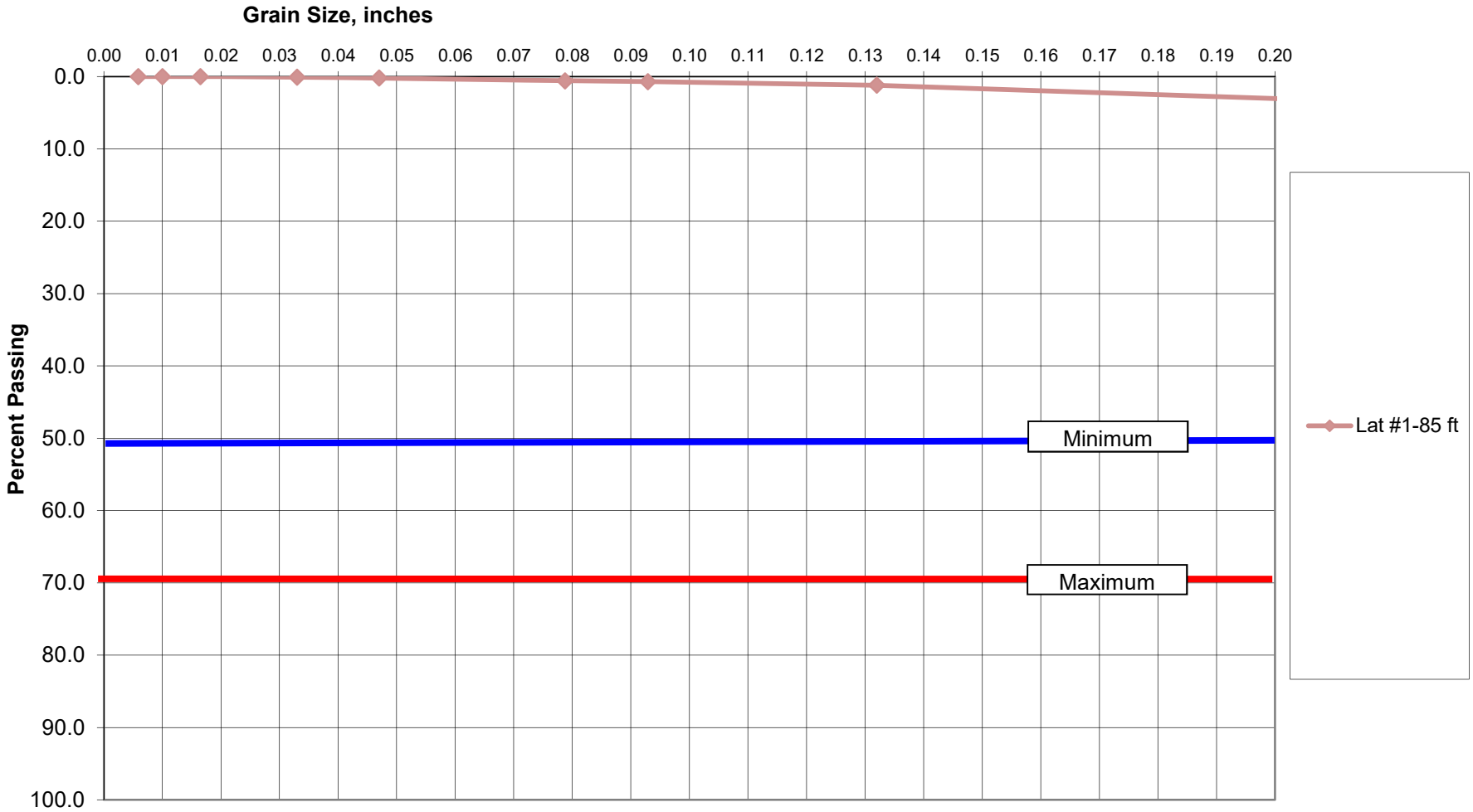
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1395	1395	79.8%	20.2%
3.5	5.664	0.223	280	1675	95.8%	4.2%
6	3.353	0.132	60	1735	99.2%	0.8%
8	2.388	0.094	10	1745	99.8%	0.2%
10	1.999	0.079	2	1747	99.9%	0.1%
16	1.194	0.047	2	1749	100.0%	0.0%
20	0.838	0.033	0	1749	100.0%	0.0%
40	0.419	0.017	0	1749	100.0%	0.0%
60	0.254	0.010	0	1749	100.0%	0.0%
100	0.150	0.006	0	1749	100.0%	0.0%
Pan			0	1749	100.0%	0.0%
		Total	1749	grams		
		Difference	4	0.2%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Radial Collector Well No. 1
HBMWD - Arcata, CA
Lateral #C2



Sieve Analyses-Collector Well
Radial Collector Well No. 1
HBMWD - Arcata, CA
Lateral #C2



Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 2
Interval: 55 **Feet** **Pipe No. :** 11

Initial Wt. 1932 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	731	731	38.0%	62.0%
3.5	5.600	0.223	458	1189	61.8%	38.2%
6	3.353	0.132	360	1549	80.5%	19.5%
8	2.360	0.094	179	1728	89.8%	10.2%
10	1.999	0.079	48	1776	92.3%	7.7%
16	1.194	0.047	80	1856	96.5%	3.5%
20	0.838	0.033	21	1877	97.6%	2.4%
40	0.419	0.017	22	1899	98.7%	1.3%
60	0.254	0.010	9	1908	99.2%	0.8%
100	0.150	0.006	10	1918	99.7%	0.3%
Pan			6	1924	100.0%	0.0%
		Total	1924	grams		
		Difference	8	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 2
Interval: 65 **Feet** **Pipe No. :** 13

Initial Wt. 1703 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1173	1173	69.4%	30.6%
3.5	5.600	0.223	290	1463	86.6%	13.4%
6	3.353	0.132	105	1568	92.8%	7.2%
8	2.360	0.094	36	1604	95.0%	5.0%
10	1.999	0.079	10	1614	95.6%	4.4%
16	1.194	0.047	18	1632	96.6%	3.4%
20	0.838	0.033	4	1636	96.9%	3.1%
40	0.419	0.017	6	1642	97.2%	2.8%
60	0.254	0.010	13	1655	98.0%	2.0%
100	0.150	0.006	23	1678	99.3%	0.7%
Pan			11	1689	100.0%	0.0%
		Total	1689	grams		
		Difference	14	0.8%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1
Lateral Number: 2
Interval: 75 **Feet** **Pipe No. :** 15

Initial Wt. 2069 grams **26**

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	700	700	33.9%	66.1%
3.5	5.600	0.223	750	1450	70.3%	29.7%
6	3.353	0.132	433	1883	91.2%	8.8%
8	2.360	0.094	112	1995	96.7%	3.3%
10	1.999	0.079	26	2021	97.9%	2.1%
16	1.194	0.047	36	2057	99.7%	0.3%
20	0.838	0.033	4	2061	99.9%	0.1%
40	0.419	0.017	2	2063	100.0%	0.0%
60	0.254	0.010	1	2064	100.0%	0.0%
100	0.150	0.006	0	2064	100.0%	0.0%
Pan			0	2064	100.0%	0.0%
		Total	2064	grams		
		Difference	5	0.2%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1
Lateral Number: 2
Interval: 85 **Feet** **Pipe No. :** 17

Initial Wt. 1787 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1422	1422	79.8%	20.2%
3.5	5.600	0.223	296	1718	96.4%	3.6%
6	3.353	0.132	43	1761	98.8%	1.2%
8	2.360	0.094	8	1769	99.3%	0.7%
10	1.999	0.079	2	1771	99.4%	0.6%
16	1.194	0.047	8	1779	99.8%	0.2%
20	0.838	0.033	1	1780	99.9%	0.1%
40	0.419	0.017	2	1782	100.0%	0.0%
60	0.254	0.010	0	1782	100.0%	0.0%
100	0.150	0.006	0	1782	100.0%	0.0%
Pan			0	1782	100.0%	0.0%
		Total	1782	grams		
		Difference	5	0.3%		

Layne Ranney Collector Wells

Sieve Analysis Results

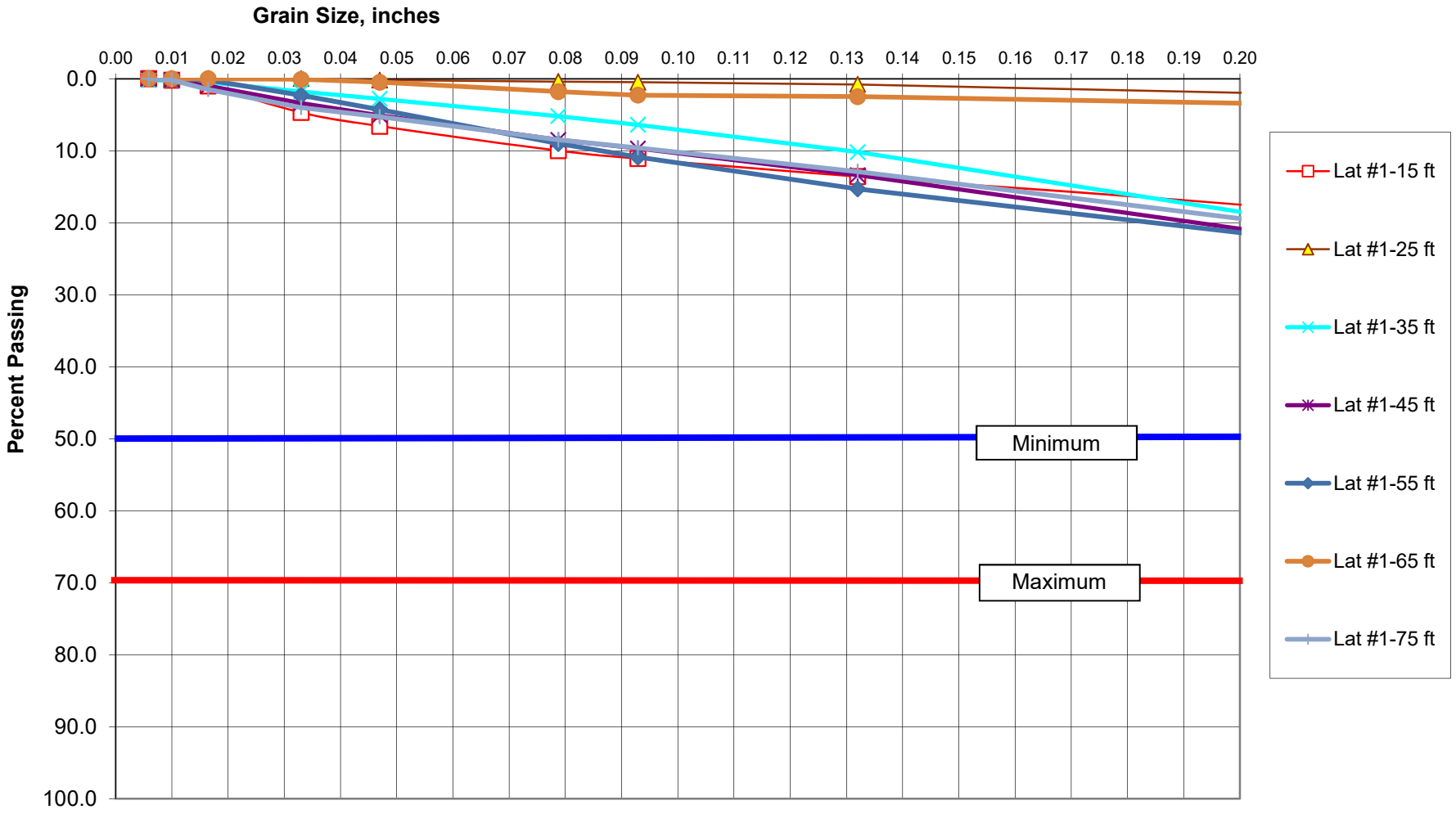
Client:	**HBMWD - Arcata, CA**	**Job No. :**	**39759**
Well ID:	**1**		
Lateral Number:	**2**		
Interval:	**95** **Feet**	**Pipe No. :**	**19**

Initial Wt. 2014 grams

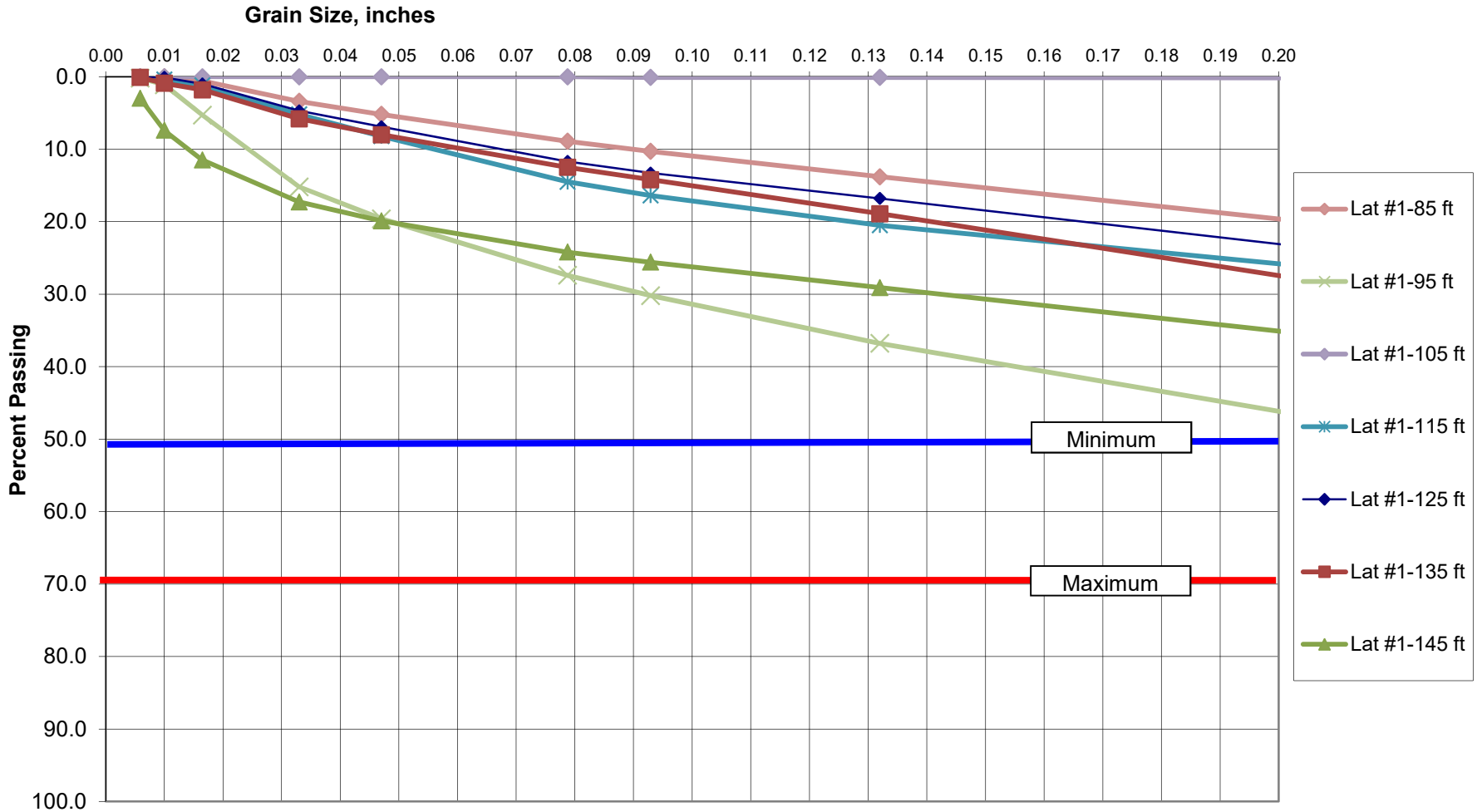
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1227	1227	61.2%	38.8%
3.5	5.600	0.223	199	1426	71.1%	28.9%
6	3.353	0.132	141	1567	78.2%	21.8%
8	2.360	0.094	89	1656	82.6%	17.4%
10	1.999	0.079	39	1695	84.5%	15.5%
16	1.194	0.047	125	1820	90.8%	9.2%
20	0.838	0.033	69	1889	94.2%	5.8%
40	0.419	0.017	88	1977	98.6%	1.4%
60	0.254	0.010	23	2000	99.8%	0.2%
100	0.150	0.006	5	2005	100.0%	0.0%
Pan			0	2005	100.0%	0.0%
		Total	2005	grams		
		Difference	9	0.4%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C1



Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C1



Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 15 **Feet** **Pipe No. :** 3

Initial Wt. 2153 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1504	1504	70.2%	29.8%
3.5	5.600	0.223	236	1740	81.2%	18.8%
6	3.353	0.132	112	1852	86.4%	13.6%
8	2.360	0.094	54	1906	88.9%	11.1%
10	1.999	0.079	22	1928	90.0%	10.0%
16	1.194	0.047	74	2002	93.4%	6.6%
20	0.838	0.033	41	2043	95.3%	4.7%
40	0.419	0.017	79	2122	99.0%	1.0%
60	0.254	0.010	17	2139	99.8%	0.2%
100	0.150	0.006	3	2142	100.0%	0.0%
Pan			1	2143	100.0%	0.0%
		Total	2143	grams		
		Difference	10	0.5%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C1
Interval: 25 **Feet** **Pipe No. :** 5

Initial Wt. 2202 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	2006	2006	91.2%	8.8%
3.5	5.600	0.223	144	2150	97.7%	2.3%
6	3.353	0.132	32	2182	99.2%	0.8%
8	2.360	0.094	8	2190	99.5%	0.5%
10	1.999	0.079	2	2192	99.6%	0.4%
16	1.194	0.047	4	2196	99.8%	0.2%
20	0.838	0.033	3	2199	100.0%	0.0%
40	0.419	0.017	1	2200	100.0%	0.0%
60	0.254	0.010	0	2200	100.0%	0.0%
100	0.150	0.006	0	2200	100.0%	0.0%
Pan			0	2200	100.0%	0.0%
		Total	2200	grams		
		Difference	2	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 35 **Feet** **Pipe No. :** 7

Initial Wt. 2138 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1248	1248	58.4%	41.6%
3.5	5.600	0.223	442	1690	79.0%	21.0%
6	3.353	0.132	229	1919	89.8%	10.2%
8	2.360	0.094	83	2002	93.6%	6.4%
10	1.999	0.079	25	2027	94.8%	5.2%
16	1.194	0.047	51	2078	97.2%	2.8%
20	0.838	0.033	21	2099	98.2%	1.8%
40	0.419	0.017	28	2127	99.5%	0.5%
60	0.254	0.010	4	2131	99.7%	0.3%
100	0.150	0.006	2	2133	99.8%	0.2%
Pan			5	2138	100.0%	0.0%
		Total	2138	grams		
		Difference	0	0.0%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C1
Interval: 45 **Feet** **Pipe No. :** 9

Initial Wt. 2156 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1239	1239	57.7%	42.3%
3.5	5.664	0.223	413	1652	76.9%	23.1%
6	3.353	0.132	208	1860	86.6%	13.4%
8	2.388	0.094	79	1939	90.3%	9.7%
10	1.999	0.079	25	1964	91.5%	8.5%
16	1.194	0.047	74	2038	94.9%	5.1%
20	0.838	0.033	35	2073	96.6%	3.4%
40	0.419	0.017	53	2126	99.0%	1.0%
60	0.254	0.010	17	2143	99.8%	0.2%
100	0.150	0.006	4	2147	100.0%	0.0%
Pan			0	2147	100.0%	0.0%
		Total	2147	grams		
		Difference	9	0.4%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 55 **Feet** **Pipe No. :** 11

Initial Wt. 2112 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1358	1358	64.5%	35.5%
3.5	5.600	0.223	260	1618	76.8%	23.2%
6	3.353	0.132	167	1785	84.7%	15.3%
8	2.360	0.094	92	1877	89.1%	10.9%
10	1.999	0.079	41	1918	91.0%	9.0%
16	1.194	0.047	98	2016	95.7%	4.3%
20	0.838	0.033	42	2058	97.7%	2.3%
40	0.419	0.017	44	2102	99.8%	0.2%
60	0.254	0.010	5	2107	100.0%	0.0%
100	0.150	0.006	0	2107	100.0%	0.0%
Pan			0	2107	100.0%	0.0%
		Total	2107	grams		
		Difference	5	0.2%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C1
Interval: 65 **Feet** **Pipe No. :** 13

Initial Wt. 2190 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1977	1977	90.6%	9.4%
3.5	5.600	0.223	124	2101	96.3%	3.7%
6	3.353	0.132	25	2126	97.5%	2.5%
8	2.360	0.094	5	2131	97.7%	2.3%
10	1.999	0.079	10	2141	98.2%	1.8%
16	1.194	0.047	30	2171	99.5%	0.5%
20	0.838	0.033	8	2179	99.9%	0.1%
40	0.419	0.017	2	2181	100.0%	0.0%
60	0.254	0.010	0	2181	100.0%	0.0%
100	0.150	0.006	0	2181	100.0%	0.0%
Pan			0	2181	100.0%	0.0%
		Total	2181	grams		
		Difference	9	0.4%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 75 **Feet** **Pipe No. :** 15

Initial Wt. 2290 grams **26**

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1441	1441	63.1%	36.9%
3.5	5.600	0.223	355	1796	78.6%	21.4%
6	3.353	0.132	193	1989	87.1%	12.9%
8	2.360	0.094	75	2064	90.4%	9.6%
10	1.999	0.079	27	2091	91.5%	8.5%
16	1.194	0.047	71	2162	94.7%	5.3%
20	0.838	0.033	30	2192	96.0%	4.0%
40	0.419	0.017	57	2249	98.5%	1.5%
60	0.254	0.010	30	2279	99.8%	0.2%
100	0.150	0.006	5	2284	100.0%	0.0%
Pan			0	2284	100.0%	0.0%
		Total	2284	grams		
		Difference	6	0.3%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C1
Interval: 85 **Feet** **Pipe No. :** 17

Initial Wt. 2194 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1472	1472	67.2%	32.8%
3.5	5.600	0.223	250	1722	78.6%	21.4%
6	3.353	0.132	167	1889	86.2%	13.8%
8	2.360	0.094	77	1966	89.7%	10.3%
10	1.999	0.079	30	1996	91.1%	8.9%
16	1.194	0.047	80	2076	94.8%	5.2%
20	0.838	0.033	40	2116	96.6%	3.4%
40	0.419	0.017	61	2177	99.4%	0.6%
60	0.254	0.010	13	2190	100.0%	0.0%
100	0.150	0.006	1	2191	100.0%	0.0%
Pan			0	2191	100.0%	0.0%
		Total	2191	grams		
		Difference	3	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 95 **Feet** **Pipe No. :** 19

Initial Wt. 2043 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	743	743	36.5%	63.5%
3.5	5.600	0.223	297	1040	51.0%	49.0%
6	3.353	0.132	249	1289	63.2%	36.8%
8	2.360	0.094	134	1423	69.8%	30.2%
10	1.999	0.079	56	1479	72.6%	27.4%
16	1.194	0.047	159	1638	80.4%	19.6%
20	0.838	0.033	91	1729	84.8%	15.2%
40	0.419	0.017	201	1930	94.7%	5.3%
60	0.254	0.010	86	2016	98.9%	1.1%
100	0.150	0.006	18	2034	99.8%	0.2%
Pan			4	2038	100.0%	0.0%
		Total	2038	grams		
		Difference	5	0.2%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C1
Interval: 105 **Feet** **Pipe No. :** 21

Initial Wt. 1955 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1911	1911	97.7%	2.3%
3.5	5.600	0.223	40	1951	99.8%	0.2%
6	3.353	0.132	3	1954	99.9%	0.1%
8	2.360	0.094	0	1954	99.9%	0.1%
10	1.999	0.079	1	1955	100.0%	0.0%
16	1.194	0.047	0	1955	100.0%	0.0%
20	0.838	0.033	0	1955	100.0%	0.0%
40	0.419	0.017	0	1955	100.0%	0.0%
60	0.254	0.010	0	1955	100.0%	0.0%
100	0.150	0.006	0	1955	100.0%	0.0%
Pan			0	1955	100.0%	0.0%
		Total	1955	grams		
		Difference	0	0.0%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 115 **Feet** **Pipe No. :** 23

Initial Wt. 2096 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1257	1257	60.0%	40.0%
3.5	5.600	0.223	265	1522	72.6%	27.4%
6	3.353	0.132	145	1667	79.5%	20.5%
8	2.360	0.094	86	1753	83.6%	16.4%
10	1.999	0.079	40	1793	85.5%	14.5%
16	1.194	0.047	132	1925	91.8%	8.2%
20	0.838	0.033	61	1986	94.8%	5.2%
40	0.419	0.017	84	2070	98.8%	1.2%
60	0.254	0.010	17	2087	99.6%	0.4%
100	0.150	0.006	7	2094	99.9%	0.1%
Pan			2	2096	100.0%	0.0%
		Total	2096	grams		
		Difference	0	0.0%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C1
Interval: 125 **Feet** **Pipe No. :** 25

Initial Wt. 2254 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1257	1257	55.9%	44.1%
3.5	5.600	0.223	431	1688	75.0%	25.0%
6	3.353	0.132	184	1872	83.2%	16.8%
8	2.360	0.094	78	1950	86.7%	13.3%
10	1.999	0.079	37	1987	88.3%	11.7%
16	1.194	0.047	107	2094	93.1%	6.9%
20	0.838	0.033	50	2144	95.3%	4.7%
40	0.419	0.017	83	2227	99.0%	1.0%
60	0.254	0.010	20	2247	99.9%	0.1%
100	0.150	0.006	3	2250	100.0%	0.0%
Pan			0	2250	100.0%	0.0%
		Total	2250	grams		
		Difference	4	0.2%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C1
Interval: 135 **Feet** **Pipe No. :** 27

Initial Wt. 2173 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1232	1232	56.8%	43.2%
3.5	5.600	0.223	287	1519	70.0%	30.0%
6	3.353	0.132	239	1758	81.1%	18.9%
8	2.360	0.094	104	1862	85.8%	14.2%
10	1.999	0.079	35	1897	87.5%	12.5%
16	1.194	0.047	98	1995	92.0%	8.0%
20	0.838	0.033	49	2044	94.2%	5.8%
40	0.419	0.017	87	2131	98.2%	1.8%
60	0.254	0.010	19	2150	99.1%	0.9%
100	0.150	0.006	17	2167	99.9%	0.1%
Pan			2	2169	100.0%	0.0%
		Total	2169	grams		
		Difference	4	0.2%		

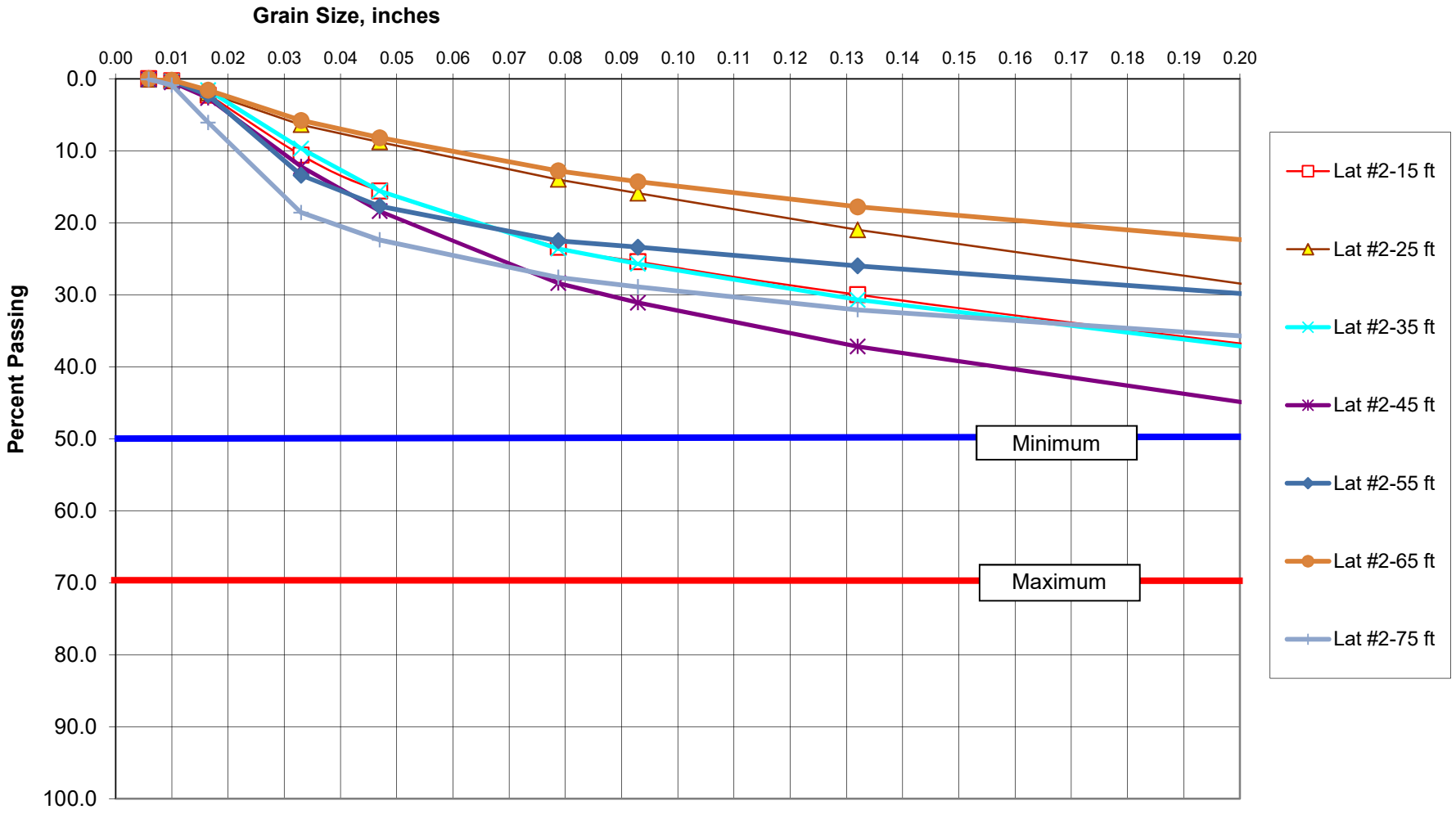
Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: Horizontal Collector Well
Lateral Number: C1
Interval: 145 **Feet** **Pipe No. :** 29

Initial Wt. 2051 grams

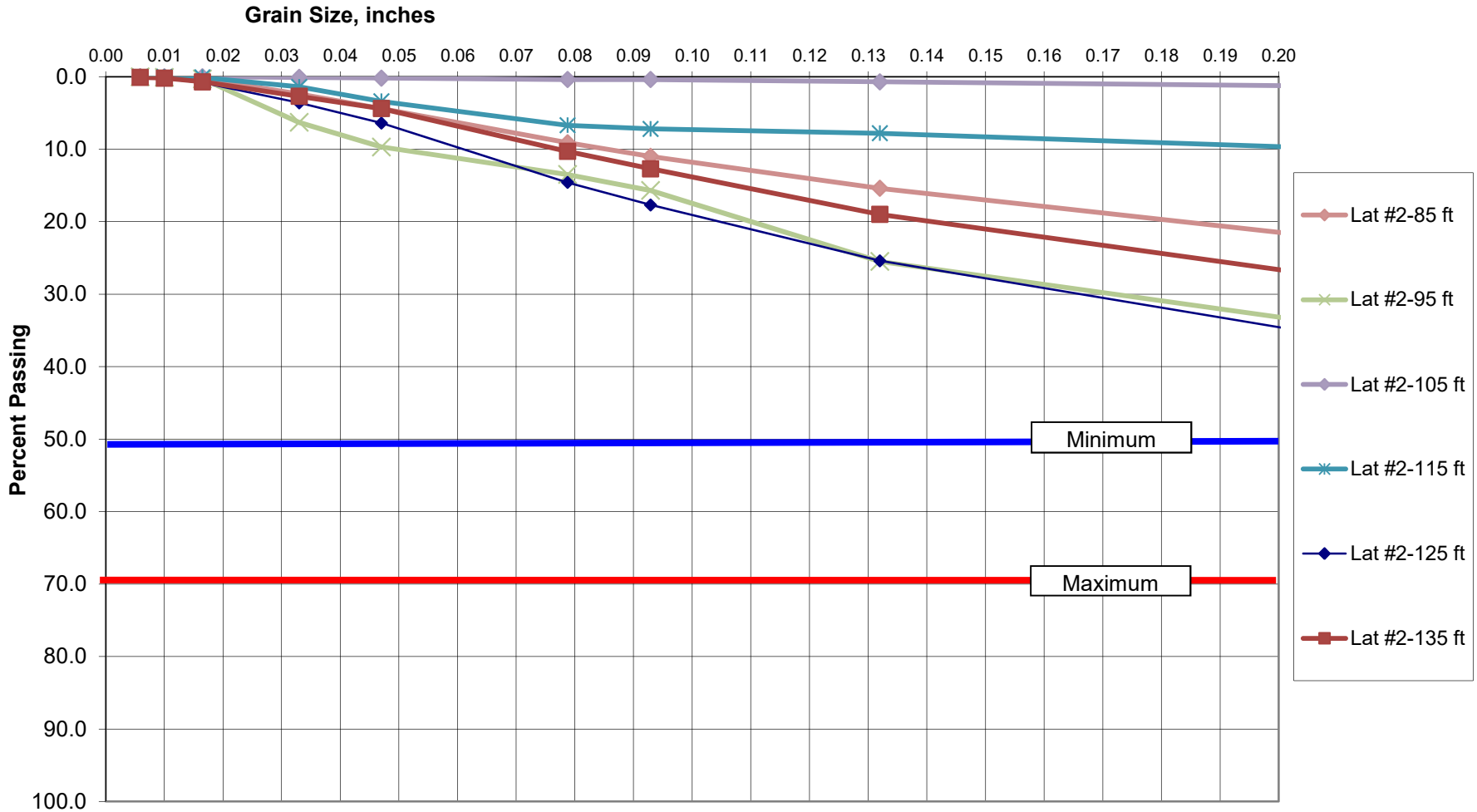
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	999	999	48.9%	51.1%
3.5	5.600	0.223	289	1288	63.1%	36.9%
6	3.353	0.132	159	1447	70.9%	29.1%
8	2.360	0.094	72	1519	74.4%	25.6%
10	1.999	0.079	28	1547	75.8%	24.2%
16	1.194	0.047	89	1636	80.1%	19.9%
20	0.838	0.033	53	1689	82.7%	17.3%
40	0.419	0.017	118	1807	88.5%	11.5%
60	0.254	0.010	83	1890	92.6%	7.4%
100	0.150	0.006	91	1981	97.0%	3.0%
Pan			61	2042	100.0%	0.0%
		Total	2042	grams		
		Difference	9	0.4%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C2



Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C2



Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C2
Interval: 15 **Feet** **Pipe No. :** 3

Initial Wt. 2168 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1030	1030	47.6%	52.4%
3.5	5.600	0.223	297	1327	61.3%	38.7%
6	3.353	0.132	189	1516	70.0%	30.0%
8	2.360	0.094	100	1616	74.6%	25.4%
10	1.999	0.079	43	1659	76.6%	23.4%
16	1.194	0.047	168	1827	84.4%	15.6%
20	0.838	0.033	108	1935	89.4%	10.6%
40	0.419	0.017	180	2115	97.7%	2.3%
60	0.254	0.010	43	2158	99.7%	0.3%
100	0.150	0.006	7	2165	100.0%	0.0%
Pan			0	2165	100.0%	0.0%
		Total	2165	grams		
		Difference	3	0.1%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C2
Interval: 25 **Feet** **Pipe No. :** 5

Initial Wt. 2217 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1184	1184	53.5%	46.5%
3.5	5.600	0.223	350	1534	69.3%	30.7%
6	3.353	0.132	216	1750	79.0%	21.0%
8	2.360	0.094	113	1863	84.1%	15.9%
10	1.999	0.079	42	1905	86.0%	14.0%
16	1.194	0.047	114	2019	91.2%	8.8%
20	0.838	0.033	53	2072	93.6%	6.4%
40	0.419	0.017	97	2169	98.0%	2.0%
60	0.254	0.010	38	2207	99.7%	0.3%
100	0.150	0.006	5	2212	99.9%	0.1%
Pan			2	2214	100.0%	0.0%
		Total	2214	grams		
		Difference	3	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C2
Interval: 35 **Feet** **Pipe No. :** 7

Initial Wt. 2241 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1140	1140	51.0%	49.0%
3.5	5.600	0.223	221	1361	60.9%	39.1%
6	3.353	0.132	188	1549	69.3%	30.7%
8	2.360	0.094	112	1661	74.3%	25.7%
10	1.999	0.079	47	1708	76.4%	23.6%
16	1.194	0.047	178	1886	84.4%	15.6%
20	0.838	0.033	132	2018	90.3%	9.7%
40	0.419	0.017	181	2199	98.4%	1.6%
60	0.254	0.010	28	2227	99.6%	0.4%
100	0.150	0.006	6	2233	99.9%	0.1%
Pan			2	2235	100.0%	0.0%
		Total	2235	grams		
		Difference	6	0.3%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C2
Interval: 45 **Feet** **Pipe No. :** 9

Initial Wt. 2178 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	897	897	41.3%	58.7%
3.5	5.664	0.223	250	1147	52.8%	47.2%
6	3.353	0.132	218	1365	62.8%	37.2%
8	2.388	0.094	132	1497	68.9%	31.1%
10	1.999	0.079	59	1556	71.6%	28.4%
16	1.194	0.047	216	1772	81.6%	18.4%
20	0.838	0.033	135	1907	87.8%	12.2%
40	0.419	0.017	207	2114	97.3%	2.7%
60	0.254	0.010	48	2162	99.5%	0.5%
100	0.150	0.006	8	2170	99.9%	0.1%
Pan			2	2172	100.0%	0.0%
		Total	2172	grams		
		Difference	6	0.3%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C2
Interval: 55 **Feet** **Pipe No. :** 11

Initial Wt. 2202 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1326	1326	60.4%	39.6%
3.5	5.600	0.223	188	1514	69.0%	31.0%
6	3.353	0.132	110	1624	74.0%	26.0%
8	2.360	0.094	57	1681	76.6%	23.4%
10	1.999	0.079	20	1701	77.5%	22.5%
16	1.194	0.047	104	1805	82.3%	17.7%
20	0.838	0.033	94	1899	86.6%	13.4%
40	0.419	0.017	245	2144	97.7%	2.3%
60	0.254	0.010	44	2188	99.7%	0.3%
100	0.150	0.006	6	2194	100.0%	0.0%
Pan			0	2194	100.0%	0.0%
		Total	2194	grams		
		Difference	8	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C2
Interval: 65 **Feet** **Pipe No. :** 13

Initial Wt. 2266 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1501	1501	66.4%	33.6%
3.5	5.600	0.223	223	1724	76.3%	23.7%
6	3.353	0.132	132	1856	82.2%	17.8%
8	2.360	0.094	80	1936	85.7%	14.3%
10	1.999	0.079	34	1970	87.2%	12.8%
16	1.194	0.047	104	2074	91.8%	8.2%
20	0.838	0.033	53	2127	94.2%	5.8%
40	0.419	0.017	95	2222	98.4%	1.6%
60	0.254	0.010	32	2254	99.8%	0.2%
100	0.150	0.006	5	2259	100.0%	0.0%
Pan			0	2259	100.0%	0.0%
		Total	2259	grams		
		Difference	7	0.3%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C2
Interval: 75 **Feet** **Pipe No. :** 15

Initial Wt. 2117 grams **26**

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1190	1190	56.5%	43.5%
3.5	5.600	0.223	142	1332	63.2%	36.8%
6	3.353	0.132	100	1432	67.9%	32.1%
8	2.360	0.094	66	1498	71.1%	28.9%
10	1.999	0.079	29	1527	72.4%	27.6%
16	1.194	0.047	108	1635	77.6%	22.4%
20	0.838	0.033	80	1715	81.4%	18.6%
40	0.419	0.017	265	1980	93.9%	6.1%
60	0.254	0.010	109	2089	99.1%	0.9%
100	0.150	0.006	16	2105	99.9%	0.1%
Pan			3	2108	100.0%	0.0%
		Total	2108	grams		
		Difference	9	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C2
Interval: 85 **Feet** **Pipe No. :** 17

Initial Wt. 2112 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1358	1358	64.4%	35.6%
3.5	5.600	0.223	260	1618	76.7%	23.3%
6	3.353	0.132	167	1785	84.6%	15.4%
8	2.360	0.094	92	1877	89.0%	11.0%
10	1.999	0.079	41	1918	90.9%	9.1%
16	1.194	0.047	98	2016	95.6%	4.4%
20	0.838	0.033	42	2058	97.6%	2.4%
40	0.419	0.017	44	2102	99.7%	0.3%
60	0.254	0.010	5	2107	99.9%	0.1%
100	0.150	0.006	2	2109	100.0%	0.0%
Pan			0	2109	100.0%	0.0%
		Total	2109	grams		
		Difference	3	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C2
Interval: 95 **Feet** **Pipe No. :** 19

Initial Wt. 2038 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1012	1012	49.9%	50.1%
3.5	5.600	0.223	298	1310	64.5%	35.5%
6	3.353	0.132	202	1512	74.5%	25.5%
8	2.360	0.094	199	1711	84.3%	15.7%
10	1.999	0.079	44	1755	86.5%	13.5%
16	1.194	0.047	79	1834	90.3%	9.7%
20	0.838	0.033	69	1903	93.7%	6.3%
40	0.419	0.017	120	2023	99.7%	0.3%
60	0.254	0.010	5	2028	99.9%	0.1%
100	0.150	0.006	2	2030	100.0%	0.0%
Pan			0	2030	100.0%	0.0%
		Total	2030	grams		
		Difference	8	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C2
Interval: 105 **Feet** **Pipe No. :** 21

Initial Wt. 2015 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1938	1938	96.3%	3.7%
3.5	5.600	0.223	45	1983	98.6%	1.4%
6	3.353	0.132	14	1997	99.3%	0.7%
8	2.360	0.094	6	2003	99.6%	0.4%
10	1.999	0.079	1	2004	99.6%	0.4%
16	1.194	0.047	3	2007	99.8%	0.2%
20	0.838	0.033	3	2010	99.9%	0.1%
40	0.419	0.017	2	2012	100.0%	0.0%
60	0.254	0.010	0	2012	100.0%	0.0%
100	0.150	0.006	0	2012	100.0%	0.0%
Pan			0	2012	100.0%	0.0%
		Total	2012	grams		
		Difference	3	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C2
Interval: 115 **Feet** **Pipe No. :** 23

Initial Wt. 2073 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1811	1811	87.6%	12.4%
3.5	5.600	0.223	46	1857	89.8%	10.2%
6	3.353	0.132	48	1905	92.2%	7.8%
8	2.360	0.094	13	1918	92.8%	7.2%
10	1.999	0.079	11	1929	93.3%	6.7%
16	1.194	0.047	68	1997	96.6%	3.4%
20	0.838	0.033	41	2038	98.6%	1.4%
40	0.419	0.017	27	2065	99.9%	0.1%
60	0.254	0.010	2	2067	100.0%	0.0%
100	0.150	0.006	0	2067	100.0%	0.0%
Pan			0	2067	100.0%	0.0%
		Total	2067	grams		
		Difference	6	0.3%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C2
Interval: 125 **Feet** **Pipe No. :** 25

Initial Wt. 2226 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1061	1061	47.7%	52.3%
3.5	5.600	0.223	333	1394	62.7%	37.3%
6	3.353	0.132	265	1659	74.6%	25.4%
8	2.360	0.094	171	1830	82.3%	17.7%
10	1.999	0.079	70	1900	85.4%	14.6%
16	1.194	0.047	181	2081	93.6%	6.4%
20	0.838	0.033	63	2144	96.4%	3.6%
40	0.419	0.017	63	2207	99.2%	0.8%
60	0.254	0.010	10	2217	99.7%	0.3%
100	0.150	0.006	4	2221	99.9%	0.1%
Pan			3	2224	100.0%	0.0%
		Total	2224	grams		
		Difference	2	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

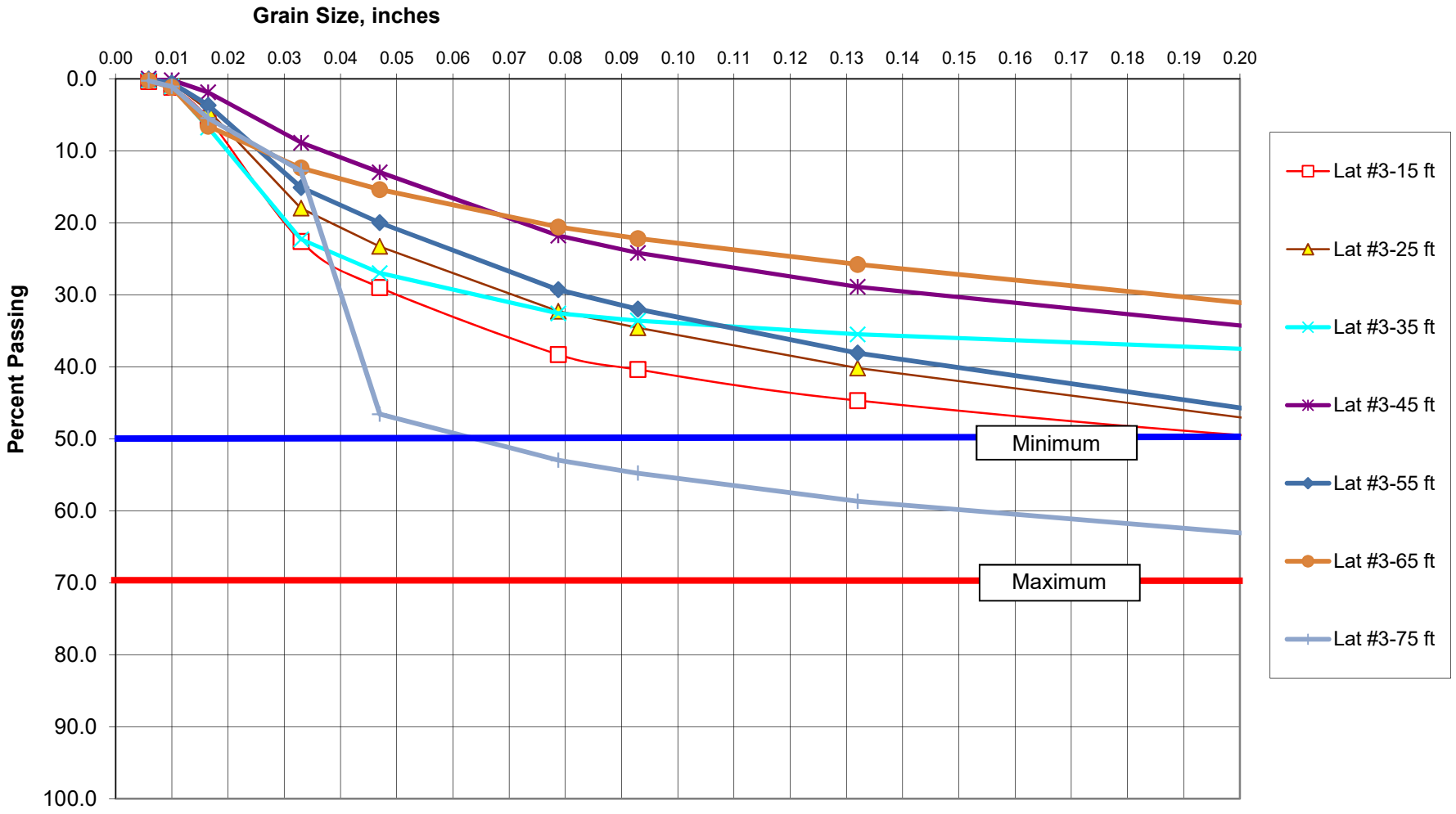
Client:	**HBMWD - Arcata, CA**	**Job No. :**	**39759**
Well ID:	**1A**		
Lateral Number:	**C2**		
Interval:	**135** **Feet**	**Pipe No. :**	**27**

Initial Wt. 1625 grams

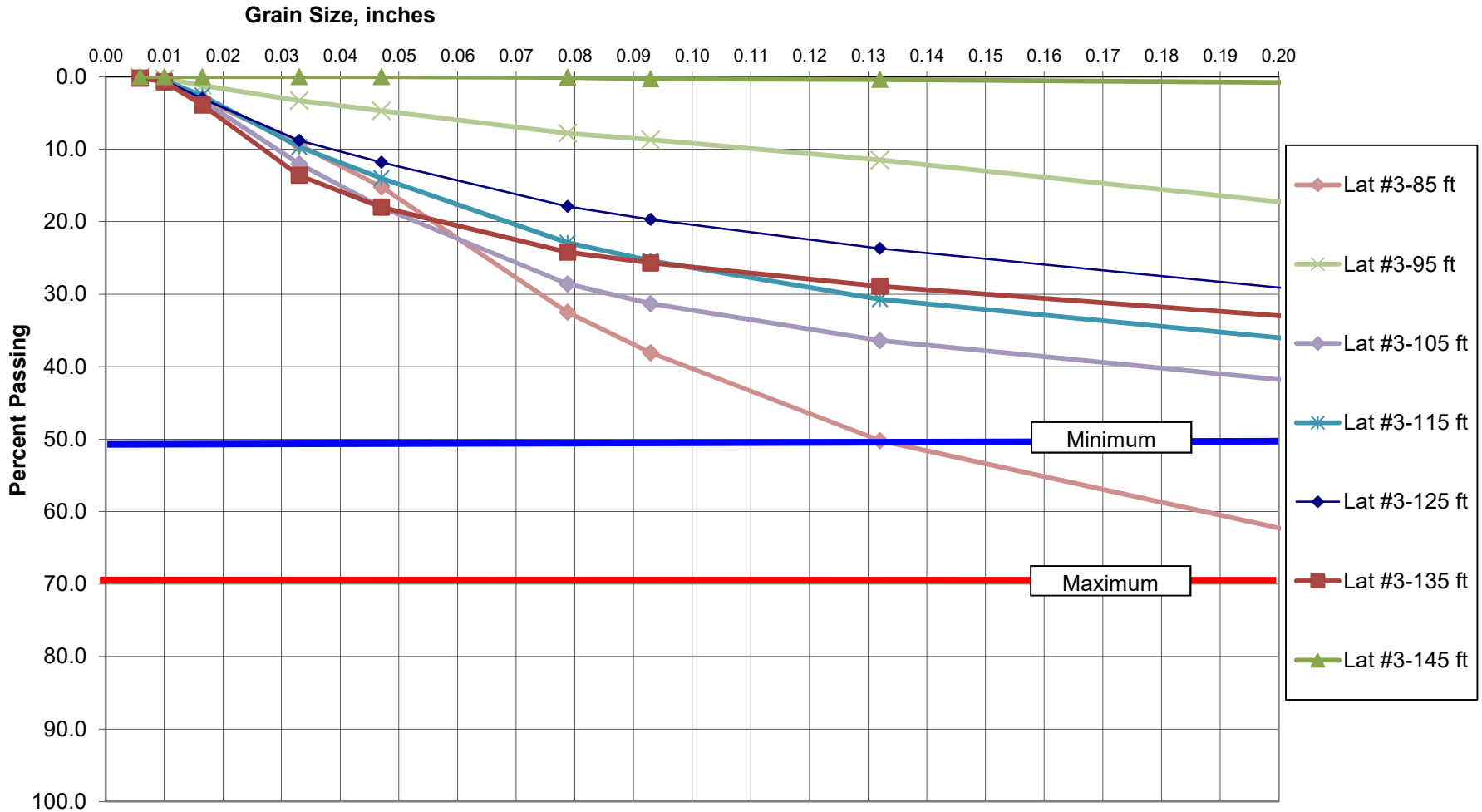
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	905	905	55.9%	44.1%
3.5	5.600	0.223	247	1152	71.1%	28.9%
6	3.353	0.132	160	1312	81.0%	19.0%
8	2.360	0.094	102	1414	87.3%	12.7%
10	1.999	0.079	39	1453	89.7%	10.3%
16	1.194	0.047	96	1549	95.6%	4.4%
20	0.838	0.033	28	1577	97.3%	2.7%
40	0.419	0.017	32	1609	99.3%	0.7%
60	0.254	0.010	7	1616	99.8%	0.2%
100	0.150	0.006	2	1618	99.9%	0.1%
Pan			2	1620	100.0%	0.0%
		Total	1620	grams		
		Difference	5	0.3%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C3



Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C3



Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C3
Interval: 15 **Feet** **Pipe No. :** 3

Initial Wt. 1956 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	837	837	42.8%	57.2%
3.5	5.600	0.223	129	966	49.4%	50.6%
6	3.353	0.132	115	1081	55.3%	44.7%
8	2.360	0.094	85	1166	59.6%	40.4%
10	1.999	0.079	40	1206	61.7%	38.3%
16	1.194	0.047	182	1388	71.0%	29.0%
20	0.838	0.033	126	1514	77.4%	22.6%
40	0.419	0.017	334	1848	94.5%	5.5%
60	0.254	0.010	84	1932	98.8%	1.2%
100	0.150	0.006	15	1947	99.6%	0.4%
Pan			8	1955	100.0%	0.0%
		Total	1955	grams		
		Difference	1	0.1%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C3
Interval: 25 **Feet** **Pipe No. :** 5

Initial Wt. 1914 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	741	741	38.7%	61.3%
3.5	5.600	0.223	234	975	50.9%	49.1%
6	3.353	0.132	170	1145	59.8%	40.2%
8	2.360	0.094	106	1251	65.4%	34.6%
10	1.999	0.079	45	1296	67.7%	32.3%
16	1.194	0.047	172	1468	76.7%	23.3%
20	0.838	0.033	102	1570	82.0%	18.0%
40	0.419	0.017	260	1830	95.6%	4.4%
60	0.254	0.010	72	1902	99.4%	0.6%
100	0.150	0.006	10	1912	99.9%	0.1%
Pan			2	1914	100.0%	0.0%
		Total	1914	grams		
		Difference	0	0.0%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C3
Interval: 35 **Feet** **Pipe No. :** 7

Initial Wt. 2205 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1255	1255	57.1%	42.9%
3.5	5.600	0.223	105	1360	61.9%	38.1%
6	3.353	0.132	56	1416	64.5%	35.5%
8	2.360	0.094	42	1458	66.4%	33.6%
10	1.999	0.079	23	1481	67.4%	32.6%
16	1.194	0.047	122	1603	73.0%	27.0%
20	0.838	0.033	104	1707	77.7%	22.3%
40	0.419	0.017	340	2047	93.2%	6.8%
60	0.254	0.010	125	2172	98.9%	1.1%
100	0.150	0.006	20	2192	99.8%	0.2%
Pan			4	2196	100.0%	0.0%
		Total	2196	grams		
		Difference	9	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C3
Interval: 45 **Feet** **Pipe No. :** 9

Initial Wt. 2208 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1191	1191	54.1%	45.9%
3.5	5.664	0.223	221	1412	64.1%	35.9%
6	3.353	0.132	154	1566	71.1%	28.9%
8	2.388	0.094	103	1669	75.8%	24.2%
10	1.999	0.079	52	1721	78.2%	21.8%
16	1.194	0.047	194	1915	87.0%	13.0%
20	0.838	0.033	91	2006	91.1%	8.9%
40	0.419	0.017	154	2160	98.1%	1.9%
60	0.254	0.010	37	2197	99.8%	0.2%
100	0.150	0.006	5	2202	100.0%	0.0%
Pan			0	2202	100.0%	0.0%
		Total	2202	grams		
		Difference	6	0.3%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C3
Interval: 55 **Feet** **Pipe No. :** 11

Initial Wt. 2231 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	796	796	35.8%	64.2%
3.5	5.600	0.223	361	1157	52.0%	48.0%
6	3.353	0.132	222	1379	61.9%	38.1%
8	2.360	0.094	134	1513	68.0%	32.0%
10	1.999	0.079	60	1573	70.7%	29.3%
16	1.194	0.047	207	1780	80.0%	20.0%
20	0.838	0.033	110	1890	84.9%	15.1%
40	0.419	0.017	254	2144	96.3%	3.7%
60	0.254	0.010	69	2213	99.4%	0.6%
100	0.150	0.006	10	2223	99.9%	0.1%
Pan			3	2226	100.0%	0.0%
		Total	2226	grams		
		Difference	5	0.2%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C3
Interval: 65 **Feet** **Pipe No. :** 13

Initial Wt. 2180 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1172	1172	53.9%	46.1%
3.5	5.600	0.223	290	1462	67.3%	32.7%
6	3.353	0.132	151	1613	74.2%	25.8%
8	2.360	0.094	77	1690	77.8%	22.2%
10	1.999	0.079	35	1725	79.4%	20.6%
16	1.194	0.047	114	1839	84.6%	15.4%
20	0.838	0.033	64	1903	87.6%	12.4%
40	0.419	0.017	126	2029	93.4%	6.6%
60	0.254	0.010	117	2146	98.8%	1.2%
100	0.150	0.006	20	2166	99.7%	0.3%
Pan			7	2173	100.0%	0.0%
		Total	2173	grams		
		Difference	7	0.3%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C3
Interval: 75 **Feet** **Pipe No. :** 15

Initial Wt. 3291 grams **26**

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	976	976	29.7%	70.3%
3.5	5.600	0.223	196	1172	35.6%	64.4%
6	3.353	0.132	186	1358	41.3%	58.7%
8	2.360	0.094	129	1487	45.2%	54.8%
10	1.999	0.079	59	1546	47.0%	53.0%
16	1.194	0.047	211	1757	53.4%	46.6%
20	0.838	0.033	1111	2868	87.2%	12.8%
40	0.419	0.017	242	3110	94.5%	5.5%
60	0.254	0.010	143	3253	98.9%	1.1%
100	0.150	0.006	28	3281	99.7%	0.3%
Pan			9	3290	100.0%	0.0%
		Total	3290	grams		
		Difference	1	0.0%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C3
Interval: 85 **Feet** **Pipe No. :** 17

Initial Wt. 2174 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	466	466	21.5%	78.5%
3.5	5.600	0.223	274	740	34.1%	65.9%
6	3.353	0.132	342	1082	49.8%	50.2%
8	2.360	0.094	262	1344	61.9%	38.1%
10	1.999	0.079	121	1465	67.5%	32.5%
16	1.194	0.047	375	1840	84.8%	15.2%
20	0.838	0.033	127	1967	90.6%	9.4%
40	0.419	0.017	138	2105	97.0%	3.0%
60	0.254	0.010	53	2158	99.4%	0.6%
100	0.150	0.006	10	2168	99.9%	0.1%
Pan			3	2171	100.0%	0.0%
		Total	2171	grams		
		Difference	3	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C3
Interval: 95 **Feet** **Pipe No. :** 19

Initial Wt. 2197 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1478	1478	67.6%	32.4%
3.5	5.600	0.223	294	1772	81.0%	19.0%
6	3.353	0.132	165	1937	88.5%	11.5%
8	2.360	0.094	60	1997	91.3%	8.7%
10	1.999	0.079	20	2017	92.2%	7.8%
16	1.194	0.047	68	2085	95.3%	4.7%
20	0.838	0.033	30	2115	96.7%	3.3%
40	0.419	0.017	46	2161	98.8%	1.2%
60	0.254	0.010	20	2181	99.7%	0.3%
100	0.150	0.006	4	2185	99.9%	0.1%
Pan			3	2188	100.0%	0.0%
		Total	2188	grams		
		Difference	9	0.4%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C3
Interval: 105 **Feet** **Pipe No. :** 21

Initial Wt. 2217 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1111	1111	50.1%	49.9%
3.5	5.600	0.223	144	1255	56.6%	43.4%
6	3.353	0.132	154	1409	63.6%	36.4%
8	2.360	0.094	113	1522	68.7%	31.3%
10	1.999	0.079	60	1582	71.4%	28.6%
16	1.194	0.047	237	1819	82.0%	18.0%
20	0.838	0.033	132	1951	88.0%	12.0%
40	0.419	0.017	192	2143	96.7%	3.3%
60	0.254	0.010	60	2203	99.4%	0.6%
100	0.150	0.006	10	2213	99.8%	0.2%
Pan			4	2217	100.0%	0.0%
		Total	2217	grams		
		Difference	0	0.0%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: **HBMWD - Arcata, CA** **Job No. :** **39759**
Well ID: **1A**
Lateral Number: **C3**
Interval: **115** **Feet** **Pipe No. :** **23**

Initial Wt. 2198 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1189	1189	54.2%	45.8%
3.5	5.600	0.223	181	1370	62.4%	37.6%
6	3.353	0.132	151	1521	69.3%	30.7%
8	2.360	0.094	116	1637	74.6%	25.4%
10	1.999	0.079	56	1693	77.1%	22.9%
16	1.194	0.047	194	1887	86.0%	14.0%
20	0.838	0.033	94	1981	90.3%	9.7%
40	0.419	0.017	157	2138	97.4%	2.6%
60	0.254	0.010	46	2184	99.5%	0.5%
100	0.150	0.006	8	2192	99.9%	0.1%
Pan			3	2195	100.0%	0.0%
		Total	2195	grams		
		Difference	3	0.1%		

Client: **HBMWD - Arcata, CA** **Job No.:** **39759**
Well ID: **1A**
Lateral Number: **C3**
Interval: **125** **Feet** **Pipe No. :** **25**

Initial Wt. 2217 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1310	1310	59.3%	40.7%
3.5	5.600	0.223	220	1530	69.3%	30.7%
6	3.353	0.132	155	1685	76.3%	23.7%
8	2.360	0.094	89	1774	80.3%	19.7%
10	1.999	0.079	40	1814	82.1%	17.9%
16	1.194	0.047	134	1948	88.2%	11.8%
20	0.838	0.033	66	2014	91.2%	8.8%
40	0.419	0.017	128	2142	97.0%	3.0%
60	0.254	0.010	55	2197	99.5%	0.5%
100	0.150	0.006	10	2207	99.9%	0.1%
Pan			2	2209	100.0%	0.0%
		Total	2209	grams		
		Difference	8	0.4%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C3
Interval: 135 **Feet** **Pipe No. :** 27

Initial Wt. 2235 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1316	1316	58.9%	41.1%
3.5	5.600	0.223	154	1470	65.8%	34.2%
6	3.353	0.132	118	1588	71.1%	28.9%
8	2.360	0.094	71	1659	74.3%	25.7%
10	1.999	0.079	34	1693	75.8%	24.2%
16	1.194	0.047	138	1831	82.0%	18.0%
20	0.838	0.033	98	1929	86.4%	13.6%
40	0.419	0.017	216	2145	96.1%	3.9%
60	0.254	0.010	72	2217	99.3%	0.7%
100	0.150	0.006	11	2228	99.8%	0.2%
Pan			5	2233	100.0%	0.0%
		Total	2233	grams		
		Difference	2	0.1%		

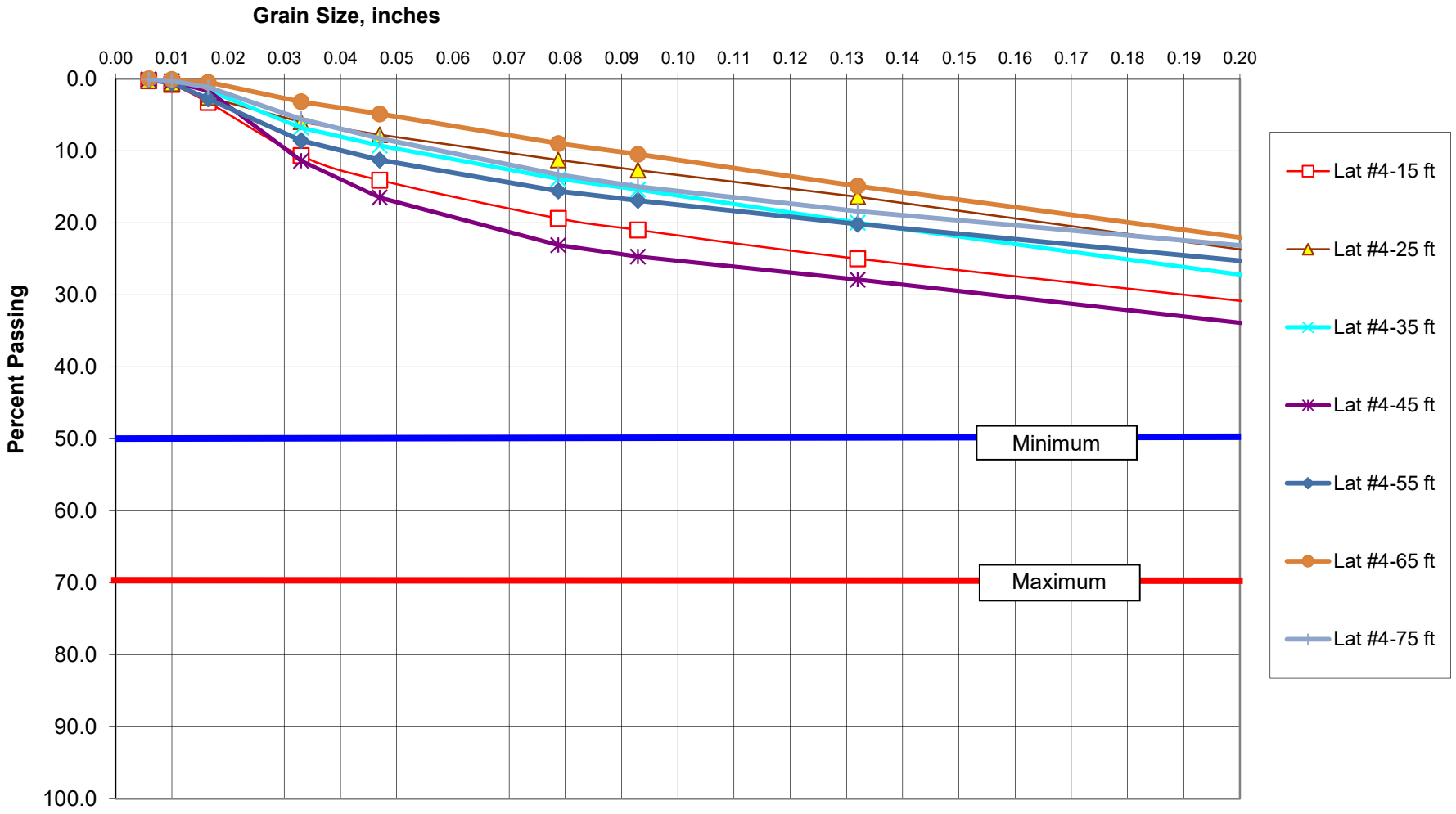
Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: Horizontal Collector Well
Lateral Number: C3
Interval: 145 **Feet** **Pipe No. :** 29

Initial Wt. 2048 grams

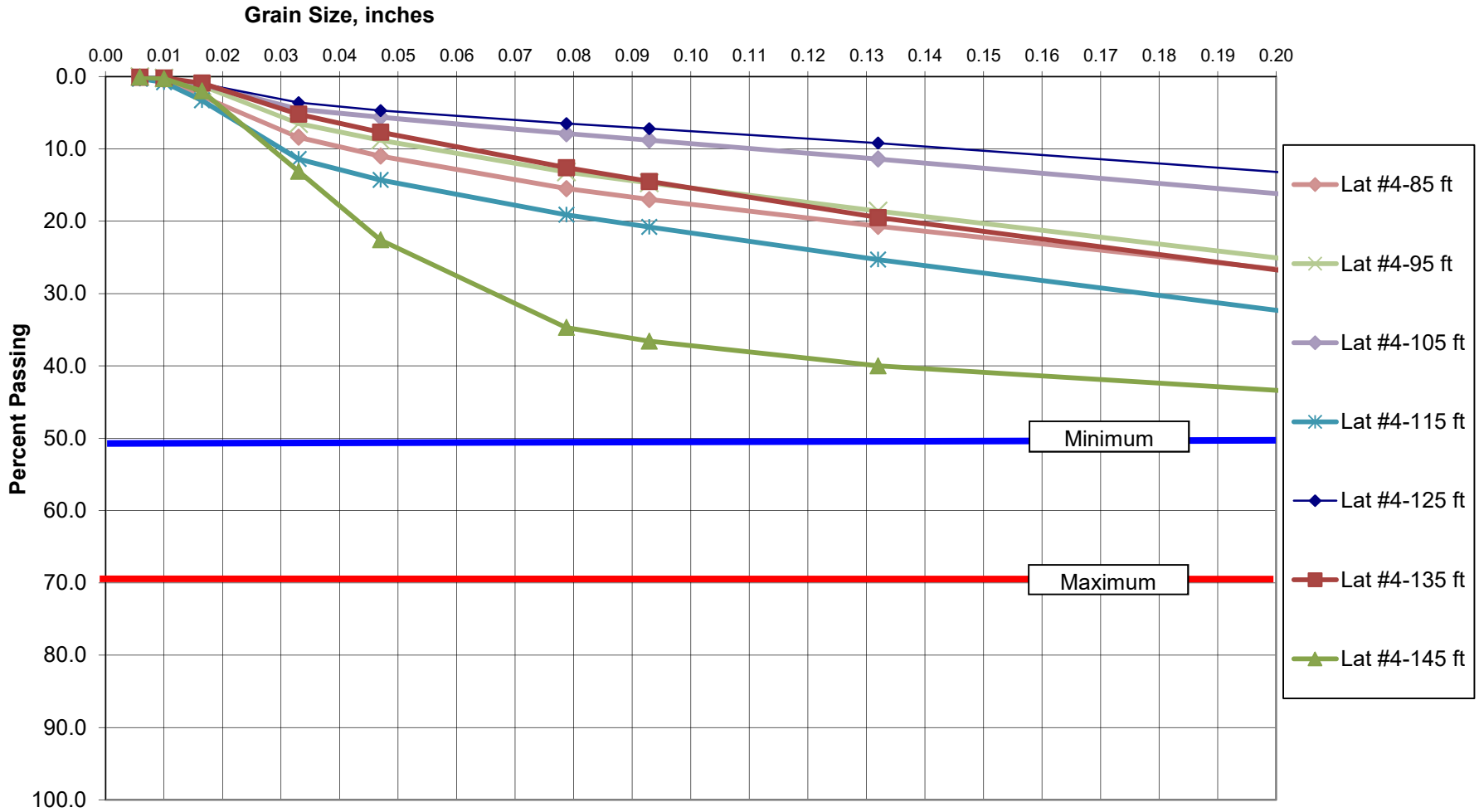
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1897	1897	92.7%	7.3%
3.5	5.600	0.223	131	2028	99.1%	0.9%
6	3.353	0.132	11	2039	99.6%	0.4%
8	2.360	0.094	2	2041	99.7%	0.3%
10	1.999	0.079	4	2045	99.9%	0.1%
16	1.194	0.047	2	2047	100.0%	0.0%
20	0.838	0.033	0	2047	100.0%	0.0%
40	0.419	0.017	0	2047	100.0%	0.0%
60	0.254	0.010	0	2047	100.0%	0.0%
100	0.150	0.006	0	2047	100.0%	0.0%
Pan			0	2047	100.0%	0.0%
		Total	2047	grams		
		Difference	1	0.0%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C4



Sieve Analyses-Collector Well
Radial Collector Well No. 1A
HBMWD - Arcata, CA
Lateral #C4



Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 15 **Feet** **Pipe No. :** 3

Initial Wt. 2278 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1230	1230	54.1%	45.9%
3.5	5.600	0.223	303	1533	67.4%	32.6%
6	3.353	0.132	172	1705	75.0%	25.0%
8	2.360	0.094	91	1796	79.0%	21.0%
10	1.999	0.079	36	1832	80.6%	19.4%
16	1.194	0.047	121	1953	85.9%	14.1%
20	0.838	0.033	76	2029	89.3%	10.7%
40	0.419	0.017	168	2197	96.7%	3.3%
60	0.254	0.010	57	2254	99.2%	0.8%
100	0.150	0.006	12	2266	99.7%	0.3%
Pan			7	2273	100.0%	0.0%
		Total	2273	grams		
		Difference	5	0.2%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C4
Interval: 25 **Feet** **Pipe No. :** 5

Initial Wt. 2236 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1259	1259	56.4%	43.6%
3.5	5.600	0.223	395	1654	74.1%	25.9%
6	3.353	0.132	211	1865	83.6%	16.4%
8	2.360	0.094	83	1948	87.3%	12.7%
10	1.999	0.079	31	1979	88.7%	11.3%
16	1.194	0.047	79	2058	92.2%	7.8%
20	0.838	0.033	39	2097	94.0%	6.0%
40	0.419	0.017	75	2172	97.4%	2.6%
60	0.254	0.010	43	2215	99.3%	0.7%
100	0.150	0.006	10	2225	99.7%	0.3%
Pan			6	2231	100.0%	0.0%
		Total	2231	grams		
		Difference	5	0.2%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 35 **Feet** **Pipe No. :** 7

Initial Wt. 2163 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1149	1149	53.3%	46.7%
3.5	5.600	0.223	374	1523	70.6%	29.4%
6	3.353	0.132	202	1725	80.0%	20.0%
8	2.360	0.094	99	1824	84.6%	15.4%
10	1.999	0.079	34	1858	86.1%	13.9%
16	1.194	0.047	98	1956	90.7%	9.3%
20	0.838	0.033	54	2010	93.2%	6.8%
40	0.419	0.017	112	2122	98.4%	1.6%
60	0.254	0.010	29	2151	99.7%	0.3%
100	0.150	0.006	3	2154	99.9%	0.1%
Pan			3	2157	100.0%	0.0%
		Total	2157	grams		
		Difference	6	0.3%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C4
Interval: 45 **Feet** **Pipe No. :** 9

Initial Wt. 2202 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1167	1167	53.1%	46.9%
3.5	5.664	0.223	246	1413	64.3%	35.7%
6	3.353	0.132	171	1584	72.1%	27.9%
8	2.388	0.094	70	1654	75.3%	24.7%
10	1.999	0.079	36	1690	76.9%	23.1%
16	1.194	0.047	145	1835	83.5%	16.5%
20	0.838	0.033	112	1947	88.6%	11.4%
40	0.419	0.017	212	2159	98.3%	1.7%
60	0.254	0.010	30	2189	99.6%	0.4%
100	0.150	0.006	5	2194	99.9%	0.1%
Pan			3	2197	100.0%	0.0%
		Total	2197	grams		
		Difference	5	0.2%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 55 **Feet** **Pipe No. :** 11

Initial Wt. 2233 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1317	1317	59.1%	40.9%
3.5	5.600	0.223	315	1632	73.2%	26.8%
6	3.353	0.132	147	1779	79.8%	20.2%
8	2.360	0.094	72	1851	83.1%	16.9%
10	1.999	0.079	30	1881	84.4%	15.6%
16	1.194	0.047	96	1977	88.7%	11.3%
20	0.838	0.033	59	2036	91.4%	8.6%
40	0.419	0.017	130	2166	97.2%	2.8%
60	0.254	0.010	48	2214	99.4%	0.6%
100	0.150	0.006	10	2224	99.8%	0.2%
Pan			4	2228	100.0%	0.0%
		Total	2228	grams		
		Difference	5	0.2%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C4
Interval: 65 **Feet** **Pipe No. :** 13

Initial Wt. 2214 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1299	1299	58.8%	41.2%
3.5	5.600	0.223	375	1674	75.8%	24.2%
6	3.353	0.132	205	1879	85.1%	14.9%
8	2.360	0.094	97	1976	89.5%	10.5%
10	1.999	0.079	35	2011	91.0%	9.0%
16	1.194	0.047	89	2100	95.1%	4.9%
20	0.838	0.033	39	2139	96.8%	3.2%
40	0.419	0.017	58	2197	99.5%	0.5%
60	0.254	0.010	10	2207	99.9%	0.1%
100	0.150	0.006	2	2209	100.0%	0.0%
Pan			0	2209	100.0%	0.0%
		Total	2209	grams		
		Difference	5	0.2%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 75 **Feet** **Pipe No. :** 15

Initial Wt. 2225 grams **26**

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1388	1388	62.5%	37.5%
3.5	5.600	0.223	288	1676	75.4%	24.6%
6	3.353	0.132	138	1814	81.6%	18.4%
8	2.360	0.094	75	1889	85.0%	15.0%
10	1.999	0.079	38	1927	86.7%	13.3%
16	1.194	0.047	110	2037	91.7%	8.3%
20	0.838	0.033	60	2097	94.4%	5.6%
40	0.419	0.017	98	2195	98.8%	1.2%
60	0.254	0.010	20	2215	99.7%	0.3%
100	0.150	0.006	4	2219	99.9%	0.1%
Pan			3	2222	100.0%	0.0%
		Total	2222	grams		
		Difference	3	0.1%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C4
Interval: 85 **Feet** **Pipe No. :** 17

Initial Wt. 1959 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1094	1094	55.9%	44.1%
3.5	5.600	0.223	307	1401	71.6%	28.4%
6	3.353	0.132	151	1552	79.3%	20.7%
8	2.360	0.094	73	1625	83.0%	17.0%
10	1.999	0.079	30	1655	84.5%	15.5%
16	1.194	0.047	87	1742	89.0%	11.0%
20	0.838	0.033	51	1793	91.6%	8.4%
40	0.419	0.017	112	1905	97.3%	2.7%
60	0.254	0.010	43	1948	99.5%	0.5%
100	0.150	0.006	8	1956	99.9%	0.1%
Pan			2	1958	100.0%	0.0%
		Total	1958	grams		
		Difference	1	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 95 **Feet** **Pipe No. :** 19

Initial Wt. 2121 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1154	1154	54.4%	45.6%
3.5	5.600	0.223	395	1549	73.0%	27.0%
6	3.353	0.132	177	1726	81.4%	18.6%
8	2.360	0.094	84	1810	85.3%	14.7%
10	1.999	0.079	31	1841	86.8%	13.2%
16	1.194	0.047	93	1934	91.2%	8.8%
20	0.838	0.033	50	1984	93.5%	6.5%
40	0.419	0.017	110	2094	98.7%	1.3%
60	0.254	0.010	23	2117	99.8%	0.2%
100	0.150	0.006	4	2121	100.0%	0.0%
Pan			0	2121	100.0%	0.0%
		Total	2121	grams		
		Difference	0	0.0%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C4
Interval: 105 **Feet** **Pipe No. :** 21

Initial Wt. 2295 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1617	1617	70.5%	29.5%
3.5	5.600	0.223	272	1889	82.4%	17.6%
6	3.353	0.132	142	2031	88.6%	11.4%
8	2.360	0.094	59	2090	91.2%	8.8%
10	1.999	0.079	21	2111	92.1%	7.9%
16	1.194	0.047	52	2163	94.4%	5.6%
20	0.838	0.033	26	2189	95.5%	4.5%
40	0.419	0.017	78	2267	98.9%	1.1%
60	0.254	0.010	18	2285	99.7%	0.3%
100	0.150	0.006	5	2290	99.9%	0.1%
Pan			2	2292	100.0%	0.0%
		Total	2292	grams		
		Difference	3	0.1%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 115 **Feet** **Pipe No. :** 23

Initial Wt. 2237 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1132	1132	50.6%	49.4%
3.5	5.600	0.223	337	1469	65.6%	34.4%
6	3.353	0.132	202	1671	74.7%	25.3%
8	2.360	0.094	102	1773	79.2%	20.8%
10	1.999	0.079	38	1811	80.9%	19.1%
16	1.194	0.047	108	1919	85.7%	14.3%
20	0.838	0.033	63	1982	88.6%	11.4%
40	0.419	0.017	182	2164	96.7%	3.3%
60	0.254	0.010	56	2220	99.2%	0.8%
100	0.150	0.006	12	2232	99.7%	0.3%
Pan			6	2238	100.0%	0.0%
		Total	2238	grams		
		Difference	-1	0.0%		

Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: 1A
Lateral Number: C4
Interval: 125 **Feet** **Pipe No. :** 25

Initial Wt. 2287 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1610	1610	70.6%	29.4%
3.5	5.600	0.223	340	1950	85.6%	14.4%
6	3.353	0.132	120	2070	90.8%	9.2%
8	2.360	0.094	46	2116	92.8%	7.2%
10	1.999	0.079	14	2130	93.5%	6.5%
16	1.194	0.047	41	2171	95.3%	4.7%
20	0.838	0.033	25	2196	96.4%	3.6%
40	0.419	0.017	61	2257	99.0%	1.0%
60	0.254	0.010	18	2275	99.8%	0.2%
100	0.150	0.006	3	2278	100.0%	0.0%
Pan			1	2279	100.0%	0.0%
		Total	2279	grams		
		Difference	8	0.3%		

Layne Ranney Collector Wells

Sieve Analysis Results

Client: HBMWD - Arcata, CA **Job No. :** 39759
Well ID: 1A
Lateral Number: C4
Interval: 135 **Feet** **Pipe No. :** 27

Initial Wt. 2284 grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1217	1217	53.4%	46.6%
3.5	5.600	0.223	403	1620	71.1%	28.9%
6	3.353	0.132	214	1834	80.5%	19.5%
8	2.360	0.094	114	1948	85.5%	14.5%
10	1.999	0.079	43	1991	87.4%	12.6%
16	1.194	0.047	112	2103	92.3%	7.7%
20	0.838	0.033	57	2160	94.8%	5.2%
40	0.419	0.017	97	2257	99.1%	0.9%
60	0.254	0.010	17	2274	99.8%	0.2%
100	0.150	0.006	2	2276	99.9%	0.1%
Pan			2	2278	100.0%	0.0%
		Total	2278	grams		
		Difference	6	0.3%		

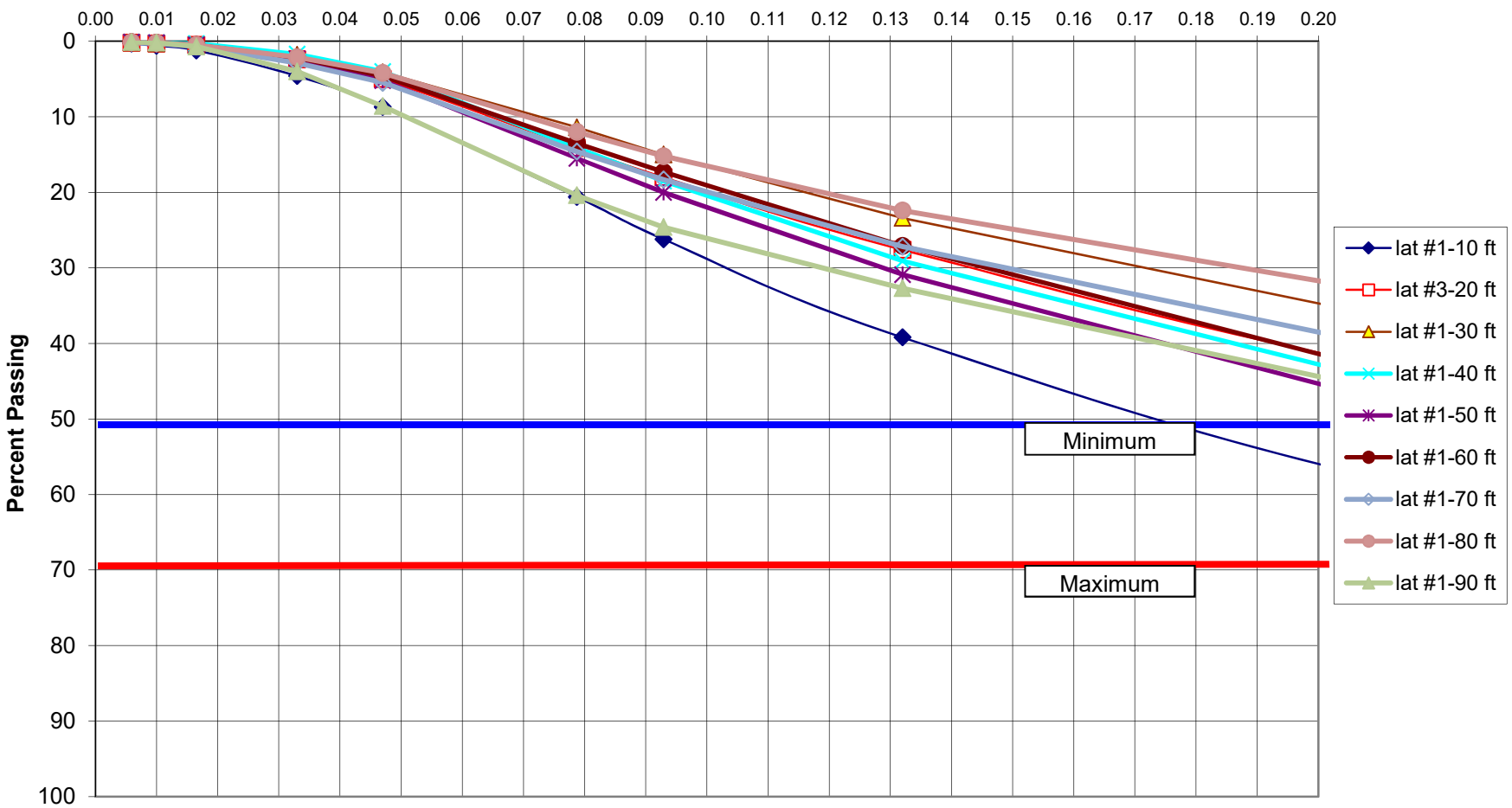
Client: HBMWD - Arcata, CA **Job No.:** 39759
Well ID: Horizontal Collector Well
Lateral Number: C4
Interval: 145 **Feet** **Pipe No. :** 29

Initial Wt. 2166 grams

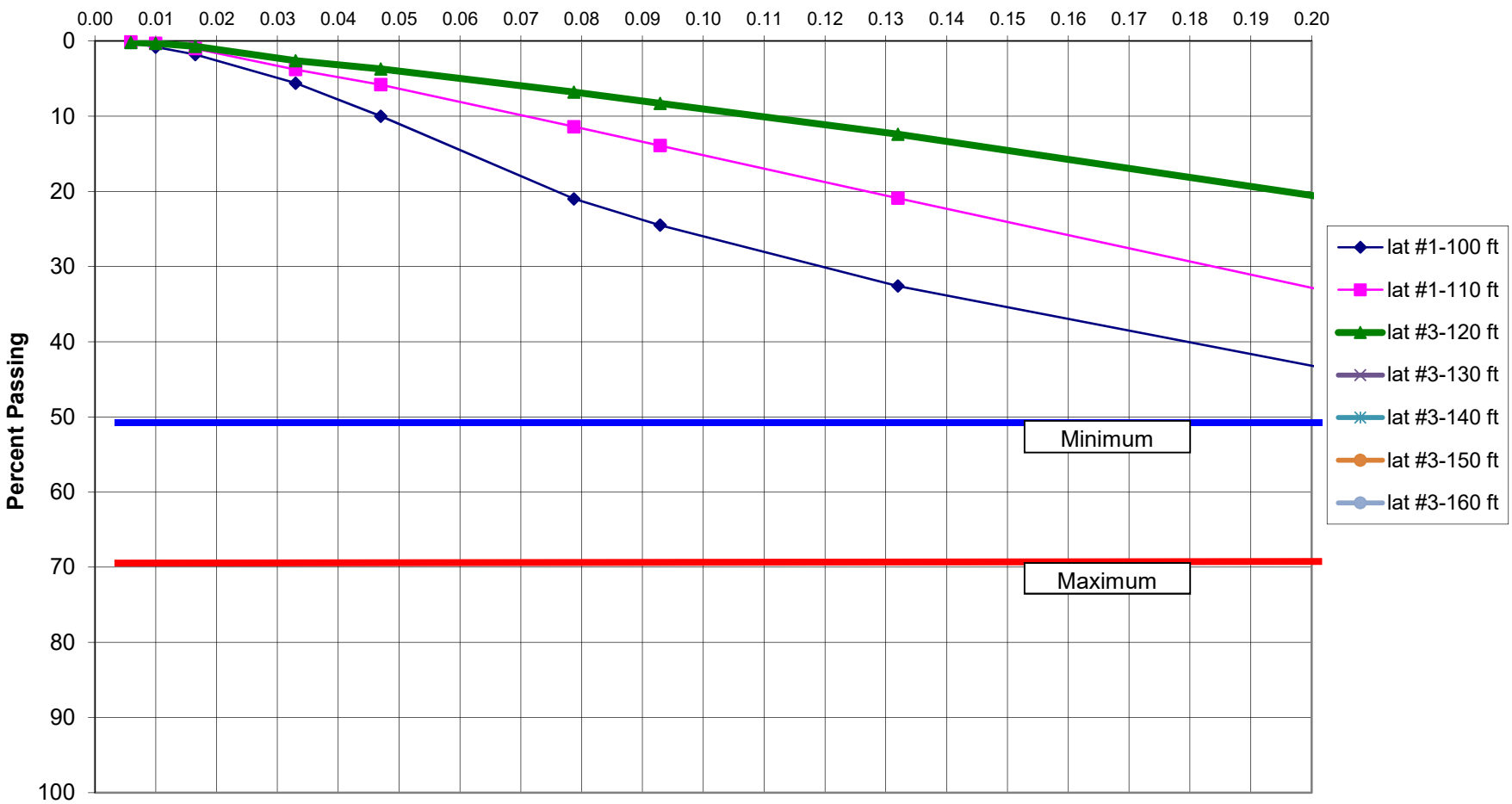
Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1046	1046	48.4%	51.6%
3.5	5.600	0.223	156	1202	55.6%	44.4%
6	3.353	0.132	94	1296	60.0%	40.0%
8	2.360	0.094	74	1370	63.4%	36.6%
10	1.999	0.079	41	1411	65.3%	34.7%
16	1.194	0.047	260	1671	77.4%	22.6%
20	0.838	0.033	205	1876	86.9%	13.1%
40	0.419	0.017	240	2116	98.0%	2.0%
60	0.254	0.010	38	2154	99.7%	0.3%
100	0.150	0.006	4	2158	99.9%	0.1%
Pan			2	2160	100.0%	0.0%
		Total	2160	grams		
		Difference	6	0.3%		

Layne Ranney Collector Wells

Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well3 - Job No. 14606
Lateral #1



Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well 3 - Job No. 14606
Lateral #1



Humboldt Bay
New Lateral Installation
Ranney Well 3
Job No. 14606
Lateral #1 Completed: 2/07/12

Northwest Sieve	\ mm	slot size inches	% passing lat #1-10 ft	% passing lat #3-20 ft	% passing lat #1-30 ft	% passing lat #1-40 ft	% passing lat #1-50 ft	% passing lat #1-60 ft	% passing lat #1-70 ft	% passing lat #1-80 ft	% passing lat #1-90 ft	% passing lat #1-100 ft	% passing lat #1-110 ft	% passing lat #3-120 ft	% passing lat #3-130 ft	% passing lat #3-140 ft	% passing lat #3-150 ft	% passing lat #3-160 ft
		0.375	81.4	65.5	56.6	65.1	69.1	68.6	60.7	49.4	67.5	63.9	61.1	41.8				
3.5	5.6	0.220	59.8	44.6	38.1	46.9	49.7	45.7	41.9	34.5	47.9	46.4	36.4	23				
6	3.353	0.132	39.2	27.6	23.4	29.1	30.9	27.1	27.2	22.4	32.7	32.6	20.9	12.4				
8	2.36	0.093	26.2	18	15	18.5	20	17.3	18.3	15.2	24.6	24.5	13.9	8.3				
10	2	0.079	20.6	14.1	11.4	14.1	15.5	13.5	14.6	12	20.4	21	11.4	6.8				
16	1.194	0.047	8.7	5	4.1	4	5.2	4.6	5.5	4.2	8.6	10	5.8	3.7				
20	0.838	0.033	4.6	2.4	1.8	1.7	2.3	2.2	2.9	2.1	4	5.6	3.8	2.6				
40	0.419	0.016	1.2	0.5	0.5	0.3	0.5	0.5	0.7	0.5	0.7	1.8	1.0	0.7				
60	0.254	0.010	0.6	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.8	0.3	0.3				
100	0.15	0.006	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2				

Recommended Screen Selection				Inventory Slot Opening	Original 10' pcs	Used Lateral 3	Used Lateral 1	Remaining
0-5	Blank	95-105	150 slot	150	16	4	8	4
5-15	100 slot	105-115	150 slot	125	12	2	2	8
15-25	125 slot	115-125	n/a slot	100	12	1	1	10
25-35	125 slot	125-135	n/a slot					
35-45	150 slot	135-145	n/a slot	80	8			8
45-55	150 slot	145-155	n/a slot	60	6			6
55-65	150 slot	155-165	n/a slot					
65-75	150 slot			5' blanks	4	1	1	2
75-85	150 slot							
85-95	150 slot							

Lateral #1 total length - 115'

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 10 **Feet** **Pipe No.** 2

Initial Wt. **1929** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	357	357	18.6%	81.4%
3.5	5.600	0.223	413	770	40.2%	59.8%
6	3.353	0.132	394	1164	60.8%	39.2%
8	2.360	0.094	249	1413	73.8%	26.2%
10	1.999	0.079	107	1520	79.4%	20.6%
16	1.194	0.047	228	1748	91.3%	8.7%
20	0.838	0.033	78	1826	95.4%	4.6%
40	0.419	0.017	66	1892	98.8%	1.2%
60	0.254	0.010	12	1904	99.4%	0.6%
100	0.150	0.006	5	1909	99.7%	0.3%
Pan			6	1915	100.0%	0.0%
		Total	1915	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 20 **Feet** **Pipe No.** 4

Initial Wt. **2095** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	721	721	34.5%	65.5%
3.5	5.600	0.223	436	1157	55.4%	44.6%
6	3.353	0.132	355	1512	72.4%	27.6%
8	2.360	0.094	201	1713	82.0%	18.0%
10	1.999	0.079	81	1794	85.9%	14.1%
16	1.194	0.047	189	1983	95.0%	5.0%
20	0.838	0.033	54	2037	97.6%	2.4%
40	0.419	0.017	40	2077	99.5%	0.5%
60	0.254	0.010	5	2082	99.7%	0.3%
100	0.150	0.006	2	2084	99.8%	0.2%
Pan			4	2088	100.0%	0.0%
		Total	2088			
		Difference	0.3%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 30 **Feet** **Pipe No.** 6

Initial Wt. **1982** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	854	854	43.4%	56.6%
3.5	5.600	0.223	365	1219	61.9%	38.1%
6	3.353	0.132	289	1508	76.6%	23.4%
8	2.360	0.094	166	1674	85.0%	15.0%
10	1.999	0.079	71	1745	88.6%	11.4%
16	1.194	0.047	143	1888	95.9%	4.1%
20	0.838	0.033	45	1933	98.2%	1.8%
40	0.419	0.017	26	1959	99.5%	0.5%
60	0.254	0.010	5	1964	99.7%	0.3%
100	0.150	0.006	2	1966	99.8%	0.2%
Pan			3	1969	100.0%	0.0%
		Total	1969	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 40 **Feet** **Pipe No.** 8

Initial Wt. **1817** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	628	628	34.9%	65.1%
3.5	5.664	0.223	326	954	53.1%	46.9%
6	3.353	0.132	320	1274	70.9%	29.1%
8	2.388	0.094	192	1466	81.5%	18.5%
10	1.999	0.079	78	1544	85.9%	14.1%
16	1.194	0.047	182	1726	96.0%	4.0%
20	0.838	0.033	41	1767	98.3%	1.7%
40	0.419	0.017	25	1792	99.7%	0.3%
60	0.254	0.010	3	1795	99.8%	0.2%
100	0.150	0.006	2	1797	99.9%	0.1%
Pan			1	1798	100.0%	0.0%
		Total	1798			
		Difference	1.0%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 50 **Feet** **Pipe No.** 10

Initial Wt. **1636** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	503	503	30.9%	69.1%
3.5	5.600	0.223	315	818	50.3%	49.7%
6	3.353	0.132	307	1125	69.1%	30.9%
8	2.360	0.094	177	1302	80.0%	20.0%
10	1.999	0.079	73	1375	84.5%	15.5%
16	1.194	0.047	168	1543	94.8%	5.2%
20	0.838	0.033	46	1589	97.7%	2.3%
40	0.419	0.017	30	1619	99.5%	0.5%
60	0.254	0.010	4	1623	99.8%	0.2%
100	0.150	0.006	2	1625	99.9%	0.1%
Pan			2	1627	100.0%	0.0%
		Total	1627	grams		
		Difference	0.6%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 60 **Feet** **Pipe No.** 12

Initial Wt. **1808** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	565	565	31.4%	68.6%
3.5	5.600	0.223	411	976	54.3%	45.7%
6	3.353	0.132	334	1310	72.9%	27.1%
8	2.360	0.094	176	1486	82.7%	17.3%
10	1.999	0.079	69	1555	86.5%	13.5%
16	1.194	0.047	160	1715	95.4%	4.6%
20	0.838	0.033	43	1758	97.8%	2.2%
40	0.419	0.017	30	1788	99.5%	0.5%
60	0.254	0.010	5	1793	99.8%	0.2%
100	0.150	0.006	2	1795	99.9%	0.1%
Pan			2	1797	100.0%	0.0%
		Total	1797			
		Difference	0.6%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 70 **Feet** **Pipe No.** 14

Initial Wt. **1687** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	658	658	39.3%	60.7%
3.5	5.600	0.223	316	974	58.1%	41.9%
6	3.353	0.132	246	1220	72.8%	27.2%
8	2.360	0.094	150	1370	81.7%	18.3%
10	1.999	0.079	62	1432	85.4%	14.6%
16	1.194	0.047	152	1584	94.5%	5.5%
20	0.838	0.033	44	1628	97.1%	2.9%
40	0.419	0.017	36	1664	99.3%	0.7%
60	0.254	0.010	7	1671	99.7%	0.3%
100	0.150	0.006	2	1673	99.8%	0.2%
Pan			3	1676	100.0%	0.0%
		Total	1676	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 80 **Feet** **Pipe No.** 16

Initial Wt. **2175** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1097	1097	50.6%	49.4%
3.5	5.600	0.223	322	1419	65.5%	34.5%
6	3.353	0.132	261	1680	77.6%	22.4%
8	2.360	0.094	156	1836	84.8%	15.2%
10	1.999	0.079	69	1905	88.0%	12.0%
16	1.194	0.047	169	2074	95.8%	4.2%
20	0.838	0.033	47	2121	97.9%	2.1%
40	0.419	0.017	35	2156	99.5%	0.5%
60	0.254	0.010	6	2162	99.8%	0.2%
100	0.150	0.006	2	2164	99.9%	0.1%
Pan			2	2166	100.0%	0.0%
		Total	2166			
		Difference	0.4%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 90 **Feet** **Pipe No.** 18

Initial Wt. **1992** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	645	645	32.5%	67.5%
3.5	5.600	0.223	391	1036	52.1%	47.9%
6	3.353	0.132	301	1337	67.3%	32.7%
8	2.360	0.094	161	1498	75.4%	24.6%
10	1.999	0.079	84	1582	79.6%	20.4%
16	1.194	0.047	235	1817	91.4%	8.6%
20	0.838	0.033	90	1907	96.0%	4.0%
40	0.419	0.017	67	1974	99.3%	0.7%
60	0.254	0.010	10	1984	99.8%	0.2%
100	0.150	0.006	2	1986	99.9%	0.1%
Pan			1	1987	100.0%	0.0%
		Total	1987	grams		
		Difference	0.3%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 100 **Feet** **Pipe No.** 20

Initial Wt. **1624** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	584	584	36.1%	63.9%
3.5	5.600	0.223	284	868	53.6%	46.4%
6	3.353	0.132	222	1090	67.4%	32.6%
8	2.360	0.094	131	1221	75.5%	24.5%
10	1.999	0.079	57	1278	79.0%	21.0%
16	1.194	0.047	178	1456	90.0%	10.0%
20	0.838	0.033	72	1528	94.4%	5.6%
40	0.419	0.017	61	1589	98.2%	1.8%
60	0.254	0.010	16	1605	99.2%	0.8%
100	0.150	0.006	9	1614	99.8%	0.2%
Pan			4	1618	100.0%	0.0%
		Total	1618			
		Difference	0.4%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 110 **Feet** **Pipe No.** 22

Initial Wt. **1988** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	767	767	38.9%	61.1%
3.5	5.600	0.223	488	1255	63.6%	36.4%
6	3.353	0.132	306	1561	79.1%	20.9%
8	2.360	0.094	138	1699	86.1%	13.9%
10	1.999	0.079	49	1748	88.6%	11.4%
16	1.194	0.047	110	1858	94.2%	5.8%
20	0.838	0.033	41	1899	96.2%	3.8%
40	0.419	0.017	55	1954	99.0%	1.0%
60	0.254	0.010	14	1968	99.7%	0.3%
100	0.150	0.006	3	1971	99.9%	0.1%
Pan			2	1973	100.0%	0.0%
		Total	1973	grams		
		Difference	0.8%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 1
Interval: 120 **Feet** **Pipe No.** 24

Initial Wt. **1887** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1093	1093	58.2%	41.8%
3.5	5.600	0.223	354	1447	77.0%	23.0%
6	3.353	0.132	199	1646	87.6%	12.4%
8	2.360	0.094	77	1723	91.7%	8.3%
10	1.999	0.079	28	1751	93.2%	6.8%
16	1.194	0.047	58	1809	96.3%	3.7%
20	0.838	0.033	22	1831	97.4%	2.6%
40	0.419	0.017	34	1865	99.3%	0.7%
60	0.254	0.010	8	1873	99.7%	0.3%
100	0.150	0.006	3	1876	99.8%	0.2%
Pan			3	1879	100.0%	0.0%
		Total	1879			
		Difference	0.4%			

Humboldt Bay
New Lateral Installation
Ranney Well 3
Job No. 14606
Lateral #2 Completed 3/23/12

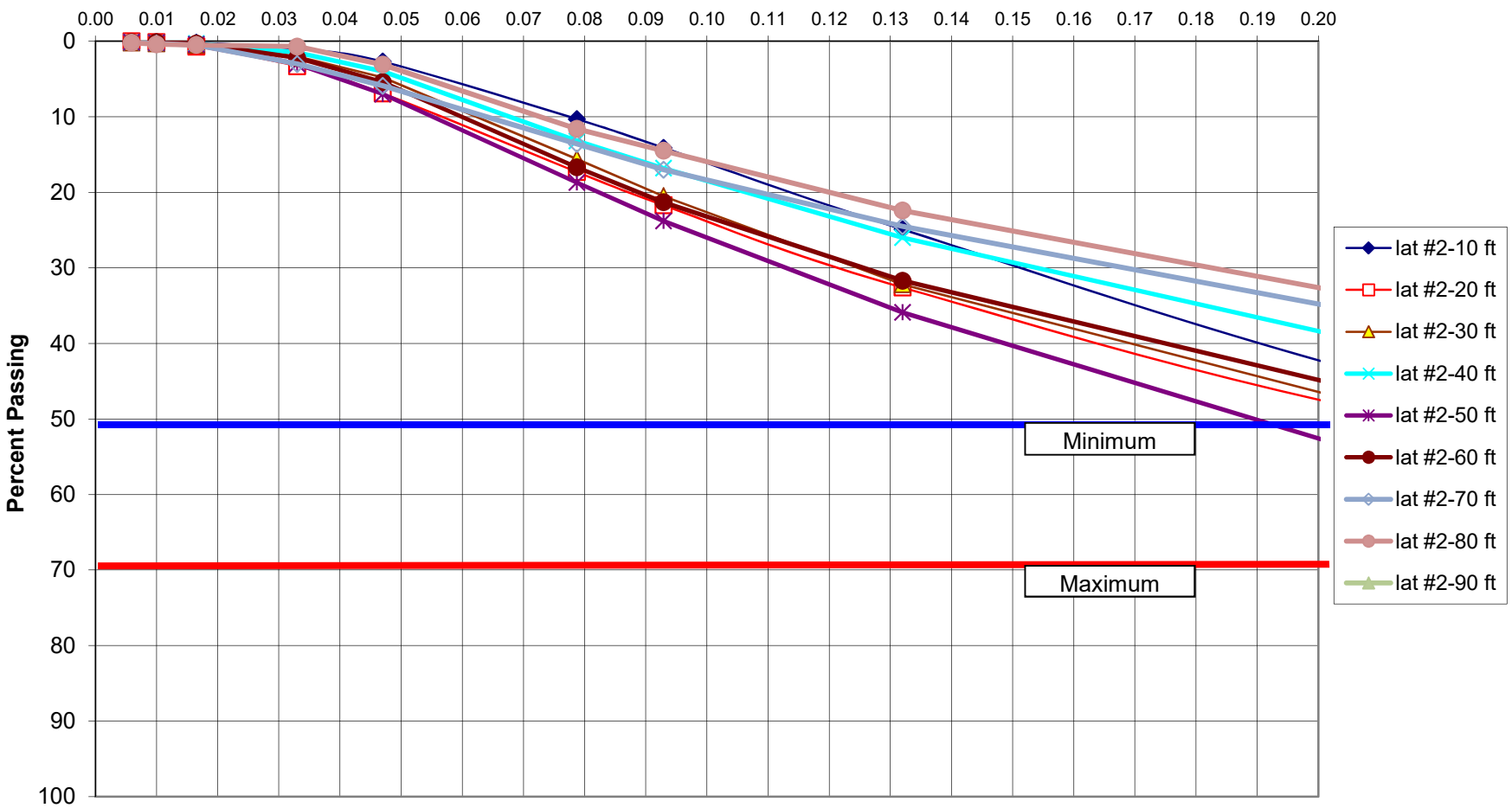
	Slot size	slot size inches	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing
Sieve	mm		lat #2-10 ft	lat #2-20 ft	lat #2-30 ft	lat #2-40 ft	lat #2-50 ft	lat #2-60 ft	lat #2-70 ft	lat #2-80 ft	lat #2-90 ft	lat #2-100 ft	lat #2-110 ft
		0.375	75.4	72	70.1	63.1	80.8	67.4	59.0	54.3	60.9	59	68.3
3.5	5.6	0.220	46.7	51	50.7	42.1	57.6	48.8	37.9	35.7	38.4	38	46.2
6	3.353	0.132	24.9	32.6	32.2	26	35.9	31.7	24.5	22.4	24.1	22.8	28.0
8	2.36	0.093	14.1	21.7	20.5	16.8	23.8	21.3	17.0	14.5	16.1	15	18.2
10	2	0.079	10.3	17.3	15.6	13.2	18.7	16.7	13.6	11.6	12.8	11.8	14.3
16	1.194	0.047	2.7	6.9	4.8	4	7	5.4	5.9	3.1	4.8	4.9	5.8
20	0.838	0.033	1	3.3	2	1.5	3	2.2	3.0	0.7	2.1	2.3	2.7
40	0.419	0.016	0.2	0.7	0.5	0.3	0.4	0.3	0.5	0.5	0.3	0.4	0.3
60	0.254	0.010	0.1	0.1	0.3	0.2	0.2	0.1	0.3	0.4	0.2	0.2	0.1
100	0.15	0.006	0.1	0	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1

Recommended Screen Selection

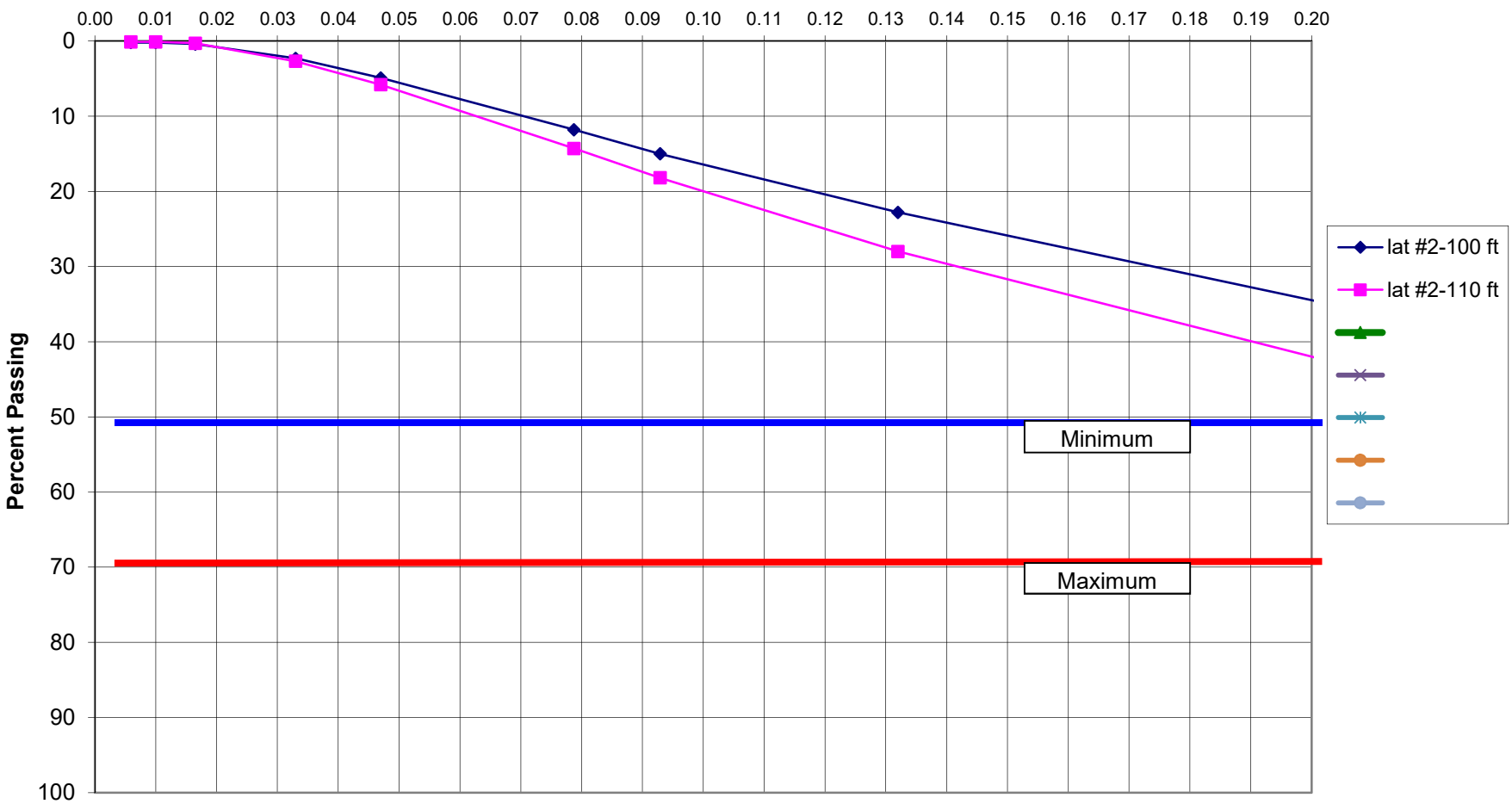
0-5	Blank	95-105	150 slot
5-15	100 slot		
15-25	125 slot		
25-35	150 slot		
35-45	150 slot		
45-55	150 slot		
55-65	150 slot		
65-75	150 slot		
75-85	150 slot		
85-95	150 slot		

Lateral #2 total lateral length - 105'

Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well36 - Job No. 14606
Lateral #2



Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well 3 - Job No. 14606
Lateral #2



Humboldt Bay Municipal Water District Collector Well #3; Lateral #2

Deviation of collector well lateral from horizontal
Angle measurements from Inclinometer
23-Mar-12 Lateral #2

Pipe Segment	Segment Length	Angle from Hor	Radians from Hor	Segment Deviation	Accumulated Deviation		Distance from caisson wall
				Feet	Feet	**Inches**	
4	20	-0.40	(0.00698)	(0.1396)	(0.1396)	**(1.68)**	20
6	15	-0.70	(0.01222)	(0.1833)	(0.3229)	**(3.87)**	35
8	15	-0.90	(0.01571)	(0.2356)	(0.5585)	**(6.70)**	50
10	15	0.10	0.00175	0.0262	(0.5323)	**(6.39)**	65
12	15	-0.70	(0.01222)	(0.1833)	(0.7156)	**(8.59)**	80
14	15	-0.80	(0.01396)	(0.2094)	(0.9250)	**(11.10)**	95
16	15	-0.40	(0.00698)	(0.1047)	(1.0297)	**(12.36)**	110
18	15	0.30	0.00524	0.0785	(0.9512)	**(11.41)**	125
20	15	0.50	0.00873	0.1309	(0.8203)	**(9.84)**	140
22	15	1.10	0.01920	0.2880	(0.5323)	**(6.39)**	155

Positive angles are up; negative angles are down
We assume a series of straight line segments.
Deviation of segment by sin (angle) x segment length
Each segment deviation is added to accumulated deviation of previous segments

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 10 **Feet** **Pipe No.** 2

Initial Wt. **2073** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	506	506	24.6%	75.4%
3.5	5.600	0.223	591	1097	53.3%	46.7%
6	3.353	0.132	449	1546	75.1%	24.9%
8	2.360	0.094	222	1768	85.9%	14.1%
10	1.999	0.079	79	1847	89.7%	10.3%
16	1.194	0.047	156	2003	97.3%	2.7%
20	0.838	0.033	35	2038	99.0%	1.0%
40	0.419	0.017	16	2054	99.8%	0.2%
60	0.254	0.010	1	2055	99.9%	0.1%
100	0.150	0.006	1	2056	99.9%	0.1%
Pan			2	2058	100.0%	0.0%
		Total	2058	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 20 **Feet** **Pipe No.** 4

Initial Wt. **2208** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	615	615	28.0%	72.0%
3.5	5.600	0.223	463	1078	49.0%	51.0%
6	3.353	0.132	405	1483	67.4%	32.6%
8	2.360	0.094	240	1723	78.3%	21.7%
10	1.999	0.079	97	1820	82.7%	17.3%
16	1.194	0.047	229	2049	93.1%	6.9%
20	0.838	0.033	78	2127	96.7%	3.3%
40	0.419	0.017	58	2185	99.3%	0.7%
60	0.254	0.010	13	2198	99.9%	0.1%
100	0.150	0.006	1	2199	100.0%	0.0%
Pan			1	2200	100.0%	0.0%
		Total	2200			
		Difference	0.4%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 30 **Feet** **Pipe No.** 6

Initial Wt. **2150** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	637	637	29.9%	70.1%
3.5	5.600	0.223	414	1051	49.3%	50.7%
6	3.353	0.132	396	1447	67.8%	32.2%
8	2.360	0.094	250	1697	79.5%	20.5%
10	1.999	0.079	104	1801	84.4%	15.6%
16	1.194	0.047	231	2032	95.2%	4.8%
20	0.838	0.033	60	2092	98.0%	2.0%
40	0.419	0.017	32	2124	99.5%	0.5%
60	0.254	0.010	3	2127	99.7%	0.3%
100	0.150	0.006	2	2129	99.8%	0.2%
Pan			5	2134	100.0%	0.0%
		Total	2134	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 40 **Feet** **Pipe No.** 8

Initial Wt. **2144** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	786	786	36.9%	63.1%
3.5	5.664	0.223	447	1233	57.9%	42.1%
6	3.353	0.132	345	1578	74.0%	26.0%
8	2.388	0.094	195	1773	83.2%	16.8%
10	1.999	0.079	77	1850	86.8%	13.2%
16	1.194	0.047	196	2046	96.0%	4.0%
20	0.838	0.033	52	2098	98.5%	1.5%
40	0.419	0.017	26	2124	99.7%	0.3%
60	0.254	0.010	3	2127	99.8%	0.2%
100	0.150	0.006	1	2128	99.9%	0.1%
Pan			3	2131	100.0%	0.0%
		Total	2131			
		Difference	0.6%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 50 **Feet** **Pipe No.** 10

Initial Wt. **2033** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	388	388	19.2%	80.8%
3.5	5.600	0.223	469	857	42.4%	57.6%
6	3.353	0.132	438	1295	64.1%	35.9%
8	2.360	0.094	245	1540	76.2%	23.8%
10	1.999	0.079	104	1644	81.3%	18.7%
16	1.194	0.047	235	1879	93.0%	7.0%
20	0.838	0.033	82	1961	97.0%	3.0%
40	0.419	0.017	51	2012	99.6%	0.4%
60	0.254	0.010	5	2017	99.8%	0.2%
100	0.150	0.006	2	2019	99.9%	0.1%
Pan			2	2021	100.0%	0.0%
		Total	2021	grams		
		Difference	0.6%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 60 **Feet** **Pipe No.** 12

Initial Wt. **1962** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	634	634	32.6%	67.4%
3.5	5.600	0.223	362	996	51.2%	48.8%
6	3.353	0.132	333	1329	68.3%	31.7%
8	2.360	0.094	202	1531	78.7%	21.3%
10	1.999	0.079	89	1620	83.3%	16.7%
16	1.194	0.047	220	1840	94.6%	5.4%
20	0.838	0.033	62	1902	97.8%	2.2%
40	0.419	0.017	38	1940	99.7%	0.3%
60	0.254	0.010	3	1943	99.9%	0.1%
100	0.150	0.006	1	1944	99.9%	0.1%
Pan			1	1945	100.0%	0.0%
		Total	1945			
		Difference	0.9%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 70 **Feet** **Pipe No.** 14

Initial Wt. **1864** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	763	763	41.0%	59.0%
3.5	5.600	0.223	392	1155	62.1%	37.9%
6	3.353	0.132	250	1405	75.5%	24.5%
8	2.360	0.094	140	1545	83.0%	17.0%
10	1.999	0.079	63	1608	86.4%	13.6%
16	1.194	0.047	143	1751	94.1%	5.9%
20	0.838	0.033	54	1805	97.0%	3.0%
40	0.419	0.017	46	1851	99.5%	0.5%
60	0.254	0.010	5	1856	99.7%	0.3%
100	0.150	0.006	2	1858	99.8%	0.2%
Pan			3	1861	100.0%	0.0%
		Total	1861	grams		
		Difference	0.2%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 80 **Feet** **Pipe No.** 16

Initial Wt. **1697** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	771	771	45.7%	54.3%
3.5	5.600	0.223	313	1084	64.3%	35.7%
6	3.353	0.132	225	1309	77.6%	22.4%
8	2.360	0.094	132	1441	85.5%	14.5%
10	1.999	0.079	50	1491	88.4%	11.6%
16	1.194	0.047	143	1634	96.9%	3.1%
20	0.838	0.033	40	1674	99.3%	0.7%
40	0.419	0.017	4	1678	99.5%	0.5%
60	0.254	0.010	2	1680	99.6%	0.4%
100	0.150	0.006	3	1683	99.8%	0.2%
Pan			3	1686	100.0%	0.0%
		Total	1686			
		Difference	0.6%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 90 **Feet** **Pipe No.** 18

Initial Wt. **1772** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	690	690	39.1%	60.9%
3.5	5.600	0.223	396	1086	61.6%	38.4%
6	3.353	0.132	253	1339	75.9%	24.1%
8	2.360	0.094	141	1480	83.9%	16.1%
10	1.999	0.079	58	1538	87.2%	12.8%
16	1.194	0.047	142	1680	95.2%	4.8%
20	0.838	0.033	47	1727	97.9%	2.1%
40	0.419	0.017	31	1758	99.7%	0.3%
60	0.254	0.010	3	1761	99.8%	0.2%
100	0.150	0.006	1	1762	99.9%	0.1%
Pan			2	1764	100.0%	0.0%
		Total	1764	grams		
		Difference	0.5%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 2
Interval: 100 **Feet** **Pipe No.** 20

Initial Wt. **1717** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	701	701	41.0%	59.0%
3.5	5.600	0.223	359	1060	62.0%	38.0%
6	3.353	0.132	260	1320	77.2%	22.8%
8	2.360	0.094	134	1454	85.0%	15.0%
10	1.999	0.079	54	1508	88.2%	11.8%
16	1.194	0.047	118	1626	95.1%	4.9%
20	0.838	0.033	45	1671	97.7%	2.3%
40	0.419	0.017	32	1703	99.6%	0.4%
60	0.254	0.010	3	1706	99.8%	0.2%
100	0.150	0.006	1	1707	99.8%	0.2%
Pan			3	1710	100.0%	0.0%
		Total	1710			
		Difference	0.4%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 2

Interval: 110 **Feet** **Pipe No.** 22

Initial Wt. **2082** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	659	659	31.7%	68.3%
3.5	5.600	0.223	458	1117	53.8%	46.2%
6	3.353	0.132	380	1497	72.0%	28.0%
8	2.360	0.094	203	1700	81.8%	18.2%
10	1.999	0.079	80	1780	85.7%	14.3%
16	1.194	0.047	178	1958	94.2%	5.8%
20	0.838	0.033	63	2021	97.3%	2.7%
40	0.419	0.017	50	2071	99.7%	0.3%
60	0.254	0.010	4	2075	99.9%	0.1%
100	0.150	0.006	1	2076	99.9%	0.1%
Pan			2	2078	100.0%	0.0%
		Total	2078	grams		
		Difference	0.2%			

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

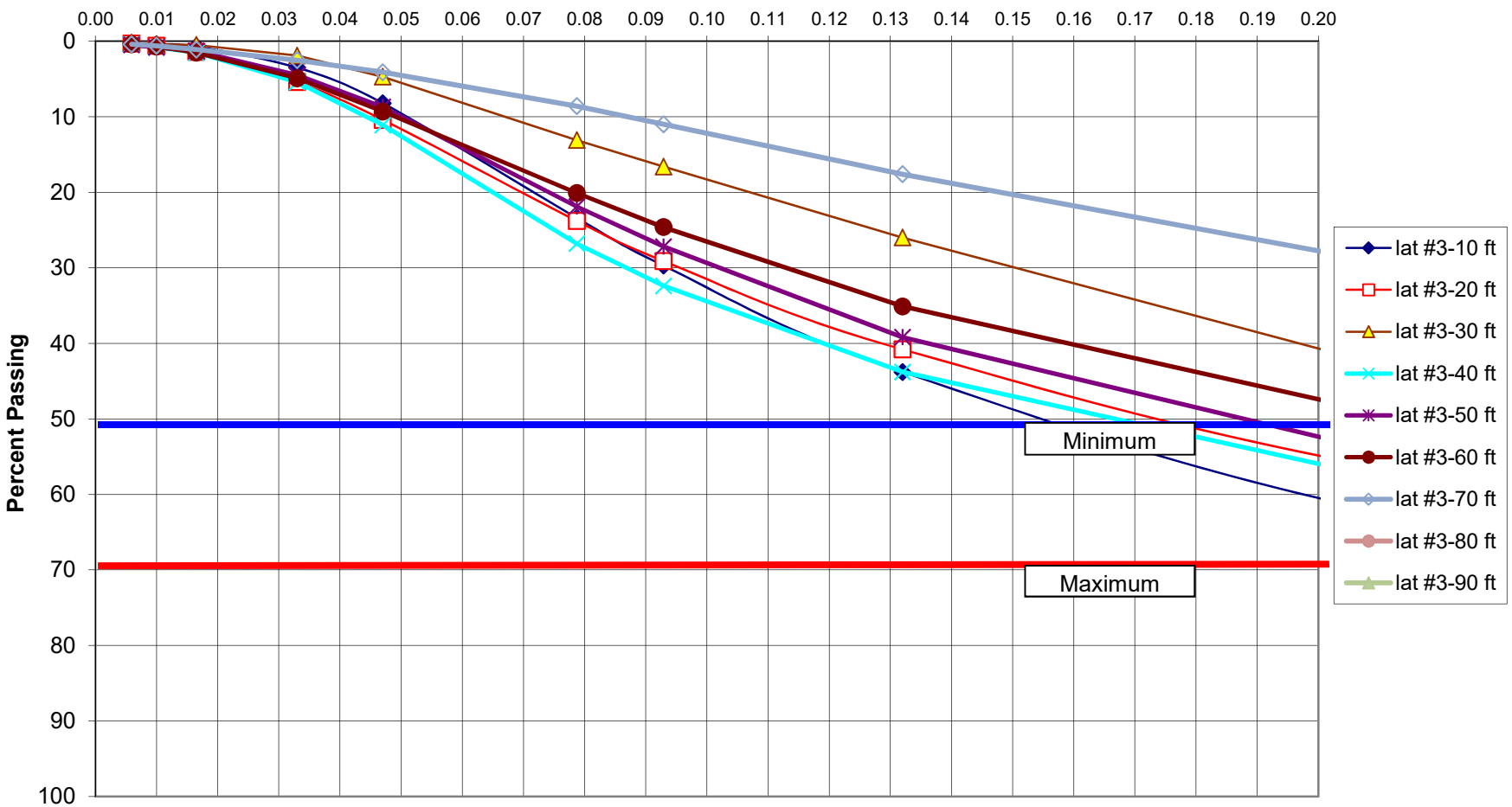
Lateral Number: 2

Interval: 120 **Feet** **Pipe No.** 24

Initial Wt. **0** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375			#VALUE!	#VALUE!
3.5	5.600	0.223			#VALUE!	#VALUE!
6	3.353	0.132			#VALUE!	#VALUE!
8	2.360	0.094			#VALUE!	#VALUE!
10	1.999	0.079			#VALUE!	#VALUE!
16	1.194	0.047			#VALUE!	#VALUE!
20	0.838	0.033			#VALUE!	#VALUE!
40	0.419	0.017			#VALUE!	#VALUE!
60	0.254	0.010			#VALUE!	#VALUE!
100	0.150	0.006			#VALUE!	#VALUE!
Pan					#VALUE!	#VALUE!
		Total	0			
		Difference	#DIV/0!			

Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well36 - Job No. 14606
Lateral #3



Humboldt Bay
New Lateral Installation
Ranney Well 3
Job No. 14606
Lateral #3 Completed

Northwest Sieve	Slot size mm	slot size inches	% passing lat #3-10 ft	% passing lat #3-20 ft	% passing lat #3-30 ft	% passing lat #3-40 ft	% passing lat #3-50 ft	% passing lat #3-60 ft	% passing lat #3-70 ft	% passing lat #3-80 ft	% passing lat #3-90 ft	% passing lat #3-100 ft	% passing lat #3-110 ft	% passing lat #3-120 ft	% passing lat #3-130 ft	% passing lat #3-140 ft	% passing lat #3-150 ft	% passing lat #3-160 ft
		0.375	81.4	73.7	68.3	73	71.4	68.5	47.2									
3.5	5.6	0.220	64	57.9	45.1	59.6	56.3	51.1	30.8									
6	3.353	0.132	43.8	40.8	26	43.8	39.2	35.1	17.6									
8	2.36	0.093	29.7	29.1	16.6	32.4	27.2	24.6	11.0									
10	2	0.079	23.4	23.8	13.1	26.8	21.9	20.1	8.6									
16	1.194	0.047	8.2	10.4	4.7	11.1	8.7	9.3	4.1									
20	0.838	0.033	3.5	5.4	1.9	5.4	4.5	4.9	2.5									
40	0.419	0.016	0.7	1.4	0.5	1.5	1.3	1.5	1.1									
60	0.254	0.010	0.4	0.6	0.4	0.8	0.8	0.7	0.6									
100	0.15	0.006	0.3	0.3	0.2	0.4	0.5	0.4	0.4									

Recommended Screen Selection

0-5	Blank	95-105	slot
5-15	100 slot	105-115	slot
15-25	125 slot	115-125	slot
25-35	125 slot	125-135	slot
35-45	150 slot	135-145	slot
45-55	150 slot	145-155	slot
55-65	150 slot	155-165	slot
65-75	150 slot		
75-85	slot		
85-95	slot		

Lateral #3 total lateral length

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 10 **Feet** **Pipe No.** 2

Initial Wt. **1812** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	337	337	18.6%	81.4%
3.5	5.600	0.223	314	651	36.0%	64.0%
6	3.353	0.132	367	1018	56.2%	43.8%
8	2.360	0.094	255	1273	70.3%	29.7%
10	1.999	0.079	114	1387	76.6%	23.4%
16	1.194	0.047	275	1662	91.8%	8.2%
20	0.838	0.033	85	1747	96.5%	3.5%
40	0.419	0.017	50	1797	99.3%	0.7%
60	0.254	0.010	6	1803	99.6%	0.4%
100	0.150	0.006	2	1805	99.7%	0.3%
Pan			5	1810	100.0%	0.0%
		Total	1810	grams		
		Difference	0.1%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 20 **Feet** **Pipe No.** 4

Initial Wt. **2165** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	568	568	26.3%	73.7%
3.5	5.600	0.223	341	909	42.1%	57.9%
6	3.353	0.132	369	1278	59.2%	40.8%
8	2.360	0.094	254	1532	70.9%	29.1%
10	1.999	0.079	113	1645	76.2%	23.8%
16	1.194	0.047	291	1936	89.6%	10.4%
20	0.838	0.033	107	2043	94.6%	5.4%
40	0.419	0.017	86	2129	98.6%	1.4%
60	0.254	0.010	18	2147	99.4%	0.6%
100	0.150	0.006	6	2153	99.7%	0.3%
Pan			7	2160	100.0%	0.0%
		Total	2160			
		Difference	0.2%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 30 **Feet** **Pipe No.** 6

Initial Wt. **1921** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	606	606	31.7%	68.3%
3.5	5.600	0.223	445	1051	54.9%	45.1%
6	3.353	0.132	364	1415	74.0%	26.0%
8	2.360	0.094	181	1596	83.4%	16.6%
10	1.999	0.079	66	1662	86.9%	13.1%
16	1.194	0.047	161	1823	95.3%	4.7%
20	0.838	0.033	53	1876	98.1%	1.9%
40	0.419	0.017	28	1904	99.5%	0.5%
60	0.254	0.010	2	1906	99.6%	0.4%
100	0.150	0.006	3	1909	99.8%	0.2%
Pan			4	1913	100.0%	0.0%
		Total	1913	grams		
		Difference	0.4%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 40 **Feet** **Pipe No.** 8

Initial Wt. **1648** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	444	444	27.0%	73.0%
3.5	5.664	0.223	220	664	40.4%	59.6%
6	3.353	0.132	259	923	56.2%	43.8%
8	2.388	0.094	187	1110	67.6%	32.4%
10	1.999	0.079	92	1202	73.2%	26.8%
16	1.194	0.047	258	1460	88.9%	11.1%
20	0.838	0.033	94	1554	94.6%	5.4%
40	0.419	0.017	64	1618	98.5%	1.5%
60	0.254	0.010	12	1630	99.2%	0.8%
100	0.150	0.006	6	1636	99.6%	0.4%
Pan			7	1643	100.0%	0.0%
		Total	1643			
		Difference	0.3%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 50 **Feet** **Pipe No.** 10

Initial Wt. **2224** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	635	635	28.6%	71.4%
3.5	5.600	0.223	336	971	43.7%	56.3%
6	3.353	0.132	381	1352	60.8%	39.2%
8	2.360	0.094	266	1618	72.8%	27.2%
10	1.999	0.079	118	1736	78.1%	21.9%
16	1.194	0.047	292	2028	91.3%	8.7%
20	0.838	0.033	94	2122	95.5%	4.5%
40	0.419	0.017	71	2193	98.7%	1.3%
60	0.254	0.010	12	2205	99.2%	0.8%
100	0.150	0.006	6	2211	99.5%	0.5%
Pan			11	2222	100.0%	0.0%
		Total	2222	grams		
		Difference	0.1%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 60 **Feet** **Pipe No.** 12

Initial Wt. **1852** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	584	584	31.5%	68.5%
3.5	5.600	0.223	323	907	48.9%	51.1%
6	3.353	0.132	297	1204	64.9%	35.1%
8	2.360	0.094	194	1398	75.4%	24.6%
10	1.999	0.079	83	1481	79.9%	20.1%
16	1.194	0.047	201	1682	90.7%	9.3%
20	0.838	0.033	81	1763	95.1%	4.9%
40	0.419	0.017	63	1826	98.5%	1.5%
60	0.254	0.010	15	1841	99.3%	0.7%
100	0.150	0.006	6	1847	99.6%	0.4%
Pan			7	1854	100.0%	0.0%
		Total	1854			
		Difference	-0.1%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 70 **Feet** **Pipe No.** 14

Initial Wt. **2050** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1081	1081	52.8%	47.2%
3.5	5.600	0.223	336	1417	69.2%	30.8%
6	3.353	0.132	272	1689	82.4%	17.6%
8	2.360	0.094	135	1824	89.0%	11.0%
10	1.999	0.079	49	1873	91.4%	8.6%
16	1.194	0.047	93	1966	95.9%	4.1%
20	0.838	0.033	32	1998	97.5%	2.5%
40	0.419	0.017	28	2026	98.9%	1.1%
60	0.254	0.010	10	2036	99.4%	0.6%
100	0.150	0.006	4	2040	99.6%	0.4%
Pan			9	2049	100.0%	0.0%
		Total	2049	grams		
		Difference	0.0%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 3
Interval: 0 **Feet** **Pipe No.** 0

Initial Wt. **10** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	1	1	10.0%	90.0%
3.5	5.600	0.223	1	2	20.0%	80.0%
6	3.353	0.132	1	3	30.0%	70.0%
8	2.360	0.094	1	4	40.0%	60.0%
10	1.999	0.079	1	5	50.0%	50.0%
16	1.194	0.047	1	6	60.0%	40.0%
20	0.838	0.033	1	7	70.0%	30.0%
40	0.419	0.017	1	8	80.0%	20.0%
60	0.254	0.010	1	9	90.0%	10.0%
100	0.150	0.006	1	10	100.0%	0.0%
Pan			0	10	100.0%	0.0%
		Total	10			
		Difference	0.0%			

Humboldt Bay
New Lateral Installation
Ranney Well 3
Job No. 14606
Lateral #4 Completed 4/3/2012

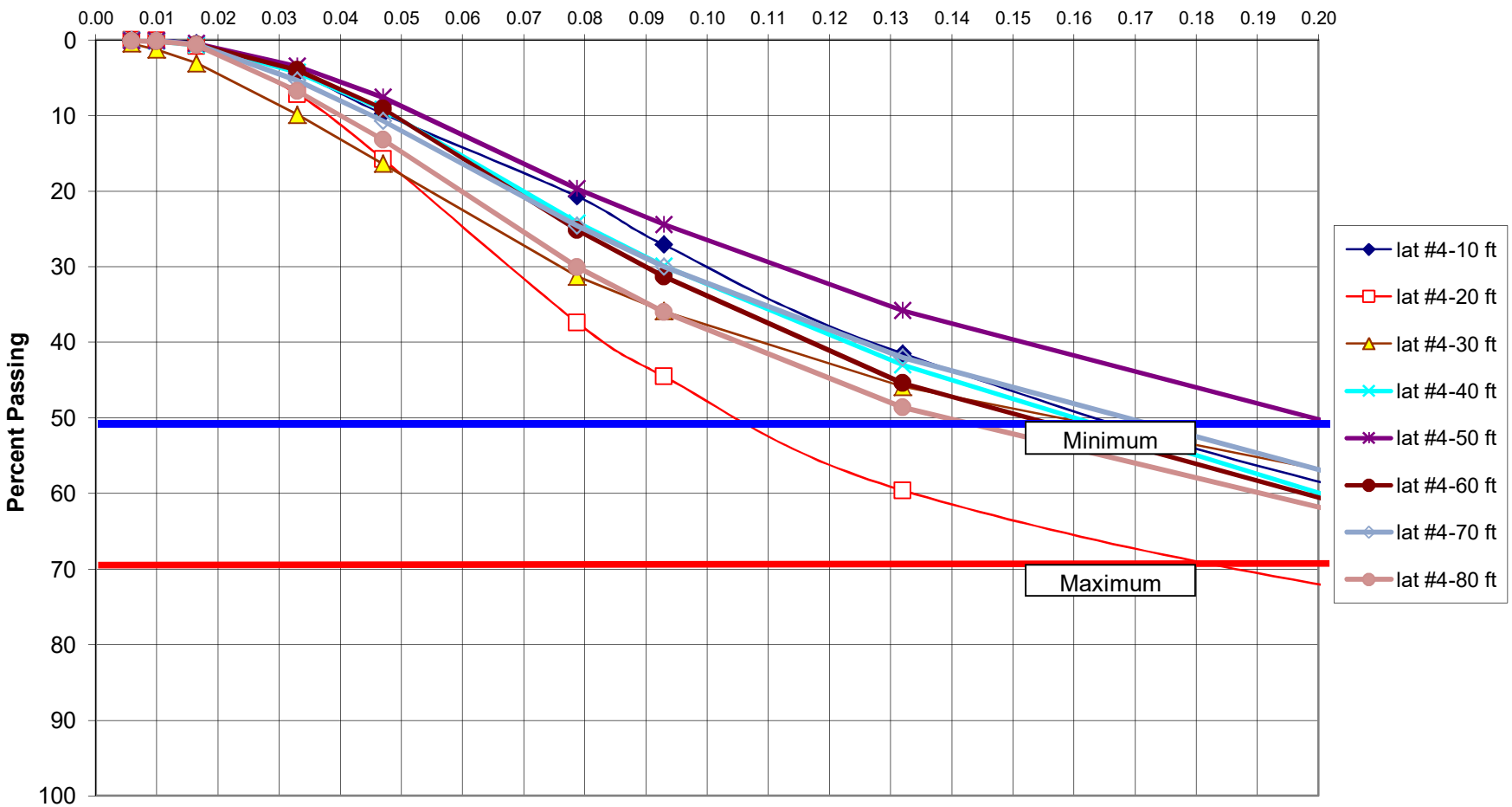
	slot size									
	Slot size	inches	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing
Sieve	mm		lat #4-10 ft	lat #4-20 ft	lat #4-30 ft	lat #4-40 ft	lat #4-50 ft	lat #4-60 ft	lat #4-70 ft	lat #4-80 ft
		0.375	82.9	91	74	84.2	75.4	81.9	81.2	80.2
3.5	5.6	0.220	62.2	74.8	60.1	65	54.5	65.1	61.3	65.8
6	3.353	0.132	41.5	59.6	45.9	43	35.8	45.4	42.0	48.6
8	2.36	0.093	27.1	44.5	35.9	29.9	24.4	31.3	30.0	36
10	2	0.079	20.7	37.4	31.3	24.2	19.7	25.2	24.6	30.1
16	1.194	0.047	9.8	15.8	16.4	9.2	7.6	9.1	10.7	13.2
20	0.838	0.033	4.4	7.2	9.9	4.3	3.5	4	5.4	6.8
40	0.419	0.016	0.5	0.8	3.1	0.7	0.5	0.6	0.6	0.7
60	0.254	0.010	0.1	0.1	1.3	0.2	0.1	0.2	0.1	0.2
100	0.15	0.006	0.1	0	0.5	0	0.1	0.1	0.0	0.2

Recommended Screen Selection

0-5	Blank	95-105	n/a slot
5-15	100 slot	105-115	n/a slot
15-25	100 slot	115-125	n/a slot
25-35	125 slot	125-135	n/a slot
35-45	150 slot	135-145	n/a slot
45-55	150 slot	145-155	n/a slot
55-65	150 slot		
65-75	150 slot		
75-85	125 slot		
85-95	n/a slot		

Lateral #4 total lateral length - 85'

Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well 3 - Job No. 14606
Lateral #4



Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 4

Interval: 10 **Feet** **Pipe No.** 2

Initial Wt. **1310** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	224	224	17.1%	82.9%
3.5	5.600	0.223	270	494	37.8%	62.2%
6	3.353	0.132	270	764	58.5%	41.5%
8	2.360	0.094	189	953	72.9%	27.1%
10	1.999	0.079	84	1037	79.3%	20.7%
16	1.194	0.047	142	1179	90.2%	9.8%
20	0.838	0.033	71	1250	95.6%	4.4%
40	0.419	0.017	50	1300	99.5%	0.5%
60	0.254	0.010	6	1306	99.9%	0.1%
100	0.150	0.006	0	1306	99.9%	0.1%
Pan			1	1307	100.0%	0.0%
		Total	1307	grams		
		Difference	0.2%			

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 4

Interval: 20 **Feet** **Pipe No.** 4

Initial Wt. **1387** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	124	124	9.0%	91.0%
3.5	5.600	0.223	225	349	25.2%	74.8%
6	3.353	0.132	210	559	40.4%	59.6%
8	2.360	0.094	209	768	55.5%	44.5%
10	1.999	0.079	98	866	62.6%	37.4%
16	1.194	0.047	299	1165	84.2%	15.8%
20	0.838	0.033	118	1283	92.8%	7.2%
40	0.419	0.017	89	1372	99.2%	0.8%
60	0.254	0.010	9	1381	99.9%	0.1%
100	0.150	0.006	2	1383	100.0%	0.0%
Pan			0	1383	100.0%	0.0%
		Total	1383			
		Difference	0.3%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 4
Interval: 30 **Feet** **Pipe No.** 6

Initial Wt. **1701** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	440	440	26.0%	74.0%
3.5	5.600	0.223	236	676	39.9%	60.1%
6	3.353	0.132	240	916	54.1%	45.9%
8	2.360	0.094	170	1086	64.1%	35.9%
10	1.999	0.079	78	1164	68.7%	31.3%
16	1.194	0.047	252	1416	83.6%	16.4%
20	0.838	0.033	111	1527	90.1%	9.9%
40	0.419	0.017	115	1642	96.9%	3.1%
60	0.254	0.010	30	1672	98.7%	1.3%
100	0.150	0.006	13	1685	99.5%	0.5%
Pan			9	1694	100.0%	0.0%
		Total	1694	grams		
		Difference	0.4%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 4
Interval: 40 **Feet** **Pipe No.** 8

Initial Wt. **1715** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	271	271	15.8%	84.2%
3.5	5.664	0.223	329	600	35.0%	65.0%
6	3.353	0.132	376	976	57.0%	43.0%
8	2.388	0.094	224	1200	70.1%	29.9%
10	1.999	0.079	98	1298	75.8%	24.2%
16	1.194	0.047	256	1554	90.8%	9.2%
20	0.838	0.033	84	1638	95.7%	4.3%
40	0.419	0.017	62	1700	99.3%	0.7%
60	0.254	0.010	9	1709	99.8%	0.2%
100	0.150	0.006	3	1712	100.0%	0.0%
Pan			0	1712	100.0%	0.0%
		Total	1712			
		Difference	0.2%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 4

Interval: 50 **Feet** **Pipe No.** 10

Initial Wt. **1950** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	478	478	24.6%	75.4%
3.5	5.600	0.223	406	884	45.5%	54.5%
6	3.353	0.132	363	1247	64.2%	35.8%
8	2.360	0.094	221	1468	75.6%	24.4%
10	1.999	0.079	93	1561	80.3%	19.7%
16	1.194	0.047	234	1795	92.4%	7.6%
20	0.838	0.033	80	1875	96.5%	3.5%
40	0.419	0.017	59	1934	99.5%	0.5%
60	0.254	0.010	7	1941	99.9%	0.1%
100	0.150	0.006	0	1941	99.9%	0.1%
Pan			2	1943	100.0%	0.0%
		Total	1943	grams		
		Difference	0.4%			

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 4

Interval: 60 **Feet** **Pipe No.** 12

Initial Wt. **1780** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	321	321	18.1%	81.9%
3.5	5.600	0.223	299	620	34.9%	65.1%
6	3.353	0.132	350	970	54.6%	45.4%
8	2.360	0.094	249	1219	68.7%	31.3%
10	1.999	0.079	108	1327	74.8%	25.2%
16	1.194	0.047	286	1613	90.9%	9.1%
20	0.838	0.033	91	1704	96.0%	4.0%
40	0.419	0.017	61	1765	99.4%	0.6%
60	0.254	0.010	6	1771	99.8%	0.2%
100	0.150	0.006	2	1773	99.9%	0.1%
Pan			2	1775	100.0%	0.0%
		Total	1775			
		Difference	0.3%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 4

Interval: 70 **Feet** **Pipe No.** 14

Initial Wt. **1608** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	301	301	18.8%	81.2%
3.5	5.600	0.223	319	620	38.8%	61.3%
6	3.353	0.132	308	928	58.0%	42.0%
8	2.360	0.094	192	1120	70.0%	30.0%
10	1.999	0.079	86	1206	75.4%	24.6%
16	1.194	0.047	223	1429	89.3%	10.7%
20	0.838	0.033	84	1513	94.6%	5.4%
40	0.419	0.017	77	1590	99.4%	0.6%
60	0.254	0.010	8	1598	99.9%	0.1%
100	0.150	0.006	2	1600	100.0%	0.0%
Pan			0	1600	100.0%	0.0%
		Total	1600	grams		
		Difference	0.5%			

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

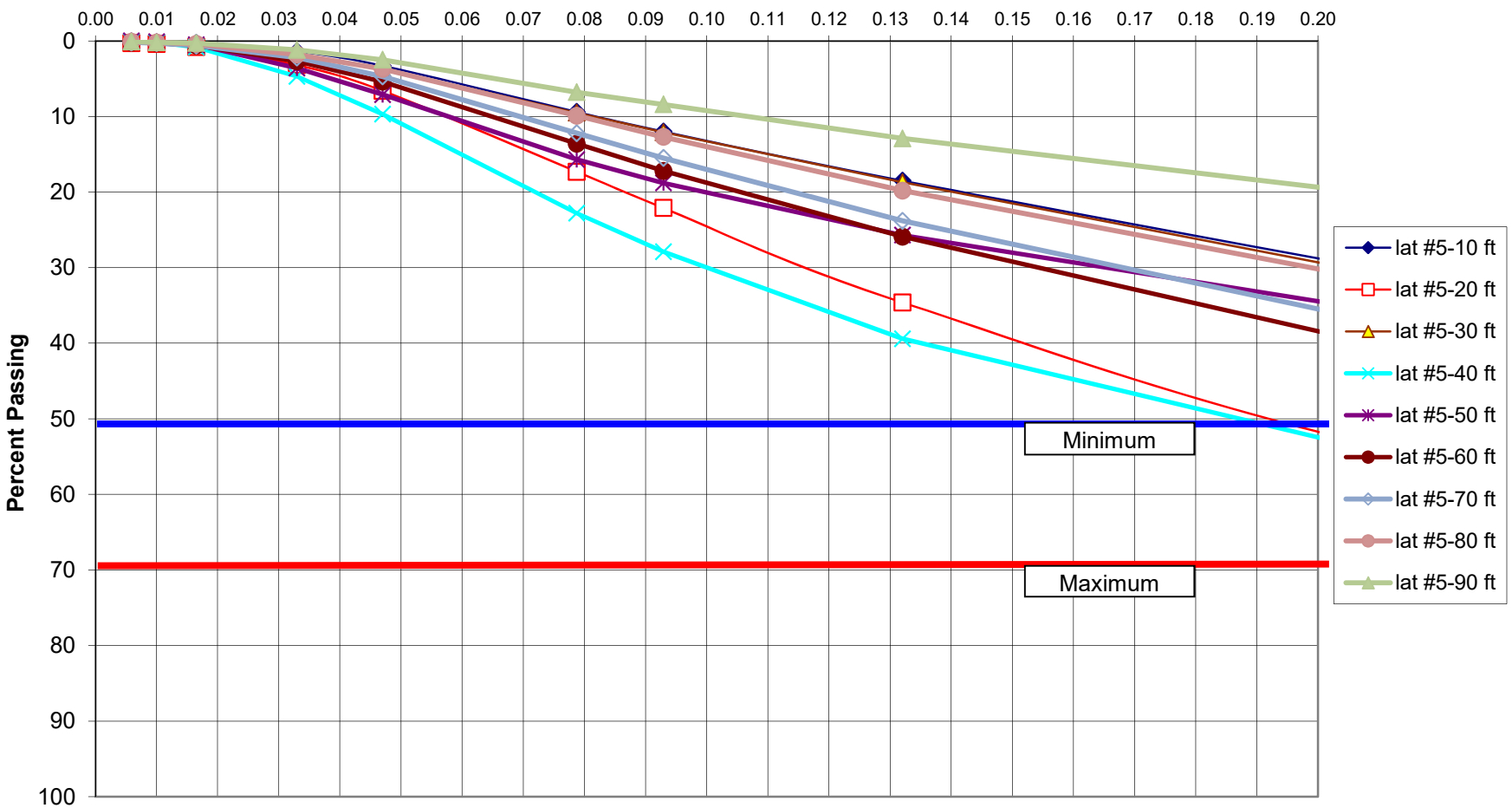
Lateral Number: 4

Interval: 80 **Feet** **Pipe No.** 16

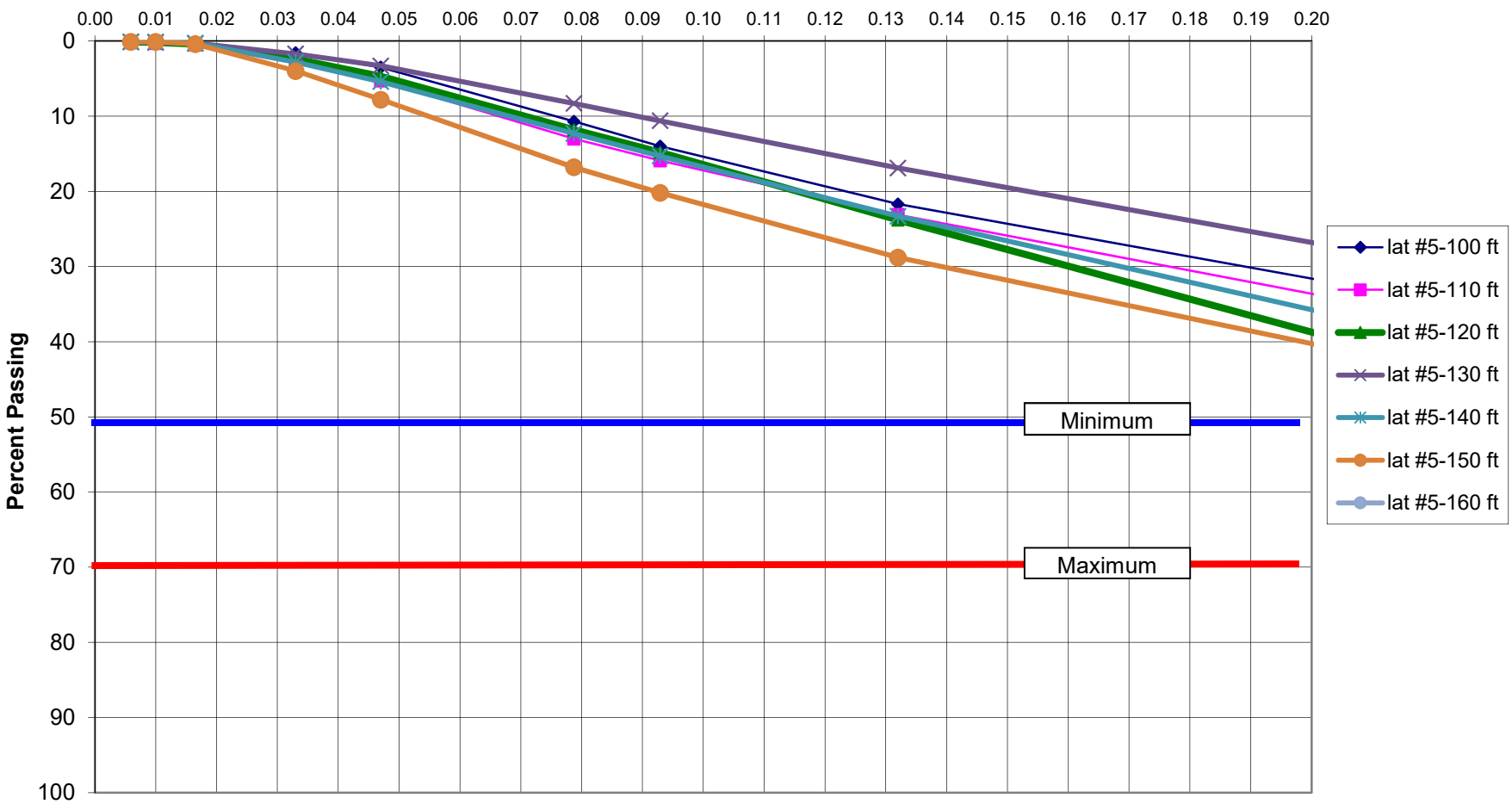
Initial Wt. **1771** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	350	350	19.8%	80.2%
3.5	5.600	0.223	255	605	34.2%	65.8%
6	3.353	0.132	304	909	51.4%	48.6%
8	2.360	0.094	223	1132	64.0%	36.0%
10	1.999	0.079	105	1237	69.9%	30.1%
16	1.194	0.047	299	1536	86.8%	13.2%
20	0.838	0.033	112	1648	93.2%	6.8%
40	0.419	0.017	109	1757	99.3%	0.7%
60	0.254	0.010	9	1766	99.8%	0.2%
100	0.150	0.006	0	1766	99.8%	0.2%
Pan			3	1769	100.0%	0.0%
		Total	1769			
		Difference	0.1%			

Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well36 - Job No. 14606
Lateral #5



Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well 3 - Job No. 14606
Lateral #5



Humboldt Bay
New Lateral Installation
Ranney Well 3
Job No. 14606
Lateral #5 Completed 3/7/2012

	slot size																	
	Slot size	inches	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing	% passing
Sieve	mm		lat #5-10 ft	lat #5-20 ft	lat #5-30 ft	lat #5-40 ft	lat #5-50 ft	lat #5-60 ft	lat #5-70 ft	lat #5-80 ft	lat #5-90 ft	lat #5-100 ft	lat #5-110 ft	lat #5-120 ft	lat #5-130 ft	lat #5-140 ft	lat #5-150 ft	lat #5-160 ft
		0.375	54.3	76.8	51.8	74	53.9	62	57.7	51.3	35.5	50.3	56.7	68.1	51.5	61	61.5	
3.5	5.6	0.220	31.8	55.6	32.5	56.4	37.1	42.2	39.0	33.3	21.3	34.6	36.8	43.2	29.8	39.5	43.7	
6	3.353	0.132	18.5	34.6	18.7	39.4	25.7	25.9	23.8	19.8	12.9	21.7	23.1	23.8	16.9	23.3	28.8	
8	2.36	0.093	12	22.1	12.1	27.9	18.8	17.2	15.5	12.7	8.4	14	15.9	14.8	10.6	15.3	20.2	
10	2	0.079	9.4	17.3	9.5	22.8	15.7	13.6	12.2	9.9	6.8	10.7	13.0	11.8	8.3	12.3	16.8	
16	1.194	0.047	3.3	6.6	3.7	9.7	7.1	5.4	4.7	3.7	2.5	3.5	5.3	4.7	3.3	5.4	7.8	
20	0.838	0.033	1.4	3.2	1.8	4.7	3.6	2.7	2.2	1.8	1.2	1.6	2.6	2.4	1.7	2.8	4	
40	0.419	0.016	0.3	0.8	0.4	0.8	0.5	0.6	0.6	0.4	0.3	0.4	0.5	0.4	0.3	0.3	0.4	
60	0.254	0.010	0.2	0.4	0.2	0.2	0.1	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.1	
100	0.15	0.006	0.1	0.3	0.1	0.1	0	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	

Recommended Screen Selection

0-5	Blank	95-105	150 slot
5-15	100 slot	105-115	150 slot
15-25	100 slot	115-125	150 slot
25-35	125 slot	125-135	150 slot
35-45	100 slot	135-145	150 slot
45-55	125 slot	145-155	150 slot
55-65	150 slot		
65-75	150 slot		
75-85	150 slot		
85-95	150 slot		

Lateral #5 total lateral length -

Humboldt Bay
New Lateral Installation
Ranney Well 3
Job No. 14606
Lateral #6 Completed 2/22/2012

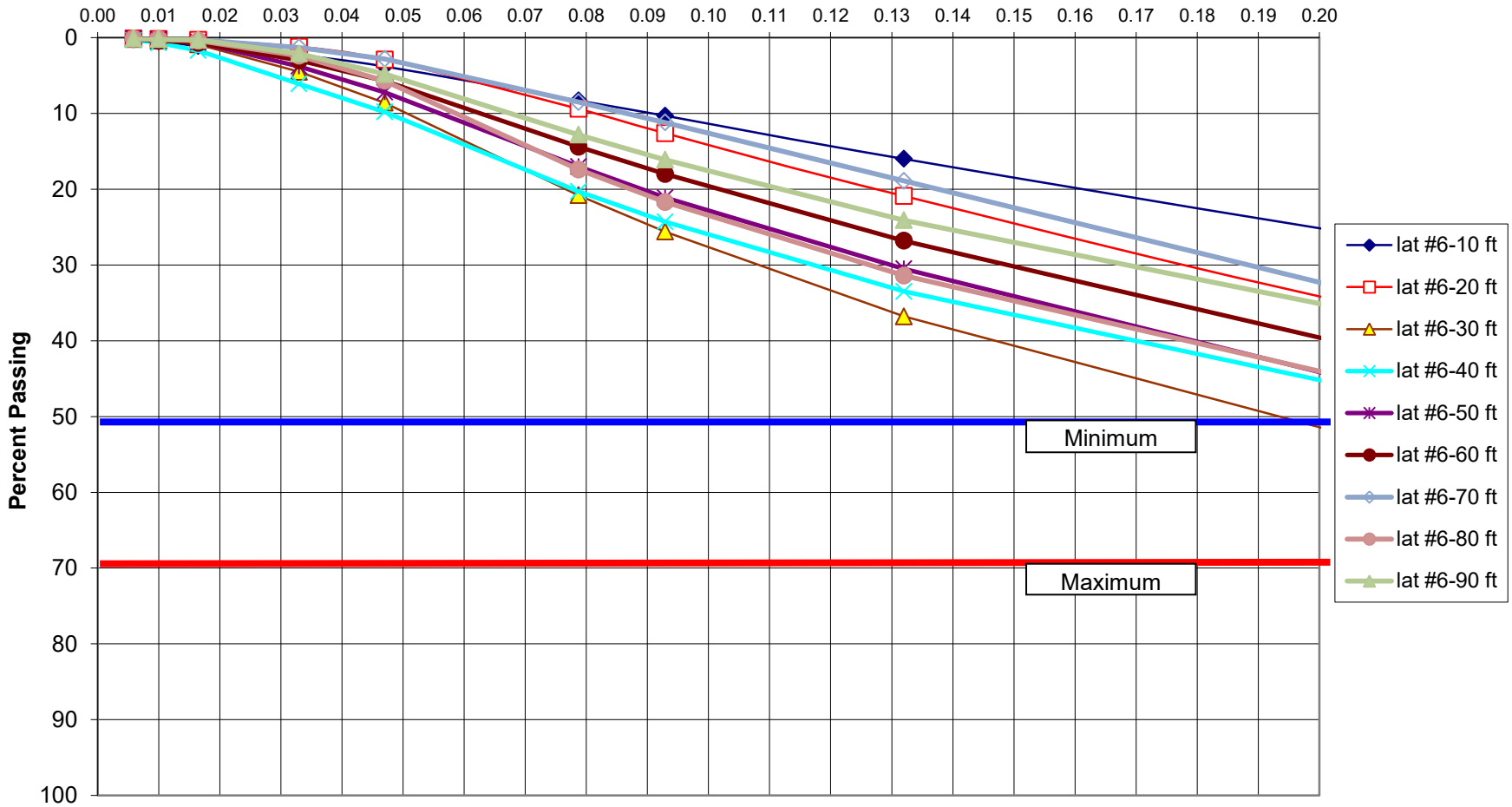
Sieve	Slot size mm	slot size inches	% passing lat #6-10 ft	% passing lat #6-20 ft	% passing lat #6-30 ft	% passing lat #6-40 ft	% passing lat #6-50 ft	% passing lat #6-60 ft	% passing lat #6-70 ft	% passing lat #6-80 ft	% passing lat #6-90 ft	% passing lat #6-100 ft	% passing lat #6-110 ft	% passing lat #6-120 ft	% passing lat #6-130 ft	% passing lat #6-140 ft	% passing lat #6-150 ft	% passing lat #6-160 ft
		0.375	47.2	61.9	79.6	71.2	68.9	67.6	63.5	69.4	60.9	61.7	70.7	64.6	50.6	65.2	65.1	
3.5	5.6	0.220	27.8	37.7	55.8	48.7	48.2	43.4	36.3	47.8	38.4	46.5	48.4	44.6	36.9	47.3	40	
6	3.353	0.132	16	20.9	36.8	33.5	30.5	26.8	18.9	31.4	24.1	29.6	29.2	28.7	26.9	30.5	22.7	
8	2.36	0.093	10.3	12.6	25.6	24.3	21.1	18	11.2	21.7	16.1	18.8	18.2	19	21	20.3	14.1	
10	2	0.079	8.3	9.4	20.8	20.3	17	14.4	8.5	17.4	12.8	14.1	13.6	14.9	18.1	16.2	10.8	
16	1.194	0.047	3.8	2.9	8.6	9.8	7.2	5.7	2.8	5.7	4.8	4.1	4.0	5.1	8.4	6	4	
20	0.838	0.033	2.3	1.2	4.5	6.1	3.8	3	1.3	2.4	2.1	1.5	1.5	2.1	4	2.5	1.7	
40	0.419	0.016	1.1	0.3	0.9	1.7	0.6	0.7	0.3	0.4	0.3	0.2	0.2	0.3	0.6	0.4	0.2	
60	0.254	0.010	0.5	0.2	0.4	0.7	0.2	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	
100	0.15	0.006	0.1	0.1	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	

Recommended Screen Selection

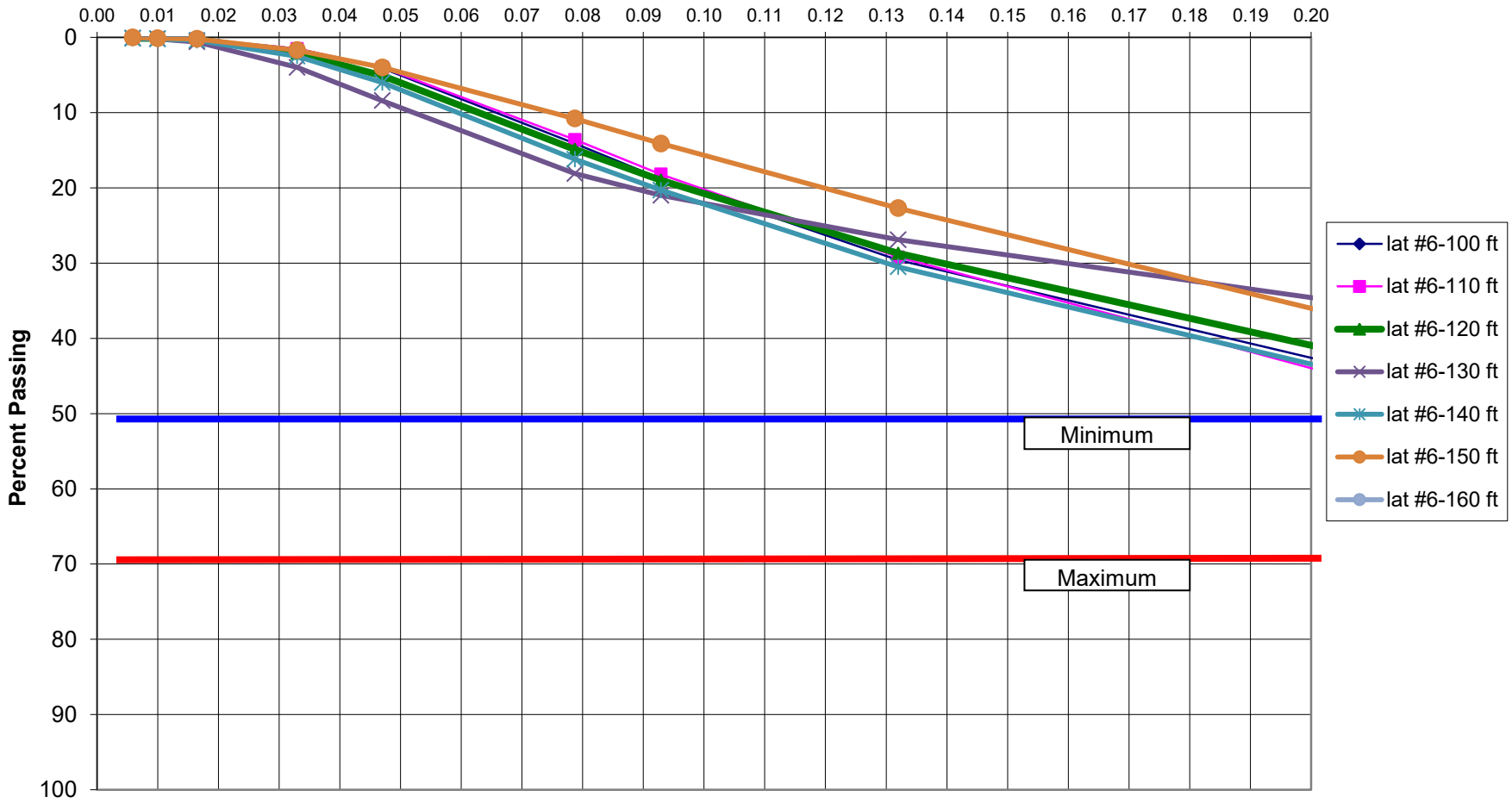
0-5	Blank	95-105	150 slot
5-15	100 slot	105-115	150 slot
15-25	100 slot	115-125	150 slot
25-35	125 slot	125-135	150 slot
35-45	125 slot	135-145	150 slot
45-55	125 slot	145-155	150 slot
55-65	150 slot		
65-75	150 slot		
75-85	150 slot		
85-95	150 slot		

Lateral #3 total lateral length - 155'

Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well36 - Job No. 14606
Lateral #6



Sieve Analyses-Collector Well
Humboldt Bay
New Lateral Installation
Ranney Well 3 - Job No. 14606
Lateral #6



Humboldt Bay Municipal Water District Collector Well #3; Lateral #6

Deviation of collector well lateral from horizontal
Angle measurements from Inclinometer
20-Feb-12

Pipe Segment	Segment Length	Angle from Hor	Radians from Hor	Segment Deviation	Accumulated Deviation		Distance from caisson wall
				Feet	Feet	**Inches**	
5	25	-0.80	(0.01396)	(0.3491)	(0.3491)	**(4.19)**	25
8	15	-0.70	(0.01222)	(0.1833)	(0.5323)	**(6.39)**	40
11	15	-0.30	(0.00524)	(0.0785)	(0.6108)	**(7.33)**	55
14	15	-0.30	(0.00524)	(0.0785)	(0.6894)	**(8.27)**	70
17	15	-0.20	(0.00349)	(0.0524)	(0.7417)	**(8.90)**	85
20	15	-0.20	(0.00349)	(0.0524)	(0.7941)	**(9.53)**	100
23	15	0.60	0.01047	0.1571	(0.6370)	**(7.64)**	115
26	15	1.00	0.01745	0.2618	(0.3752)	**(4.50)**	130
29	15	1.10	0.01920	0.2880	(0.0873)	**(1.05)**	145
31	10	0.90	0.01571	0.1571	0.0698	**0.84**	155

Positive angles are up; negative angles are down
We assume a series of straight line segments.
Deviation of segment by sin (angle) x segment length
Each segment deviation is added to accumulated deviation of previous segments

Pipe Projection Superintendant reported that he lost visual of digging head at pipe #28

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 10 **Feet** **Pipe No.** 2

Initial Wt. **1843** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	965	965	52.8%	47.2%
3.5	5.600	0.223	356	1321	72.2%	27.8%
6	3.353	0.132	216	1537	84.0%	16.0%
8	2.360	0.094	104	1641	89.7%	10.3%
10	1.999	0.079	37	1678	91.7%	8.3%
16	1.194	0.047	81	1759	96.2%	3.8%
20	0.838	0.033	28	1787	97.7%	2.3%
40	0.419	0.017	22	1809	98.9%	1.1%
60	0.254	0.010	11	1820	99.5%	0.5%
100	0.150	0.006	8	1828	99.9%	0.1%
Pan			1	1829	100.0%	0.0%
		Total	1829	grams		
		Difference	0.8%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 20 **Feet** **Pipe No.** 4

Initial Wt. **2284** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	863	863	38.1%	61.9%
3.5	5.600	0.223	550	1413	62.3%	37.7%
6	3.353	0.132	381	1794	79.1%	20.9%
8	2.360	0.094	188	1982	87.4%	12.6%
10	1.999	0.079	72	2054	90.6%	9.4%
16	1.194	0.047	147	2201	97.1%	2.9%
20	0.838	0.033	39	2240	98.8%	1.2%
40	0.419	0.017	21	2261	99.7%	0.3%
60	0.254	0.010	2	2263	99.8%	0.2%
100	0.150	0.006	1	2264	99.9%	0.1%
Pan			3	2267	100.0%	0.0%
		Total	2267			
		Difference	0.7%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 30 **Feet** **Pipe No.** 6

Initial Wt. **2031** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	411	411	20.4%	79.6%
3.5	5.600	0.223	478	889	44.2%	55.8%
6	3.353	0.132	383	1272	63.2%	36.8%
8	2.360	0.094	226	1498	74.4%	25.6%
10	1.999	0.079	97	1595	79.2%	20.8%
16	1.194	0.047	244	1839	91.4%	8.6%
20	0.838	0.033	83	1922	95.5%	4.5%
40	0.419	0.017	72	1994	99.1%	0.9%
60	0.254	0.010	11	2005	99.6%	0.4%
100	0.150	0.006	4	2009	99.8%	0.2%
Pan			4	2013	100.0%	0.0%
		Total	2013	grams		
		Difference	0.9%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 40 **Feet** **Pipe No.** 8

Initial Wt. **2231** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	638	638	28.8%	71.2%
3.5	5.664	0.223	498	1136	51.3%	48.7%
6	3.353	0.132	337	1473	66.5%	33.5%
8	2.388	0.094	204	1677	75.7%	24.3%
10	1.999	0.079	89	1766	79.7%	20.3%
16	1.194	0.047	233	1999	90.2%	9.8%
20	0.838	0.033	81	2080	93.9%	6.1%
40	0.419	0.017	99	2179	98.3%	1.7%
60	0.254	0.010	22	2201	99.3%	0.7%
100	0.150	0.006	8	2209	99.7%	0.3%
Pan			7	2216	100.0%	0.0%
		Total	2216			
		Difference	0.7%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 50 **Feet** **Pipe No.** 10

Initial Wt. **2031** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	628	628	31.1%	68.9%
3.5	5.600	0.223	418	1046	51.8%	48.2%
6	3.353	0.132	357	1403	69.5%	30.5%
8	2.360	0.094	191	1594	78.9%	21.1%
10	1.999	0.079	82	1676	83.0%	17.0%
16	1.194	0.047	198	1874	92.8%	7.2%
20	0.838	0.033	70	1944	96.2%	3.8%
40	0.419	0.017	63	2007	99.4%	0.6%
60	0.254	0.010	8	2015	99.8%	0.2%
100	0.150	0.006	3	2018	99.9%	0.1%
Pan			2	2020	100.0%	0.0%
		Total	2020	grams		
		Difference	0.5%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 60 **Feet** **Pipe No.** 12

Initial Wt. **2005** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	646	646	32.4%	67.6%
3.5	5.600	0.223	484	1130	56.6%	43.4%
6	3.353	0.132	331	1461	73.2%	26.8%
8	2.360	0.094	175	1636	82.0%	18.0%
10	1.999	0.079	73	1709	85.6%	14.4%
16	1.194	0.047	173	1882	94.3%	5.7%
20	0.838	0.033	55	1937	97.0%	3.0%
40	0.419	0.017	45	1982	99.3%	0.7%
60	0.254	0.010	7	1989	99.6%	0.4%
100	0.150	0.006	3	1992	99.8%	0.2%
Pan			4	1996	100.0%	0.0%
		Total	1996			
		Difference	0.4%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 70 **Feet** **Pipe No.** 14

Initial Wt. **1752** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	635	635	36.5%	63.5%
3.5	5.600	0.223	473	1108	63.7%	36.3%
6	3.353	0.132	303	1411	81.1%	18.9%
8	2.360	0.094	133	1544	88.8%	11.2%
10	1.999	0.079	48	1592	91.5%	8.5%
16	1.194	0.047	99	1691	97.2%	2.8%
20	0.838	0.033	26	1717	98.7%	1.3%
40	0.419	0.017	16	1733	99.7%	0.3%
60	0.254	0.010	3	1736	99.8%	0.2%
100	0.150	0.006	1	1737	99.9%	0.1%
Pan			2	1739	100.0%	0.0%
		Total	1739	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 80 **Feet** **Pipe No.** 16

Initial Wt. **1750** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	533	533	30.6%	69.4%
3.5	5.600	0.223	375	908	52.2%	47.8%
6	3.353	0.132	285	1193	68.6%	31.4%
8	2.360	0.094	169	1362	78.3%	21.7%
10	1.999	0.079	76	1438	82.6%	17.4%
16	1.194	0.047	203	1641	94.3%	5.7%
20	0.838	0.033	58	1699	97.6%	2.4%
40	0.419	0.017	34	1733	99.6%	0.4%
60	0.254	0.010	4	1737	99.8%	0.2%
100	0.150	0.006	1	1738	99.9%	0.1%
Pan			2	1740	100.0%	0.0%
		Total	1740			
		Difference	0.6%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 90 **Feet** **Pipe No.** 18

Initial Wt. **1772** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	690	690	39.1%	60.9%
3.5	5.600	0.223	396	1086	61.6%	38.4%
6	3.353	0.132	253	1339	75.9%	24.1%
8	2.360	0.094	141	1480	83.9%	16.1%
10	1.999	0.079	58	1538	87.2%	12.8%
16	1.194	0.047	142	1680	95.2%	4.8%
20	0.838	0.033	47	1727	97.9%	2.1%
40	0.419	0.017	31	1758	99.7%	0.3%
60	0.254	0.010	3	1761	99.8%	0.2%
100	0.150	0.006	1	1762	99.9%	0.1%
Pan			2	1764	100.0%	0.0%
		Total	1764	grams		
		Difference	0.5%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 100 **Feet** **Pipe No.** 20

Initial Wt. **1771** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	675	675	38.3%	61.7%
3.5	5.600	0.223	268	943	53.5%	46.5%
6	3.353	0.132	296	1239	70.4%	29.6%
8	2.360	0.094	191	1430	81.2%	18.8%
10	1.999	0.079	82	1512	85.9%	14.1%
16	1.194	0.047	177	1689	95.9%	4.1%
20	0.838	0.033	45	1734	98.5%	1.5%
40	0.419	0.017	23	1757	99.8%	0.2%
60	0.254	0.010	2	1759	99.9%	0.1%
100	0.150	0.006	1	1760	99.9%	0.1%
Pan			1	1761	100.0%	0.0%
		Total	1761			
		Difference	0.6%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 110 **Feet** **Pipe No.** 22

Initial Wt. **1917** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	560	560	29.3%	70.7%
3.5	5.600	0.223	425	985	51.6%	48.4%
6	3.353	0.132	366	1351	70.8%	29.2%
8	2.360	0.094	210	1561	81.8%	18.2%
10	1.999	0.079	88	1649	86.4%	13.6%
16	1.194	0.047	183	1832	96.0%	4.0%
20	0.838	0.033	48	1880	98.5%	1.5%
40	0.419	0.017	25	1905	99.8%	0.2%
60	0.254	0.010	2	1907	99.9%	0.1%
100	0.150	0.006	1	1908	99.9%	0.1%
Pan			1	1909	100.0%	0.0%
		Total	1909	grams		
		Difference	0.4%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 120 **Feet** **Pipe No.** 24

Initial Wt. **1874** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	661	661	35.4%	64.6%
3.5	5.600	0.223	374	1035	55.4%	44.6%
6	3.353	0.132	297	1332	71.3%	28.7%
8	2.360	0.094	180	1512	81.0%	19.0%
10	1.999	0.079	76	1588	85.1%	14.9%
16	1.194	0.047	183	1771	94.9%	5.1%
20	0.838	0.033	57	1828	97.9%	2.1%
40	0.419	0.017	34	1862	99.7%	0.3%
60	0.254	0.010	3	1865	99.9%	0.1%
100	0.150	0.006	1	1866	99.9%	0.1%
Pan			1	1867	100.0%	0.0%
		Total	1867			
		Difference	0.4%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 130 **Feet** **Pipe No.** 26

Initial Wt. **1732** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	850	850	49.4%	50.6%
3.5	5.600	0.223	235	1085	63.1%	36.9%
6	3.353	0.132	172	1257	73.1%	26.9%
8	2.360	0.094	102	1359	79.0%	21.0%
10	1.999	0.079	50	1409	81.9%	18.1%
16	1.194	0.047	166	1575	91.6%	8.4%
20	0.838	0.033	76	1651	96.0%	4.0%
40	0.419	0.017	59	1710	99.4%	0.6%
60	0.254	0.010	7	1717	99.8%	0.2%
100	0.150	0.006	2	1719	99.9%	0.1%
Pan			1	1720	100.0%	0.0%
		Total	1720	grams		
		Difference	0.7%			

Client: Humboldt Bay **Job No.:** 14606
Well Number: Ranney Well #3
Lateral Number: 6
Interval: 140 **Feet** **Pipe No.** 28

Initial Wt. **2025** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	704	704	34.8%	65.2%
3.5	5.600	0.223	361	1065	52.7%	47.3%
6	3.353	0.132	339	1404	69.5%	30.5%
8	2.360	0.094	206	1610	79.7%	20.3%
10	1.999	0.079	83	1693	83.8%	16.2%
16	1.194	0.047	207	1900	94.0%	6.0%
20	0.838	0.033	70	1970	97.5%	2.5%
40	0.419	0.017	43	2013	99.6%	0.4%
60	0.254	0.010	4	2017	99.8%	0.2%
100	0.150	0.006	2	2019	99.9%	0.1%
Pan			2	2021	100.0%	0.0%
		Total	2021			
		Difference	0.2%			

Sieve Analysis Results

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 6

Interval: 150 **Feet** **Pipe No.** 30

Initial Wt. **2095** grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	732	732	34.9%	65.1%
3.5	5.600	0.223	525	1257	60.0%	40.0%
6	3.353	0.132	362	1619	77.3%	22.7%
8	2.360	0.094	181	1800	85.9%	14.1%
10	1.999	0.079	69	1869	89.2%	10.8%
16	1.194	0.047	143	2012	96.0%	4.0%
20	0.838	0.033	48	2060	98.3%	1.7%
40	0.419	0.017	30	2090	99.8%	0.2%
60	0.254	0.010	3	2093	99.9%	0.1%
100	0.150	0.006	1	2094	100.0%	0.0%
Pan			1	2095	100.0%	0.0%
		Total	2095	grams		
		Difference	0.0%			

Client: Humboldt Bay **Job No.:** 14606

Well Number: Ranney Well #3

Lateral Number: 6

Interval: 0 **Feet** **Pipe No.** 0

Initial Wt. grams

Sieve No.	Sieve size (mm)	Sieve size (inches)	Weight Retained (grams)	Cumulative Weight (grams)	Cumulative % Retained	Cumulative % Passing
3/8	9.525	0.375	0	0		
3.5	5.600	0.223	0	0		
6	3.353	0.132	0	0		
8	2.360	0.094	0	0		
10	1.999	0.079	0	0		
16	1.194	0.047	0	0		
20	0.838	0.033	0	0		
40	0.419	0.017	0	0		
60	0.254	0.010	0	0		
100	0.150	0.006	0	0		
Pan			0	0		
		Total	0			
		Difference				

APPENDIX D – PERMITS

PERTINENT SECTIONS OF HBMWD HABITAT CONSERVATION PLAN

PERTINENT SECTIONS OF LONG-TERM STREAMBED ALTERATION AGREEMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEMS (NPDES) PERMITS

ARMY CORPS OF ENGINEERS 404 PERMIT

PERTINENT SECTIONS OF HBMWD HABITAT CONSERVATION PLAN

Table 9. Mitigation and Monitoring for Covered Activities

District Activity	Potential Impacts, Mitigation and Monitoring
1. Releasing flow at Matthews Dam	Potential Impacts: Take resulting from no flow releases to river, or from rapidly changing flows in a very short time period (e.g. "ramping") Mitigation: Provide flows sufficient to maintain a 5 cfs minimum at all times below the dam. During low-flow times of the year (defined for this purpose as 100 cfs or less), if the District plans to reduce its releases at one time by more than 25%, it shall do so in gradual increments over a 24-hour period to ensure no stranding will result. Monitoring: Daily flow records for releases from Matthews Dam shall be recorded and maintained.
2. Diverting water in the Essex Reach (sub-surface via Ranney collectors and surface via direct diversion facility)	Potential Impacts: Decreasing flow in river below Essex, potentially causing habitat loss Mitigation: The District will provide sufficient flows to maintain habitat, in accordance with requirements in District's State Water Rights Permits. Monitoring: On a daily basis, the District plans and executes its flow releases to satisfy all downstream requirements (e.g. diversion and bypass below Essex). On a daily basis, the District will monitor the actual flow below Essex to ensure its bypass flow requirements are met.
3. Bypass flows below Essex	Potential Impact: Decreasing flow below Essex, potentially causing habitat loss. Mitigation: The District will release sufficient water from Matthews Dam to accommodate its downstream diversion requirements, and to maintain the in-stream flow requirements below Essex in accordance with conditions in the District's State Water Rights Permits. It is important to note that the District could be out of compliance with respect to the downstream flow requirements for up to 72 hours following issuance of a USGS "correction factor" which affects the resulting flow measurement at a USGS gage station on the Mad River (See Section 8.2.a and Appendix C for more details). USGS provides the District with a copy of the gage station correction factor right after they establish one. The District shall immediately increase its release from Matthews if a shortfall in the required bypass flow below Essex occurs following receipt of such correction factor. Monitoring: On a daily basis, the District plans and executes its flow releases to satisfy all downstream requirements (e.g diversion and bypass below Essex). On a daily basis, the District will monitor the actual flow below Essex to ensure its bypass flow requirements are met.
4. Operating the direct diversion facility (Station 6) including the fish screens	Potential Impacts: Take resulting from operation of the fish screens (impingement or removal via the buckets attached to the screen face) Mitigation: The District will be retrofitting the Station 6 screens to minimize take. The retrofit project is described in detail in Section 8.1, which follows. Monitoring: The District will conduct comprehensive monitoring after the Station 6 screens are retrofitted. The monitoring is described in detail in Section 8.2.b, which follows.

District Activity	Table 9 (Continued) Potential Impacts, Mitigation and Monitoring
5. Dredging of forebay at Station 6	Potential Impact: Take could occur if the clamshell bucket or excavator happens to strike or capture fish which happen to be in the forebay at the time of this work. This activity only occurs in the winter when background turbidity in the river is very high, so additional adverse turbidity effects will not occur. Mitigation: To the maximum extent practicable, the District shall conduct excavation activities in a manner that minimizes take of salmonids. To reduce the likelihood of injuring and capturing fish, the operator shall strike the top of the water with the bucket prior to starting dredging, and shall also move the clamshell bucket within the water column in a slow, predictable manner. Monitoring: District personnel will visually monitor as work proceeds.
6. Maintaining adequate water surface elevation to Station 6 during low-flow months and 9. Maintaining adequate flow to Station 6 (by excavating aggraded material in low-flow channel)	Potential Impacts: Take could occur if fish are killed or injured during construction. Turbidity may increase for a short period of time just downstream of Station 6. Mitigation: a) Measures to minimize adverse impacts to habitat: The work will be done such that it occupies the minimum possible area of the low-flow channel. Work will occur in a timely manner to minimize turbidity disturbances (generally less than 6-to-8 hours). The Station 6 pumps will be run as much as possible to draw as much turbidity into the forebay as possible. Any additional techniques known to the District, and suitable for this work, shall be employed to further minimize turbidity effects (e.g. silt screens). The District shall exercise every reasonable precaution to protect the stream from fuel or oil spills. Equipment fueling shall not occur within the bankfull channel. All equipment shall be pressure washed and inspected for leaks prior to entering the river bed. In the event that a spill occurs, a hazardous material spill plan shall be implemented, and details regarding the spill will be reported by the District to NMFS. b) Measures to minimize take: i. To the maximum extent practicable, this work will occur no earlier than required by the District to minimize the likelihood of encountering listed juvenile salmonids. ii. A fisheries biologist shall conduct pre- and post- construction surveys of the action area. The pre-construction survey will occur no earlier than 10 days prior to construction. The post-construction survey will occur no later than 30 days following construction. The District shall prepare a report documenting the findings. The following conditions will be surveyed and reported: ❑ A biological investigation of the abundance and distribution of listed salmonids from the construction area to the Highway 299 Bridge ❑ An investigation of the channel configuration and habitat types of the construction area, that includes quantitative information on the existing substrate, depth, velocity, and in stream cover. ❑ A visual estimate of embeddedness in habitats below the construction to the Highway 299 Bridge to evaluate the percentage of stored fine sediment before and after construction.

iii. At least one week prior to the planned construction work, the District will convene a meeting with NMFS, and other interested agencies, to develop a plan to minimize effects to listed salmonids. The District will provide baseline water quality data collected at Station 6, results of the pre-construction investigations, and a description of the planned construction. Participants of the meeting will develop a plan to include: 1) measures to minimize impacts to fish such as by utilizing fish exclusion fencing prior to and during construction, and 2) measures to rescue and relocate fish, if necessary.

iv. During construction, to the maximum extent practicable, heavy equipment shall be located on the dry river bar. During construction, a biologist shall make every effort to remove and exclude fish from the work area. If gravels from the trenching operation is used for the construction of the berm, gravel will be transported to the berm site in a manner to minimize stream crossings. Prior to any crossings of the wetted channel, a biologist shall make every effort to remove and exclude fish from the proposed crossing.

c) Longer-term Mitigation:
Construction of the gravel berm has been required since 1992 to maintain adequate water surface elevation to Station 6 during the low-flow months (given the long-term bed degradation which has occurred in the Mad River). At this time, there is no reason to believe the bed elevation will aggrade and return to its prior elevation. Therefore, the District will likely have to address low water surface elevations during the low-flow months over the foreseeable future.

The District shall initiate a study to determine if a more permanent solution is feasible to provide the necessary water-surface elevation during the low-flow months. This study shall include an assessment of the geomorphic conditions at the site, engineering considerations, including navigability, and biological considerations, which shall be developed in consultation with NMFS and CDFG. The study shall identify feasible alternatives and shall recommend the preferred alternative. The District shall complete this study within 3 years after obtaining an Incidental Take Permit from NMFS. Via the adaptive management process of this HCP, the District, in consultation with NMFS, shall pursue a more permanent solution if a feasible alternative exists (feasible from engineering, operational and biological perspectives).

Monitoring:
Within 30 days following completion of this work, the District shall provide a monitoring report to NMFS which documents:

i. Pre- and post-construction surveys conducted by the fisheries biologist,
ii. A summary of the construction activities, including pre-and post construction photographs, and
iii. A summary of the fish rescue/relocation reports efforts and whether any injury or mortality occurred.

District Activity	Table 9 (Continued) Potential Impacts, Mitigation and Monitoring
7. Maintaining adequate capacity in tailrace and spillway pools below Matthews Dam	Potential Impact: Take could occur during excavation (if juvenile steelhead are able to navigate the downstream natural barriers and are present in the plunge pool or tailrace outlet at the time when work is being done). Turbidity may increase for a short period of time in the vicinity of the plunge pool or tailrace outlets. Mitigation: a) Measures to minimize adverse impacts to habitat: Work will occur in a timely manner such that turbidity disturbance are minimized. The District shall exercise every reasonable precaution to protect the stream from fuel or oil spills. Equipment fueling shall not occur within the bank full channel. All equipment shall be pressure washed and inspected for leaks prior to entering the wetted channel bed. In the event that a spill occurs, a hazardous material spill plan shall be implemented, and details regarding the spill will be reported by the District to NMFS. b) Measures to minimize take: Prior to commencing work, District personnel shall inspect the area. If fish are present, District personnel will wade the water ahead of heavy equipment to disperse the fish. Monitoring: The District shall monitor work and provide pre- and post-construction photographs.
8. Gaining access to and maintaining Ranney collectors (which may involve building temporary gravel structures in river bed)	Potential Impacts: Take should not result from this activity. Temporary gravel structures are constructed on the dry river bed near the collectors during low-flow conditions (unless an emergency or unforeseen condition otherwise warrants). The river bed is returned to its pre-construction condition. At this time, the District is able to access all collectors from the dry river bed, so channel crossings are not necessary. If channel conditions change over the term of the HCP, the District may need to cross the wetted channel. Mitigation: To the maximum extent practicable, this work will occur during summer low flow conditions and during a dry weather pattern. The District shall exercise every reasonable precaution to protect the stream bed from fuel or oil spills. Equipment fueling shall not occur within the bankfull channel. All equipment shall be pressure washed and inspected for leaks prior to entering the channel bed. In the event that a spill occurs, a hazardous material spill plan shall be implemented, and details regarding the spill will be reported by the District to NMFS. If channel crossings become necessary in the future, temporary crossings shall be installed and removed during the period of June 15th to September 15th. A fisheries biologist shall wade the stream ahead of heavy equipment crossing the wetted channel to disperse any juvenile salmonids that may be present. With respect to construction of a containment berm associated with collector flushing, this work shall be completed prior to September 15th each year. Monitoring: District personnel, or the fisheries biologist, shall monitor work and provide pre- and post- construction photographs.

Table 9 (Continued)	
District Activity	**Potential Impacts, Mitigation and Monitoring**
9. Maintaining adequate flow to Station 6 (by excavating aggraded material in low-flow channel)	Addressed above with Activity No. 6
10. Protecting banks and structures (by maintaining or repairing existing rock structures or revetments)	Potential Impacts: Short-term impacts to riparian vegetation could occur, and juveniles could theoretically be killed during the placement of rock. Since this activity is in response to storms or other significant events which cause damage, this work is not expected to occur at all frequently. Mitigation: a) Measures to minimize adverse impacts to habitat: To the maximum extent practicable, this work will occur during summer low flow conditions and during a dry weather pattern. Placement of rock structures shall be done in such a manner that it occupies the minimum possible area of the low-flow channel, and minimizes adverse impacts to riparian vegetation. Stream bank disturbances during rock/revetment repair activities shall be restored with willow mattresses, geo-textile, and/or pre-existing vegetation cover. The District shall exercise every reasonable precaution to protect the stream from fuel or oil spills. Equipment fueling shall not occur within the bankfull channel. All equipment shall be pressure washed and inspected for leaks prior to entering the river bed. In the event that a spill occurs, a hazardous material spill plan shall be implemented, and details regarding the spill will be reported by the District to NMFS. b) Measures to minimize take: If any rock placement occurs in the wetted channel, District personnel or a fisheries biologist shall be present to disperse fish by wading the river ahead of the heavy equipment which is placing rock. Monitoring: District personnel or the fisheries biologist shall monitor work and provide pre- and post- construction photographs.

PERTINENT SECTIONS OF HBMWD LONG-TERM STREAMBED ALTERATION AGREEMENT

(Matthews Dam) and stream diversion at Essex. The District shall provide DFG a draft of the assessment within six month of execution of this LTSAA for DFG approval. The results of the DFG approved assessment proposal shall be submitted within three years of execution of this LTSAA. The results of the assessment will help inform DFG and the District if aquatic habitat for listed and sensitive species can be improved with minor modifications to the District's operations. Any minor modifications to the Districts operations shall be limited to those within the District's operational constraints. The District will not be required to fund additional studies or assessments, but will cooperate with DFG by providing available data or personnel.

D. Based on the assessment results described in 10.2 C above, the District and DFG shall determine and agree upon the flow releases and bypass flows within one year of completing the assessment. Flow releases from Matthews Dam shall be designed to mimic the natural hydrograph to the extent feasible and bypass flows below the Essex Reach shall keep fish in good condition. Given the District's flow releases are limited during storm events; dam releases shall, to the extent feasible, track the magnitude and duration of inflow to the reservoir as measured at USGS Station No. 11480390, Zenia, California.

E. Flow releases from Matthews dam shall not strand or displace (washout) fish or other aquatic resources.

F. The District's operations at Essex shall not: 1) inhibit juvenile and adult fish passage, 2) constrict the natural flow of the stream, or 3) cause sudden changes in velocity or turbulent stream flow that would result in juvenile displacement or inhibition of juvenile and adult fish movement.

G. Maintenance activities described in 2.0 D through 2.0 H shall not result in the stranding or entrapment of fish.

H. If the District is authorized to add instream flow dedication to its water right pursuant to Water Code §1707, the water released for instream purposes may be used to toward meeting the above conditions 10.2 C through 10.2 F.

I. The District shall maintain daily records with current operational information for the Essex Reach diversions including: 1) domestic diversion via the Ranney Collectors and industrial diversion via the direct diversion facility; 2) date and time; 3) instantaneous diversion rate (in gallons per minute or cubic feet per second); and 4) screen cleaning and inspection notes. The District shall provide records to DFG upon request.

10.3 Maintenance

A. Maintenance of, or repairs to, existing rock structures shall not disturb or remove vegetation to the maximum extent practicable. If more than 1/8 of an acre of

riparian vegetation is removed during maintenance activities, the Permittee shall submit to DFG a revegetation plan (described below) for review and approval.

1. Submittal of a DFG-Approved Revegetation Plan

A revegetation plan shall be prepared by a qualified botanist, plant ecologist, or revegetation specialist with expertise in northern California ecosystems and native plant revegetation techniques. Currently available research addressing revegetation methods, selection of species having good survival characteristics for the topography and climate of the maintenance area shall be used. This plan shall be submitted to DFG for review and approval prior to commencement of vegetation removal activities.

2. Contents of the Revegetation Plan

The plan shall include the following elements:

1. Identification and quantities and types of the native and non-native plant communities that will be impacted by the maintenance activity.

2. Utilization of a native plant pallet of species currently or historically present in the work area. Seeds, cuttings and divisions of locally-collected native plants are recommended.

3. Planting design specifications and schedule, maintenance plan, erosion control and irrigation plans as necessary. Planting shall be conducted during the most favorable period of the year for plant establishment. Approval in writing of the revegetation plan by DFG shall provide permission for the applicant to conduct the replanting activities specified within the revegetation plan.

4. Designated photo points shall be established for monitoring planting success following guidelines from the current literature on the topic of photo point monitoring. For example: *Photo Point Monitoring, Frederick C. Hall, PNW-GTR-526, USFS, March 2002.*

5. Restoration of native plants at a ratio of 3:1 or with a planting density typical of historic conditions or at a level that will facilitate natural recruitment and recovery of the native riparian species.

6. If an invasive non-native plant species is present and a native plant community does not exist or exists in combination with invasive non-native plant species, the plan shall address the removal of the invasive non-native species.

7. A description of how planting success will be determined. The criteria for success shall be 80 percent survival with 75 percent coverage after five years.

8. A post-maintenance activity monitoring plan of plant survival and coverage requirements for five years.

9. An invasive non-native plant species eradication and five year maintenance plan.

B. Removal of large woody debris [(LWD) downed trees greater than 12 inches in diameter and 20 feet in length] from annual maintenance work sites shall require DFG approval. LWD approved for removal by DFG shall be temporarily stockpiled, and after completion of operations, redistributed into the active stream channel at the direction of DFG.

C. A qualified wildlife biologist shall evaluate and document in a report prepared for DFG's review and concurrence the extent of suitable willow flycatcher habitat in and within 300 feet of any proposed maintenance activity site that includes vegetation removal, new road construction, rip rap maintenance, and/or gravel bar manipulation where work is proposed to occur before August 15. Where such activities are proposed, a survey of suitable habitat shall be conducted by a qualified wildlife biologist to determine if the project area or adjacent habitat is occupied by willow flycatcher. The survey shall follow guidelines found in *A willow flycatcher survey protocol for California* (Bombay, et al. 2003), which can be obtained at the attached link: http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html.

DFG shall receive a report summarizing survey effort results at least one week before maintenance activities are to take place. If willow flycatchers are observed, the qualified wildlife biologist shall design appropriate buffer widths and operational restrictions and forward the operational report to DFG for review and approval. Maintenance activities shall not commence until DFG has approved the operational report. DFG shall strive to make the determination within 96 hours of receiving the survey report.

10.4 Site Specific Conditions

A. Forebay dredge materials shall not be stockpiled within 150 feet of the top of bank or edge of existing riparian, whichever is greater. Temporary stockpiling adjacent to Pump Station No. 6 may occur, but shall not remain for more than one work season. Stockpile locations shall be approved by DFG prior to use.

B. Gravel used to construct the berm adjacent to Pump Station No. 6 shall be allowed to return to the river when increased winter flows wash it out. Following

NPDES PERMIT

STATE WATER RESOURCES CONTROL BOARD
1001 I Street, Sacramento, California 95814
http://www.waterboards.ca.gov/water_issues/programs/npdes

ORDER WQ 2014-0194-DWQ
GENERAL ORDER NO. CAG140001

STATEWIDE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR DRINKING WATER SYSTEM DISCHARGES TO WATERS OF THE UNITED STATES

Discharges from drinking water systems to surface waters in California are subject to waste discharge requirements as set forth in this Order, and as authorized by a Notice of Applicability issued by the Deputy Director of Water Quality (Deputy Director). Definitions for the purpose of this Order are included in Attachment A. Key definitions are as follows:

Table 1. Key Definitions for the Purpose of this Order

Drinking Water System[1]	A system with 1000[2] connections or greater that are regulated by the State Water Board Division of Drinking Water or a local county department of health, with the primary purpose of transmitting, treating and distributing safe drinking water. Drinking water systems include state owned/operated facilities such as parks, campgrounds, and rest areas [1] *This Order applies to community water systems as defined in Attachment A of this Order. This Order does not apply to non-community water systems or non-transient water systems as defined in Attachment A of this Order.* [2] *Systems with fewer than 1000 connections that discharge to waters of the United States have the option to enroll in this Order. Non-enrollment does not exempt dischargers from Clean Water Act requirements.*
Drinking Water System Discharge	Short-term or seasonal discharges from a drinking water system of water that has been dedicated for drinking water purposes
Water Purveyor	Any entity that discharges from a drinking water system, including water purveyors, wholesalers, distributors, districts, municipalities, private companies, and other entities that own or operate a community drinking water system
Discharger	A water purveyor that is authorized to discharge under this Order through an approved Notice of Applicability issued by the Deputy Director of Water Quality
Waters of the United States	Generally refers to surface waters, as defined for the purposes of the federal Clean Water Act. For the purpose of this Order, the terms “surface water,” and “receiving water” are interchangeably used to mean “waters of the United States,” unless noted otherwise

Table 2. Administrative Information

This Order was adopted by the State Water Board on November 18, 2014:
This Order shall become effective on February 26, 2015 (100 days after the adoption date of this Order)
This Order shall expire on February 25, 2020

CERTIFICATION

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the State Water Board on November 18, 2014.

AYE:	Chair Felicia Marcus Vice Chair Frances Spivy-Weber Board Member Tam M. Doduc Board Member Steven Moore Board Member Dorene D'Adamo
NAY:	None
ABSENT:	None
ABSTAIN:	None

Jeanine Townsend
Clerk to the Board

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I. SCOPE OF STATEWIDE GENERAL ORDER AND REQUIRED REGULATORY COVERAGE

This Order is a National Pollutant Discharge Elimination System (NPDES) general permit that authorizes discharges from drinking water systems, as defined on Page 1 of this Order. This Order provides regulatory coverage for short-term or seasonal planned and emergency (unplanned) discharges resulting from a water purveyor's essential operations and maintenance activities undertaken to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements for providing reliable delivery of safe drinking water.

Planned discharges include regularly scheduled, automated, or non-regularly scheduled activities that must take place to comply with mandated regulations and that the water purveyor knows in advance will result in a discharge to surface water. Emergency discharges include unplanned discharges that occur due to facility leaks, system failures, operational errors, or catastrophic events for which the water purveyor is not aware of the discharge until after the discharge has commenced. Planned and emergency discharges may occur directly, through a constructed storm drain or through another conveyance system, to waters of the United States (U.S.).

The Federal Water Pollution Control Act (also referred to as the Clean Water Act) section 402 requires that a discharge of any pollutant or combination of pollutants to surface waters that are deemed waters of the U.S., with certain exceptions, be regulated by a NPDES permit. (For the purpose of this Order, the terms "waters of the United States [or U.S.]", "surface waters" and "receiving waters" are used interchangeably unless noted otherwise.) On September 22, 1989, the U.S. Environmental Protection Agency (U.S. EPA) granted the State of California, through the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards), the authority to issue NPDES permits pursuant to title 40 Code of Federal Regulations parts 122 and 123.

Discharges of a pollutant from a drinking water system, regardless of the size of the system, are required to be regulated by an NPDES permit if the discharges flow into a water of the U.S. Title 40 Code of Federal Regulations part 122.28 provides for issuance of general permits to regulate a category of dischargers if they involve the same or substantially similar types of operations; discharge the same type of waste; require the same type of effluent limitations or operating conditions; require similar monitoring; and are more appropriately regulated under a general order rather than individual orders. Discharges from drinking water systems that result from mandated activities to protect public health are of substantially similar types of operations, discharging the same type of waste.

This Order requires all water purveyors in California with drinking water system discharges to waters of the U.S. as described in Section I.B of this Order, except those water purveyors that meet the exception criteria identified in section I.A of this Order, to obtain NPDES regulatory coverage through enrollment in this statewide NPDES General Order. The water purveyor shall submit an application package to the State Water Board in accordance with section II.C.1 *Application Package Requirements* any time after the effective date of the permit but no later than **September 1, 2015**.

A. Water Purveyors NOT Required to Enroll in This Order

Water purveyors that meet any of the following criteria, items 1 through 6, are NOT required to submit an application package to obtain coverage through enrollment in this particular statewide NPDES General Order; this Order is, however, available for water purveyors that meet the criteria of items 1 through 3 below and choose to enroll. (This Order does not exempt any water purveyor from federal Clean Water Act requirements to obtain NPDES regulatory coverage for its discharges to waters of the U.S.) By **September 1, 2015**, water purveyors that meet any one of the items 2 through 5 below shall submit to the State Water Board a Notice of Non-Applicability form (see Attachment B-2) that certifies NPDES regulatory coverage from this Order is not required. A water purveyor with multiple community water systems in California need only submit one Notice of Non-Applicability for its systems that meet the same criterion.

1. The drinking water system has fewer than 1000 connections that deliver drinking water to end users. (This does not include water wholesalers as defined in Attachment A that deliver water to other drinking water systems); or

2. The water purveyor discharges solely to a municipal separate storm sewer system(s) (MS4) and has an established local agreement with the MS4 permittee to discharge into its system(s),

   AND

   The corresponding Regional Water Board Executive Officer provides written confirmation to the State Water Board Deputy Director that the local agreement provides sufficient regulation of the subject drinking water system discharges through an existing MS4 NPDES permit; or

3. The water purveyor is an MS4 permittee, or co-permittee, named on a State Water Board or a Regional Water Board issued MS4 permit that also authorizes discharges from drinking water systems, and all drinking water system discharges solely discharge into its own MS4 system; or

4. The water purveyor's discharge is regulated under an existing individual site-specific NPDES permit issued by the Regional Water Board because: (1) the discharge from the system is outside of the scope of this low threat Order, and/or (2) a Total Maximum Daily Load (TMDL) was adopted and the Regional Water Board determined that TMDL-specific permit requirements for its drinking water system(s) discharges are appropriate because those discharges may contribute to the impairment of the water body; or

5. All discharges from the drinking water system do not discharge to a water of the U.S.; or

6. The discharge is exempt from the legal requirement to obtain an NPDES permit under federal law.

After review, a Notice of Non-Applicability Approval by the State Water Board's Deputy Director of Water Quality (Deputy Director) may be issued. If the Notice of Non-Applicability is not complete or the discharge is deemed ineligible, the Deputy Director will send a response letter to the applicant outlining: (1) the missing information that deems the Notice of Non-Applicability incomplete, or (2) why the described discharge is not eligible and thus the water purveyor must obtain coverage under this Order. The State Water Board will provide the water purveyor **60 days from the date of the response letter** to provide State Water Board staff the items necessary to complete the Notice of Non-Applicability or to submit a complete application package in accordance with section II.C of this Order.

B. Discharges Authorized Under This Order

This Order authorizes drinking water system discharges (as defined on Page 1) resulting from a water purveyor's essential operations and activities undertaken to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements. Discharges authorized by this Order are composed solely of water that is dedicated by drinking water facilities for the primary purpose of providing safe and reliable drinking water. Additionally, discharges authorized under this Order are determined to not adversely affect or impact beneficial uses of the receiving waters when properly managed through best management practices. Such discharges include, but are not limited to, discharges from supply wells, transmission systems, water treatment facilities, water distribution systems, and storage facilities. Any discharges that are likely to cause or contribute to an exceedance of a water quality objective other than those granted an exception under the State Water Board Resolution 2014-0067, will not be authorized under this Order.

This Order authorizes single discharges at one identified location and multiple simultaneous discharges at multiple locations. Authorized discharges to waters of the U.S. may include, but are not limited to, the following discharges:

1. Planned Discharges Due To:

a. Groundwater supply well flushing or pump-to-waste.
b. Groundwater well development, rehabilitation, and testing.
c. Groundwater monitoring for purpose of supply well development, rehabilitation and testing.
d. Trench dewatering of drinking water during planned repairs.
e. Transmission system installation, cleaning, and testing.
f. Water treatment plant operations (excluding filter backwash that is discharged to a water of the U.S).
g. Distribution system storage tank or reservoir releases.
h. Distribution system dewatering, flushing, and pressure testing.
i. Fire flow / fire hydrant testing.
j. Meter testing.

k. Automated water quality analyzers operations.
l. Pressure relief valves.
m. Unscheduled activities that must be undertaken to comply with mandates of the Federal Drinking Water Act and California Health and Safety Code.

2. Emergency (Unplanned) Discharges Due To:

a. Emergency drinking water system failures and repairs including transmission and distribution system failures and repairs.
b. Trench dewatering due to an emergency failure.
c. Operation errors.
d. Catastrophic events.

C. Discharges Not Authorized Under This Order

The State Water Board does not authorize any of the following discharges to waters of the U.S. under this Order:

1. Discharges that are not within the scope of this Order as described in section I and/or are not authorized by a Notice of Applicability issued by the Deputy Director of Water Quality (Deputy Director); or

2. Discharges to a water of the U.S. with a total maximum daily load (TMDL) that prescribes a waste load allocation to a water purveyor, where the Deputy Director determines that the requirements of this Order are not consistent with the assumptions and requirements of the TMDL and thus compliance with this Order is not sufficient for the water purveyor to comply with the imposed TMDL requirements; or

3. Discharges from new drinking water systems (not an expansion of an existing system) into a Clean Water Act section 303(d)-listed impaired water body that is impaired for a constituent that exists in the new discharge at a concentration greater than the criteria used to establish the impairment of the water body, and for which a regional water board has issued an individual permit that addresses the TMDL requirements; or

4. Direct discharges into areas designated by the State Water Board as Areas of Special Biological Significance (ASBS).

II. PERMIT COVERAGE AND APPLICATION REQUIREMENTS

A. Permit Coverage

This Order provides regulatory coverage to water purveyors with existing and potential authorized discharges as set forth in section I.B to waters of the U.S. from a community drinking water system that does not adversely affect or impact beneficial uses of the

receiving water. Permit coverage may include discharges from work conducted by contractors on behalf of the water purveyor.

B. Permit Effective Date

This Order becomes effective **February 26, 2015**, 100 days after the adoption date of this Order. Any time after the effective date but no later than **September 1, 2015**, all water purveyors that do not meet the criteria of section I.A. of this Order shall submit a complete application package in accordance with the following section II.C.

C. Application Package Requirements

To obtain regulatory coverage under this Order, a water purveyor must submit to the State Water Board a complete application package that includes all the following items. A water purveyor with multiple drinking water systems in California need only submit one complete application package (with individual Notice of Intent forms for each of its drinking water systems) and obtain one Notice of Applicability for regulatory coverage of all its systems that discharge to waters of the U.S.

1. **Notice of Intent.** A completed Notice of Intent form for each of its drinking water systems (shown as Attachment B1 of this Order), signed and certified in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions.

2. **Application Package Fee.** A fee payable to the State Water Board in accordance with California Code of Regulations, title 23, or subsequent fee regulations updates. The current fee schedule is available at the following website: http://www.waterboards.ca.gov/resources/fees

   Only one fee is required for an application package requesting coverage for multiple drinking water systems.

3. **Site Information.**
   a. A site schematic showing the following items:
      i. The general location of the community drinking water facilities and/or the boundaries of the water purveyor's service area(s); and
      ii. The general location of groundwater supply wells and/or any discharge locations to surface waters; and
      iii. General identification of the portion of the community water system that discharges within a 300-foot conveyance distance from the receiving water(s) and/or within a 300-foot radius of the receiving water(s).
   b. Names of all named receiving water bodies and/or major downstream water bodies.

c. A description of the multiple uses of the water prior to surface water discharge or beneficial reuse that the discharges will serve (i.e. ground water recharge, irrigation).
d. Reason(s) that the discharge water cannot be utilized for multiple uses or beneficial reuse. (Refer to section VI. MULTIPLE USES OR BENEFICIAL REUSE, below)

4. **Total Maximum Daily Loads (TMDL) Constituent-specific Application Package Supplement** (applicable for discharges into waters of the U.S. identified in section III. K of the Fact Sheet). A supplement to the application requirements listed above shall include the following items:
    i. **Laboratory Analysis of TMDL-specific constituent(s).** (The laboratory analysis shall be conducted by a laboratory certified by the Environmental Laboratory Accreditation Program (ELAP).) The application package supplement shall include a laboratory analysis sheet(s) indicating the concentration of the applicable TMDL specific constituent(s) in the drinking water system discharge at the point of discharge. The monitoring and analysis shall be conducted in accordance with title 40 Code of Federal Regulations part 136. The water purveyor shall submit the following items for the application supplement to be deemed complete:
        a) A minimum of two samples representative of the drinking water system discharge that contains or has the potential to contain the greatest concentration or level of constituent/parameter associated with the TMDL constituent/parameter. The samples shall be taken at a location after the appropriate treatment or controls are implemented for the constituent associated with the TMDL; and
        b) The estimated minimum and maximum discharge volume per discharge event; and
        c) The estimated average discharge volume from the system per year. The estimated volumes may be based on historical data.
    ii. **TMDL-specific Best Management Practices.** Description of site-specific best management practices that properly treat and/or control corresponding TMDL constituents in the discharge to a concentration or level less than the water purveyor's applicable TMDL-specific permit requirement (s) as set forth in Attachment G, if any.

The supplemental analytical information will be used to confirm that the discharge does not contribute to the specific impairment of the TMDL-related waterbody(ies) and that the requirements in this Order are sufficient to ensure compliance with the specific TMDLs.

D. State Water Board Notice of Applicability

After the water purveyor's application package is deemed complete, the Deputy Director will issue a Notice of Applicability. Regulatory coverage for the planned and emergency

discharges that occur within the areas identified in the application package commences with the date of issuance of a Notice of Applicability to the water purveyor. If the submitted application package is not complete in accordance with previous section II.C., or the discharge is deemed ineligible for coverage under this Order, the Deputy Director will send a response letter to the applicant outlining: (1) the missing information that renders the application package incomplete, or (2) why the described discharge is not eligible for coverage under this Order. The water purveyor will have **60 days from the date of the response letter** to provide State Water Board staff the items necessary to complete the application package.

E. Permit Coverage Termination

1. **Termination of Existing Regional Water Board Permit Coverage.** Upon the issuance of the NOA in accordance with this Order, the State Water Board expects the applicable Regional Water Board to terminate regulatory coverage under an existing non-MS4 Regional Water Board NPDES permit for discharges within the scope of this Order.

2. **Termination of Statewide Permit Coverage or Revocation of Notice of Non-Applicability.** The Deputy Director may terminate coverage or revoke a Notice of Non-Applicability Approval (NONAA) under this Order for any of the specified causes, and require application for coverage under an individual or other NPDES permit as set forth in title 40 Code of Federal Regulations part 122.28(b)(3). Causes for permit coverage termination or NONAA revocation include, but are not limited to, the following:
   a. Violation of any term or condition of this Order; or
   b. Misrepresentation or failure to disclose all relevant facts in obtaining permit coverage or non-applicability status under this Order, or
   c. Written request from a Discharger to terminate enrollment because discharge has ceased or that the permit is no longer needed.

   Annual permit fees will be assessed by the State Water Board up to the date of written termination notification from the State Water Board to the Discharger, or the date of a termination request letter from the Discharger to the State Water Board, whichever is applicable.

3. **Qualified Biologist Certification Following Project Completion.** Upon completion of the project, the Discharger shall provide certification by a qualified biologist that beneficial uses of the receiving waters have been restored. For drinking water system discharges, completion of the project is when the water purveyor ceases discharges from its drinking water system under this Order, or when the State terminates NPDES permit coverage for the discharge(s).

F. Permit Transfer

A change in ownership of the facilities authorized to discharge through coverage under this Order requires the current owner to provide written notice to the State Water Board

at least 30 days in advance of transfer of ownership. The Deputy Director may determine that the new owner must submit an application package to seek coverage under this Order if the nature or location(s) of the discharge(s) have changed from the application package on file.

III. FINDINGS

The State Water Board finds the following:

A. Legal Authorities. This Order serves as statewide Waste Discharge Requirements (WDRs) pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by the U.S. EPA, and the California Water Code, chapter 5.5, division 7 (commencing with § 13370). This Order shall serve as a statewide general NPDES permit for point source discharges from single or multiple discharge points to surface waters, storm drains, and other storm water conveyances leading to waters of the U.S.

B. Background and Rationale for Requirements. The Fact Sheet (Attachment F) contains background information and rationale for the requirements in this Order, and is hereby incorporated into and constitutes findings for this Order. Attachments A through E, G, and H are also incorporated into this Order.

C. Termination of Existing Coverage Under Similar Regional Water Board Orders. The State Water Board's intention in the issuance of this statewide NPDES Permit is to provide consistent and efficient regulation of discharges from drinking water systems statewide. To provide such consistency, the State Water Board intends that existing regulatory coverage under an existing non-MS4 Regional Water Board NPDES permit for discharges regulated under this Order will be terminated by the applicable regional water board upon issuance of the Notice of Applicability to a water purveyor per the terms of this Order.

D. Threat and Complexity of Discharge.
When mitigated through implementation of appropriate management practices, treatment and/or controls, discharges from community water systems, as defined under this Order, pose no adverse effects or impacts to beneficial uses of the receiving waters. In accordance with the State Water Board fee regulations, the discharges that are regulated under this general NPDES Permit require minimal or no additional treatment systems to meet limits and pose no significant threat to water quality and therefore are of low threat and low complexity.

E. State Implementation Policy. As adopted in March 2000, and amended in February 2005, the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP) establishes implementation provisions for priority pollutant criteria, and objectives and provisions for chronic toxicity control. Section 5.3 of the SIP allows for the granting of a categorical exception for drinking water system activities conducted to fulfill statutory requirements mandated by federal and state regulations.

F. California Ocean Plan. In 1972, the State Water Board adopted the Water Quality Control Plan for Ocean Waters of California (hereinafter Ocean Plan), as amended. The latest Ocean Plan amendment became effective on August 19, 2013. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean waters of the State. To protect the beneficial uses of ocean water, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan and are applicable to those discharges directly into the Ocean or indirectly via a storm water system that drains into the Ocean near the location of discharge. This Order does not authorize direct discharges into Areas of Special Biological Significance (ASBS).

Section III.J of the Ocean Plan allows the State Water Board to grant an exception where the State Water Board determines that the exception will not compromise protection of the ocean waters or beneficial uses and the public interest will be served.

G. Exception Resolution. On November 18, 2014, the State Water Board adopted a Resolution approving an exception to the State Implementation Policy and the Ocean Plan to water purveyors statewide for discharges from drinking water systems from complying with specified priority pollutant criteria and ocean plan objectives. As provided in Resolution 2014-0067, the State Water Board granted an exception per section 5.3 of the State Implementation Policy to water purveyors statewide, for planned and emergency discharges to inland surface waters, enclosed bays and estuaries. Similarly, as provided in Resolution 2014-0067, the State Water Board granted water purveyors with drinking water system discharges to the ocean, other than direct discharges into ASBS, an Ocean Plan exception for compliance with specified Ocean Plan objectives. As further discussed in the Fact Sheet (Attachment F), the State Water Board finds that in accordance with the requirements of the SIP and Ocean Plan, discharges from drinking water systems qualify for an exception of the State Implementation Policy and Ocean Plan per Resolution 2014-0067.

H. California Environmental Quality Act. Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA), (commencing with section 21100) of Division 13 of the Public Resources Code.

Additionally, pursuant to CEQA, Public Resources Code section 21100 et seq., on November 18, 2014 the State Water Board adopted Resolution 2014-0067 approving a Mitigated Negative Declaration for excepting the type of discharges as covered under this Order from specified requirements of the State Implementation Policy and the California Ocean Plan.

I. Total Maximum Daily Load (TMDL) Implementation. A review of Regional Water Board TMDLs found that, as of the adoption date of this Order, only the Los Angeles Regional Water Board and the San Diego Regional Water Board have TMDLs that either directly apply waste load allocations to, or may indirectly imply that waste load allocations are applicable to, the discharges from drinking water systems regulated under this General Order. None of these TMDLs established waste load allocations that apply exclusively to discharges from drinking water systems. These TMDLs are

applicable to the discharges from drinking water systems authorized under this Order and are therefore implemented by this Order.

This Order requires TMDL-related sampling of discharges from drinking water systems identified in a TMDL. If a Regional Water Board determines that any of these TMDLs, or any newly approved TMDLs, establish requirements that should be implemented through TMDL-specific permit requirements for the discharges from drinking water systems that are authorized under this Order, the Regional Water Board may issue permit(s) for those discharges, with coverage under this Order subsequently terminated. Alternatively, if further TMDLs are adopted that address pollutants that are likely to be in discharges from drinking water systems, and allocate waste loads specifically to water purveyors regulated under this Order, the State Water Board may consider adding additional TMDL-specific permit requirements to Attachment G of this Order in a subsequent permit amendment or renewal.

J. Notification of Interested Parties. State and Regional Water Board staffs have conducted eight stakeholder meetings statewide, and numerous other informal communications, and have notified prospective water purveyors and interested agencies and persons of the intent to issue this statewide NPDES permit and prescribe these statewide waste discharge requirements. The State Water Board provided an opportunity for all interested parties to submit written comments and testimony.

K. Consideration of Public Comment. The State Water Board, in an August 5, 2014 public hearing, heard and considered public comments pertaining to the draft Order. The State Water Board also considered all written public comments submitted by the public comment due date of August 19, 2014, prior to adopting this Order. The Fact Sheet (Attachment F) provides details regarding the public notice and public hearing.

THEREFORE, IT IS HEREBY ORDERED that, in order to meet the provisions contained in California Water Code, Division 7 (commencing with section 13000) and regulations adopted thereunder, and the provisions contained in the Clean Water Act and regulations and guidelines adopted thereunder, a water purveyor shall comply with the requirements of this Order. Water purveyors that have obtained coverage under this Order shall comply with the requirements in sections IV. through VII. (Discharge Specifications and Effluent Limitations, Receiving Water Limitations, Multiple Uses or Beneficial Uses Provisions, and Compliance Determination), Attachments D and E (Standard Provisions and Monitoring and Reporting Program) of this Order, and Attachment G (TMDL-related requirements) as applicable.

IV. DISCHARGE SPECIFICATIONS AND EFFLUENT LIMITATIONS (ONLY APPLICABLE TO DISCHARGES THAT ENTER A WATER OF THE U.S.)

For purposes of this Order, references to “discharge(s)” mean discharge(s) that may occur directly, through a constructed storm drain, or through other conveyance system, to waters of U.S. The Discharger shall comply with the following discharge specifications and effluent limitations.

A. Specification for Implementation of Best Management Practices

1. The Discharger shall implement best management practices (BMPs) that treat or control pollutants from its discharges to maintain compliance with this Order. Implementation of BMPs includes proper management, and routing of discharges to control the pollutants of concern. The Discharger shall properly manage planned discharges and implement proven BMPs provided by professional associations or institutes such as the American Water Works Association, to protect beneficial uses of the receiving water body(ies). For emergency discharges, the Discharger shall implement BMP procedures as soon as feasible while concurrently protecting public health and safety. Attachment C of this Order provides example BMPs.

   At minimum, the Discharger shall implement BMPs for planned discharges to achieve the following performance measures:

   i. Prevent aquatic toxicity by using dechlorination chemical additions, implementing equivalent proven dechlorination methods, and/or assuring that the chlorine in the discharge dissipates naturally; such that the level of chlorine in the discharge is less than 0.019 mg/L prior to entering a receiving water.

   ii. Prevent riparian erosion and hydromodification by implementing flow dissipation, erosion control, and hydromodification-prevention measures; and

   iii. Minimize sediment discharge, turbidity and color impacts by implementing sediment, turbidity, erosion and color control measures.

2. For Groundwater Supply Well Operations, the Discharger shall implement treatment systems or BMPs for all groundwater well development, rehabilitation, or operation discharges to waters of the U.S. to ensure these discharges:
   (1) Do not cause or contribute to an exceedance of the receiving water limitation for turbidity in Section V.G. of this Order, and
   (2) Comply with a turbidity action level of 100 Nephelometric Turbidity Units (NTUs) or less in the discharge. An exceedance of the turbidity numeric action level of 100 NTU is not a violation of this Order, but any exceedance does require that the Discharger take action to modify, change or enhance BMPs when the turbidity level is greater than 100 NTU, until the turbidity level is 100 NTU or less.

3. The Discharger shall implement quality assurance and quality control protocol to assure best management practices, monitoring, and reporting are effective, valid, and in compliance with this Order. The Discharger shall train all personnel operating the drinking water system and responding to emergency discharges to assure the quality assurance and quality control protocol is properly implemented.
4. For planned discharges, BMPs shall be implemented prior to and during discharges that enter a water of the U.S. For planned discharges from pressure relief valves (*i.e.*, due to testing or maintenance) and unchlorinated pump-to waste wells, BMPs

shall be implemented unless infeasible (e.g., inaccessible, inadequate space). For emergency discharges, BMPs shall be implemented as soon as feasible following assurance that public safety, property, and infrastructure are protected.

5. In fulfilling the requirements of this section, the Discharger may implement the example BMPs contained in Attachment C, or proven BMPs per updated approved guidance established by industry experts, professional associations, or entities (e.g. *2014 Edition of the BMP Manual for Drinking Water System Releases* published by the California-Nevada Section of the American Water Works Association).
6. The Discharger shall maintain a documented log of all BMPs implemented for its different types of discharges that enter a water of the U.S., and make it available to State and Regional Water Board staff upon request.
7. The Discharger shall modify BMPs as necessary to maintain compliance with the requirements of this Order. If monitoring results or other available information demonstrate that the discharge is not in compliance, the Discharger shall determine the source of non-compliance, and develop and implement new or revised BMPs as necessary. As part of this process, the Discharger shall validate the effectiveness of any new or revised BMPs to achieve the requirements of this Order. All non-compliance and corresponding corrective actions to address non-compliance shall be reported to the State Water Board in the annual report, as required in the Monitoring and Reporting Program (Attachment E) of this Order. A log documenting the additional or revised BMPs shall be made available upon request by staff of the State and/or Regional Water Board.

B. Effluent Limitations

1. All Discharges of Superchlorinated Water:

a. The total chlorine residual concentration in the discharge shall not exceed 0.019 mg/L.

b. A field monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation.

2. All Planned Discharges directly into, or within 300 feet of, Inland Surface Waters, Enclosed Bays, and Estuaries

a. The total chlorine residual concentration in the discharge shall not exceed 0.019 mg/L.
b. A field monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation.

3. All Planned Discharges directly into, or within 300 feet of, Ocean Waters

a. The total chlorine residual concentration in the discharge shall not exceed 0.008 mg/L.
b. A field monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation.

c. The turbidity concentration in the discharge shall not exceed 225 NTU at any time.

V. RECEIVING WATER LIMITATIONS

Receiving water limitations are based on water quality objectives contained in Regional Water Quality Control Board Basin Plans and State Water Board water quality control plans, including the Ocean Plan, and policies, and are a required part of this Order. Drinking water system discharges to the receiving water that are authorized to discharge under this Order shall not cause or contribute to the exceedance of a water quality objective or standard in the receiving water, other than water quality objectives or standards for parameters that have been granted an exception under the State Water Board Resolution 2014-0067 and are not part of a TMDL, and at minimum shall not cause or contribute to an occurrence of the following in the receiving water:

A. pH. The pH level to be outside the range of the pH receiving water objective in a corresponding Regional Water Board basin plan.

B. Chemical Constituents. Chemical constituents to be present in concentrations that adversely affect beneficial uses.

C. Floating Material and Trash. Floating material, debris or trash to be present that cause nuisance or adversely affect beneficial uses.

D. Sediment and Total Suspended Solids. The sediment load and total suspended solids discharge rate of surface waters to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

E. Toxicity. Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.

F. Hydromodification. Velocity and/or volume of discharge to modify the existing physical characteristics of a water body.

G. Turbidity. Turbidity concentrations to exceed corresponding Regional Water Board basin plan water quality objectives for turbidity.

VI. MULTIPLE USES OR BENEFICIAL REUSE

The discharge to surface waters may be considered wasteful when it is feasible for the water to be used prior to discharge. The State Water Board strongly encourages all water purveyors to put all or part of the discharge water to multiple uses or a beneficial reuse prior to discharge into surface water. Because of the high quality of the discharge water addressed in this Order, discharges authorized under this Order that are put to multiple use or beneficial reuse are not required to be monitored and generally not required to obtain any other waste discharge requirements if the water that would otherwise be discharged is instead collected and reused for landscape irrigation, agricultural irrigation or other uses in

a manner that augments the existing water supply, or if the discharge is directly or indirectly discharged to: (1) storm water capture basin(s), (2) low impact development features, or (3) other groundwater-recharge system(s).

VII. PROVISIONS

A. Standard Provisions

The Discharger shall comply with all Standard Provisions in Attachment D.

B. Monitoring and Reporting Program Requirements

The Discharger shall comply with the Monitoring and Reporting Program requirements in Attachment E.

C. Special Provisions

1. Reopener Provisions

The State Water Board may modify or reopen this Order prior to its expiration date in any of the following circumstances:

a. If present or future investigations demonstrate that the discharges governed by, and in compliance with, this Order cause adverse impacts on water quality or beneficial uses of the receiving waters;

b. If State Water Board precedential decisions, new policies, new laws, or new regulations are adopted;

c. To include specific implementation provisions in Attachment G for any existing or newly adopted TMDLs;

d. If an administrative or judicial decision on a separate NPDES permit or Waste Discharge Requirements addresses requirements applicable to discharges authorized in this Order; and/or

e. As otherwise authorized by law.

D. Noncompliance

Noncompliance with any requirement of this Order may be subject to enforcement action by the State Water Board and/or Regional Water Board as authorized under the Porter Cologne Water Quality Control Act (Water Code Section 13000), consistent with the State Water Board's enforcement policy.

VIII. COMPLIANCE DETERMINATION FOR PLANNED DISCHARGES

Compliance with the final effluent limitations contained in Section IV.B of this Order will be determined as specified below:

A. Permit Compliance for Planned Discharges only

Compliance with applicable effluent limitations, BMP implementation requirements, receiving water limitations, monitoring, notification, and reporting requirements of the permit constitutes compliance with this Order. Due to the infeasibility of a Discharger to self-monitor compliance with receiving water limits in distant receiving water bodies (for discharges into drainage conveyance systems), non-compliance with receiving water limitations for indirect discharges will be determined based on additional site-specific information made available to the Water Boards indicating that drinking water system discharges caused or contributed to the exceedance of the receiving water limitations and adversely impacted beneficial uses.

B. General

Compliance with effluent limitations shall be determined using monitoring and reporting protocols defined in the Monitoring and Reporting Program of this Order. For purposes of reporting and administrative enforcement by the State and/or Regional Water Boards, the Discharger shall be deemed out of compliance with the effluent limitations if the constituent concentration or level is greater than the effluent limitation and greater than or equal to the minimum level (ML, also known as the Reporting Level (RL)) of properly calibrated in-field monitoring equipment.

C. Total Residual Chlorine

Handheld chlorine measuring devices that are U.S. EPA-approved are appropriate to measure residual chlorine in the field for compliance determination. The minimum level of a hand-held chlorine meter used to determine compliance with the total chlorine residual effluent limitations is 0.1 mg/L or lower. A discharge monitoring result with a total residual chlorine concentration greater than or equal to 0.1 mg/L shall be deemed out of compliance with a chlorine effluent limitation. Due to other possible interferences of these handheld devices, if readings are false positives, these will not be evaluated for compliance if explanation of cause of false positive is provided.

ATTACHMENT A – DEFINITIONS

Adverse Effect or Adverse Impact to Beneficial Uses of a Receiving Water Body
A detrimental effect upon water quality or beneficial uses of a receiving water body caused by a discharge or loading of a pollutant or pollutants.

Authorized Discharge
Any discharge that is authorized pursuant to this National Pollutant Discharge Elimination System (NPDES) permit and meets the requirements and conditions set forth in this Order.

Basin Plan
The Water Quality Control Plan(s) adopted by a Regional Water Quality Control Board. A Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve water quality objectives for all waters of the Basin.

Beneficial Uses
The existing or potential uses of receiving waters in the permit area as designated by a Regional Water Board basin plan or other water quality control plan.

Best Management Practices (BMPs)
Methods, measures, or practices designed and selected to reduce or eliminate the discharge of pollutants to surface waters from point and nonpoint source discharges. BMPs include structural and nonstructural controls, and operation and maintenance procedures, which can be applied before, during, and/or after pollution producing activities.

Community Water System
A public water system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year.

Drinking Water System
A system regulated by the State Water Resources Control Board Division of Drinking Water or a local county department of health, with the primary purpose of conveying, treating, storing and distributing safe drinking water to at least 15 service connections used by yearlong residents or regularly serves at least 25 year around residents of the area served by the system.

Deputy Director
The Deputy Director of Water Quality for the State Water Resources Control Board or any person(s) delegated by the Deputy Director to serve as acting Deputy Director.

Direct Discharge
Any discharge that enters a Water of the U.S. without first traveling via a storm drain or any other constructed conveyance system.

Discharger
Any water purveyor named in this Order as being responsible for permit requirements within its jurisdiction. A discharger to this Order includes a public or private water purveyor, wholesaler, or district, or a contractor working on behalf of the water purveyor, wholesaler or district.

Drinking Water System Discharges
Release of flows from drinking water intakes, transmission, storage, pumping, treatment and distribution systems including flows due to: (1) system failures and pressure releases, (2) system development, testing and maintenance that is performed to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and State Water Board Division of Drinking Water permit requirements.

Emergency Discharge
A discharge due to a sudden unexpected occurrence involving a clear and imminent danger, demanding immediate action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services, including the provision of drinking water supplies in accordance with applicable drinking water statutes and regulations.

Estuaries
Surface waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater.

Enclosed Bays
Enclosed bays are hydrological indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay.

Impaired Water Body
A water body that is currently listed on the Clean Water Act section 303(d) list.

Indirect Discharge
Any discharge that enters a Water of the U.S. by first traveling via a storm drain or any other constructed conveyance system.

Inland Surface Waters
All surface waters of the state that do not include the ocean, enclosed bays, or estuaries.

Low Impact Development (LID)
A storm water management and land development strategy that emphasizes water conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely reflect pre-development hydrologic functions.

Method Detection Limit (MDL)
Minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in in 40 C.F.R. part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML) and Reporting Level (RL)
The minimum level (ML) means the concentration at which a properly calibrated monitoring system gives a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific monitoring procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed. A reporting level (RL) is the ML for reporting and compliance determination included in this Order.

MS4 Operator
The MS4 Operator is the entity responsible for the operation of its local municipal separate storm sewer system subject to an MS4 NPDES Permit.

Monitoring Well
Specialized wells in which the depth to groundwater can be measured and samples of ground water can be collected for analysis for the purpose of managing drinking water aquifers and/or to fulfill requirements mandated by the federal Safe Drinking Water Act and the California Health and Safety Code.

Non-community Water System
A water system that is not a community water system, as defined in this attachment. A non-community water system is a water system that generally serves less than 15 service connections used by yearlong residents or does not regularly serve at least 25 year around residents with the water system's service area.

Not Detected (ND)
Sample results less than the properly calibrated monitoring equipment's MDL.

Non-transient Water System
A water system that is not a community water system, as defined in this attachment, and that regularly serves at least 25 of the same persons over six months per year. Non-transient water systems are regulated by the State Water Board Division of Drinking Water.

National Pollutant Discharge Elimination System (NPDES)
The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Clean Water Act sections 307, 402, 318, and 405.

Pollutants
Substances defined in Clean Water Act section 502(6) (33 U.S.C. § 1362(6)), and incorporated by reference into Water Code section 13373.

Pollution Prevention
Any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in discharge water from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State Water Board or Regional Water Board.

Receiving Water
The term receiving water is used interchangeably with the term waters of the U.S.

Superchlorinated Water
Water that is dosed with chlorine in order to adequately sanitize and disinfect drinking water system facilities

Supply Well
A groundwater well that is installed, operated, maintained and/or rehabilitated in accordance with the federal Safe Drinking Water Act and the California Health and Safety Code to pump ground water for the primary purpose of delivering drinking water to a municipality or community.

Transmission Systems
Transmission systems include pipes, pumps, canals, pump houses, and other components used to move water from the point of origin to storage reservoirs, treatment facilities, and distribution systems. Transmission systems do not have connections to serve end users.

Water Purveyor
Any entity that discharges from a drinking water system, including water purveyors, wholesalers, distributors, districts, municipalities, private companies, and other entities that own or operate a community drinking water system.

Water Wholesaler
An entity that provides potable water to a person, political subdivision, or municipality that is not the ultimate consumer of the service.

Waters of the State
Any surface water or groundwater, including saline waters, within boundaries of the state.

Waters of the United States (U.S.)
Generally refers to surface waters, as defined for the purposes of the federal Clean Water Act.

ATTACHMENT B1 – NOTICE OF INTENT

STATE WATER RESOURCES CONTROL BOARD TO APPLY FOR REGULATORY COVERAGE UNDER ORDER WQ 2014-0194-DWQ, NPDES NO. CAG140001 FOR DRINKING WATER SYSTEM DISCHARGES TO WATERS OF THE U.S.

1. DRINKING WATER SYSTEM OWNER[1]

Name			Number of Connections:_____
State Water Board Division of Drinking Water Drinking Water System No.:_____ (If Applicable - Conceptual Letter Approval – System No.:_____)			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:[2]			Date:

2. APPLICANT (IF DIFFERENT FROM SYSTEM OWNER)

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:[2]			Date:

3. WATER SUPPLIERS (IF APPLICABLE)

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:[2]			Date:

4. BILLING ADDRESS

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			

[1] If additional property owners are involved, provide the information in a supplementary letter.

[2] By signing this notice of intent, you are certifying under penalty of perjury that the information provided in this application and in any attachments is true and accurate to the best of your knowledge. By signing this Notice of Intent, you agree to closely monitor and stop the discharge if there is any violation of Order WQ 2014-0194-DWQ or impact to receiving water beneficial uses.

5. PLANNED DISCHARGE INFORMATION

Identify the type of facilities that will have drinking water system discharge (all that apply)

☐	Intake and/or Transmission Facilities	☐	Distribution Systems
☐	Storage Tanks and/or Reservoirs	☐	Supply Wells
☐	Water Treatment Facilities	☐	Other (explain below)

List and description of other discharges.

Are the discharges existing discharges as of the adoption date of this Order)? _____

If not, identify the new discharges that are proposed to take place prior to the expiration date of this Order?

List any additives to the drinking water not affiliated with drinking water treatment, their purpose, and quantity: (For example, algaecides, anticorrosion agents, etc.)

6. MULTIPLE WATER USE OR BENEFICIAL USE OPTIONS

Is using a portion of the discharge for irrigation, groundwater infiltration/recharge or other use a viable option?	☐ Yes	☐ No
Is land disposal of a portion of your discharge a viable option?	☐ Yes	☐ No

Provide a brief description of the discharge (or portion thereof), that is collected and applied for irrigation or other beneficial reuse. If no multiple water use options of any portion of your discharge are viable, explain why (attach additional sheet as necessary).

7. RECEIVING WATER INFORMATION (provide on separate sheet if necessary) *Note that identification of receiving waters does not necessarily constitute a formal finding that any specific water body is a water of the U.S.*

Name of all named receiving water bodies and/or major downstream water bodies:		
Circle the Regional Water Quality Control Board(s) where receiving water body (ies) is/are located: REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9 (See Attachment H for identification of the various regions)		
Are any of the receiving water bodies receiving drinking water system discharges listed on the current 303d list[1] for a constituent in your discharge?	☐ Yes	☐ No
If Yes, then list the water bodies on the 303d list, the constituent causing the impairment:		
Does/Do the receiving water body(ies) have applicable waste load allocations identified in Section K of the Fact Sheet or TMDL-related requirements in Attachment G? If yes, the following items must be attached to this form for the application package to be deemed complete: a. Laboratory Analysis and estimated volume of your discharge per section II.C.1.d.i. of this Order b. If applicable, a description of the additional best management practices, including applicable treatment or controls that will be implemented to comply with TMDL-related requirements per section II.C.1.d.ii. of this Order	☐ Yes	☐ No

[1] See http://www.waterboards.ca.gov/water_issues/programs/tmdl/ for current Clean Water Act section 303(d) listing.

8. BEST MANAGEMENT PRACTICES (CHECK ALL THAT APPLY)

☐ Best Management Practices (BMPs) are being implemented by trained personnel of the subject drinking water system(s) and an instruction copy of the BMPs are available to all personnel and available at the water purveyor's main office(s) upon State or Regional Water Board staff request.

Date that implementation of BMPs commenced for the above identified Drinking Water System:

_____

If not, provide date BMPs will be implemented and available. (Date must be within 6 months of the effective date of this Order.) _____

9. APPLICATION FEE

☐ Provide the appropriate applicable fees. Information on applicable fees can be found at http://www.waterboards.ca.gov/resources/fees/ Checks shall be made payable to the State Water Resources Control Board.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Signature Date

ATTACHMENT B2 – NOTICE OF NON-APPLICABILITY

STATE WATER RESOURCES CONTROL BOARD

CERTIFYING NON-APPLICABILITY OF REGULATORY COVERAGE UNDER ORDER WQ 2014-0194-DWQ, NPDES NO. CAG140001

1. DRINKING WATER SYSTEM OWNER

Name			State Board Division of Drinking Water Drinking Water System Permit No.:
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:			Date:

2. WATER PURVEYOR (IF DIFFERENT FROM ABOVE)

Name			
Mailing Address			
City	State	ZIP	Phone
Contact Person			
Signature:			Date:

3. REASON FOR NON-APPLICABILITY: (check one that applies and complete information)

Discharges from the above system(s):

☐ Are regulated by a separate individual NPDES Permit issued by a Regional Water Board to address site-specific discharges outside the scope of this Order or a Total Maximum Daily Load (TMDL) –related water quality impairments:

Regional Water Board Order No. _____NPDES Permit No._____

☐ Are covered under a local agreement with an municipal sewer storm system (MS4) permittee (Attach a copy of agreement and acknowledgement by the corresponding Regional Water Board)

☐ Are from a drinking water system owned/operated by an (MS4) permittee or co-permittee named on an existing Water Board NPDES Permit and <u>all</u> discharges flow into the same regulated storm drain system.

Provide Order No. _____NPDES Permit No._____

☐ Do not discharge to a water of the U.S. or a conveyance that drains to a water of the U.S.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Signature Date

ATTACHMENT C – EXAMPLE BEST MANAGEMENT PRACTICES (BMPs)

The Discharger shall implement BMPs to comply with the requirements of this Order, to protect the beneficial uses of the receiving waters and to prevent erosion or hydromodification caused by drinking water system discharges. Required BMPs include but are not limited to the proven practices established by the American Water Works Association, or other professional associations or institutes, in accordance with updated available technology. Dischargers shall implement BMPs comparable to the following example procedures and measures to achieve compliance.

I. Example BMP Procedures

A. Chlorinated Water Discharges

All chlorinated water shall be dechlorinated chemically or naturally. Filter bags, filter rolls and fabric filters, shall be used to remove any sand, silt or debris from entering the surface water or storm drain system.

B. Superchlorinated Water Discharges

All superchlorinated water shall be dechlorinated at the point of discharge directly into a surface water or the point of discharge into any storm water conveyance system. Filter bags or rolls, or equivalent, shall be used to remove any sand, silt or debris from entering the surface water or storm drain system.

C. Facility Drainage Discharges

All discharges from transmission, treatment, storage and distribution facility draining for cleaning and maintenance shall be dechlorinated. Filter bags, filter rolls and fabric filters shall be used to remove sediment prior to discharging to surface waters or storm drains.

D. Groundwater Supply Well Discharges

During flushing, rehabilitation, or development of water supply wells, multi-baffled settling tanks, or equivalent, shall be used if necessary to remove large particles and to reduce turbidity. If further management is needed to reduce solids after settling, the Discharger shall filter the water implementing a filter-bag filtration system, or equivalent practice, before discharging to achieve a turbidity threshold that is in compliance with this Order.

II. Example BMP Measures

A. Sediment and Erosion Control

Sediment and erosion control BMPs that assess and prevent potential impacts to receiving waters, at discharge points and downstream reaches.

1. **Receiving Waters.** The Discharger shall identify methods for locating discharge points and receiving waters to determine appropriate sediment and erosion control measures.

2. **Sediment Control.** Sediment control practices shall be used to filter and trap sediment particles, and prevent them from reaching storm drains or receiving waters. Sediment control practices to control sedimentation discharge and buildup in receiving waters include:

   (a) Straw wattles and gravel bags may be placed in a flow pathway and around storm drain inlets;

   (b) Plastic sheets may be used to line a trench and flow pathway to prevent water contact with soil;

   (c) Check dams may be constructed to dissipate flow energy and minimize the potential for discharges to dislodge soil; and

   (d) A storm water swale, if available nearby to the point of discharge that has sufficient capacity for the discharge.

   (e) Discharge to an open field or turf to remove sand and/or silt or larger particles prior to surface water discharge.

3. **Erosion Controls.** Erosion control practices shall be used to protect soil surfaces at discharge points and receiving waters. Erosion control practices shall be used to prevent re-suspension of ambient sediment within a receiving water, and shoreline erosion and streambed scour. Such controls shall minimize the energy of discharges by managing flow velocities and volumes, and shall be appropriately designed so that the discharge does not exceed the hydraulic capacity of the receiving water at the point of discharge and areas downstream of the discharge point. The following measures may be used to control erosion in receiving waters:

   (a) Construct check dams to slow down the flow;

   (b) Install flow diffusers at discharge point;

   (c) Fashion discharge flow path with as little slope as possible; and

   (d) Decrease discharge flow rates and duration.

B. Dechlorination

The following types of dechlorination methods, or equivalent, to remove chlorine:

1. Dechlorinating Diffuser – The dechlorinating diffuser connects directly to a discharge nozzle (e.g., to a fire hydrant or fire hose) and contains a chamber that houses dechlorination agent. Some diffusers feature a siphon for dechlorinating agent tablets or a solution to dechlorinate the water.

2. Dechlorination Mats – These mats are used to facilitate effective contact between the flow and dechlorinating agent during dechlorination. For dechlorination of discharges from trenches during main breaks, the tablets are placed inside synthetic mesh fabric pockets sewn together in a grid or line. The dechlorinating mats are laid across the flow path or over the storm water conveyance system.

As the discharged water contacts the tablets, dechlorinating agent is released and chlorine is inactivated.

3. Broadcast Dechlorination – Dechlorination granules are spread over an area, such as pavement, where chlorinated water is flowing toward a storm water conveyance system inlet. As the discharged water contacts the tablets, dechlorinating agent is released and chlorine is inactivated.

4. Chemical Injection Metering Pump – Occasionally, a dechlorination agent is injected into a discharge pipe, such as a tank drain, to dechlorinate the water before entering the storm water system.

Addition of dechlorination chemicals shall be managed to ensure the dechlorination agent does not adversely affect or impact beneficial uses of the receiving waters.

C. Copper and Zinc Management

A Discharger that applies copper-based herbicides or zinc-based corrosion inhibitors to its water shall implement BMP measures to eliminate or reduce copper and zinc concentrations in its discharges to the extent feasible, including but not limited to the following:

1. Record keeping of where, when and how much zinc or copper is used to treat water that has the potential to be discharged to a surface water.

2. Implementation of BMPs that eliminate planned discharges and minimize emergency discharges to surface water bodies from occurring within 48 hours of applying copper-based herbicides or zinc-based corrosion inhibitors.

3. Implementation of BMPs to eliminate or reduce to the extent feasible the use of copper-based herbicides or zinc-based corrosion inhibitors by using less toxic agents or other methods in place of copper-based herbicides or zinc-based corrosion inhibitors.

D. Training

All personnel using, operating and maintaining all facilities and equipment shall be properly trained to implement BMPs to discharges when conducting mandated operational and maintenance activities. The Discharger's staff and/or contractors shall be properly trained to understand permit compliance needs and perform the required monitoring, notification and reporting.

E. Equipment and Supplies

Equipment and sampling meters shall be inspected, maintained and calibrated per manufacturer instructions and specifications.

ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger shall comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (Water Code) and is grounds for a potential enforcement action, permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 C.F.R. § 122.41(a).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 C.F.R. § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 C.F.R. § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Water Purveyor to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision includes the operation of backup or auxiliary facilities or similar systems that are installed by a Water Purveyor only when necessary to achieve compliance with the conditions of this Order. (40 C.F.R. § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 C.F.R. § 122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 C.F.R. § 122.5(c).)

F. Inspection and Entry

The Water Purveyor shall allow State and/or Regional Water Board staff, United States Environmental Protection Agency (U.S. EPA), and/or their authorized representatives

(including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 C.F.R. § 122.41(i); Water Code section 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 C.F.R. § 122.41(i)(1));

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 C.F.R. § 122.41(i)(2));

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 C.F.R. § 122.41(i)(3)); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 C.F.R. § 122.41(i)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 C.F.R. § 122.41(f).)

B. Duty to Reapply

If the Discharger chooses to continue a discharge regulated by this Order after the expiration date of this Order and after the State Water Board has reissued this Order, the Discharger shall apply for and obtain new permit coverage as required by the new Order. (40 C.F.R. § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the State Water Board. The State Water Board may require modification or revocation and reissuance of the Order or Notice of Applicability to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 C.F.R. § 122.41(l)(3) and 122.61.)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)

B. If applicable, monitoring results shall be conducted according to test procedures under 40 Code of Federal Regulations part 136. (40 C.F.R. § 122.41(j)(4) and 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. Records Retention

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the State Water Board's Division of Water Quality Deputy Director at any time. (40 C.F.R. § 122.41(j)(2).)

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 C.F.R. § 122.41(j)(3)(i));

2. The individual(s) who performed the sampling or measurements (40 C.F.R. § 122.41(j)(3)(ii));

3. The date(s) sampling and monitoring were performed (40 C.F.R. § 122.41(j)(3)(iii));

4. The individual(s) who performed the analyses (40 C.F.R. § 122.41(j)(3)(iv)); and

5. The results of such monitoring. (40 C.F.R. § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 C.F.R. § 122.7(b)(1)); and

2. Permit applications and attachments, permits and monitoring data. (40 C.F.R. § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the State Water Board or the United States Environmental Protection Agency (U.S. EPA) within a reasonable time, any information which the State Water Board or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the State Water Board, a Regional Water Board or U.S. EPA copies of records required to be maintained by this Order. (40 C.F.R. § 122.41(h) and Wat. Code, §§ 13267, 13383.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions – Reporting sections V.B.2 through V.B.7, below. (40 C.F.R. § 122.41(k).)

2. For a corporation, a responsible corporate officer shall sign all permit applications. For the purpose of this section, a responsible corporate officer means: (i) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (40 C.F.R. § 122.22(a)(1).)

3. For a partnership or sole proprietorship, a general partner or the proprietor shall sign all permit applications, respectively. (40 C.F.R. § 122.22(a)(2).)

4. For a municipality, State, federal, or other public agency, all permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA). (40 C.F.R. § 122.22(a)(3).).

5. All reports required by this Order and other information requested by the State Water Board, a Regional Water Board or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 C.F.R. § 122.22(b)(1));

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and

c. The written authorization is submitted to the State Water Board. (40 C.F.R. § 122.22(b)(3).)

6. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above shall be submitted to the State and Regional Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)

7. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above is making the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program in Attachment E of this Order.

2. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 Code of Federal Regulations part 136, the results of this monitoring shall be included in the calculation and reporting of the data to the State Water Board. (40 C.F.R. § 122.41(l)(4)(ii).)

D. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment to the Regional Water Board. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances.

A written submission shall also be provided to the applicable regional water quality control board within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 C.F.R. § 122.41(l)(6)(i).)

2. The State Water Board or a Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 C.F.R. § 122.41(l)(6)(iii).)

E. Anticipated Noncompliance

The Discharger shall give advance notice to the appropriate Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 C.F.R. § 122.41(l)(2).)

F. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C and V.D above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.D above. (40 C.F.R. § 122.41(l)(7).)

G. Other Information

When the Water Purveyor becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or U.S. EPA, the Water Purveyor shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. Standard Provisions – Enforcement

The State and Regional Water Board are authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM

Discharges from drinking water systems, as authorized by this Order, shall be properly managed to not adversely affect or impact beneficial uses of a receiving water body. The purpose of the monitoring and reporting requirements contained in the following Monitoring and Reporting Program is to provide information demonstrating that management practices are properly implemented to protect surface water quality. The objective of the monitoring is to validate that the management practices are performing properly to maintain compliance with this Order and protect receiving waters from adverse impacts to beneficial uses.

Title 40 Code of Federal Regulations part 122.48 requires that all National Pollutant Discharge Elimination System (NPDES) permits specify monitoring and reporting requirements. California Water Code sections 13267 and 13383 also authorize the State Water Resources Control Board (State Water Board) and a Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements, which implement the federal and State of California regulations.

Dischargers authorized under this Order shall comply with all Standard Provisions in Attachment D related to monitoring, reporting and recordkeeping.

I. GENERAL MONITORING PROVISIONS

A. Samples and measurements taken as required herein shall be representative of the nature of the monitored discharge after implementation of best management practices (BMPs). All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the discharge flow joins or is diluted by any other waste stream or body of water.

B. Chemical analyses that require laboratory testing are not required in this Order (with the exception of application requirements for discharge into a water body with already established TMDL requirements identified in Section K of the Fact Sheet and/or TMDL-related requirements prescribed to the water purveyors listed in Attachment G). The Discharger shall conduct onsite field measurements for pH, turbidity, and total chlorine residual per quality assurance and quality control (QA/QC) protocol that conform to U.S. EPA guidelines, or procedures approved by the American Water Works Association or other professional drinking water industry association.

C. The Discharger shall maintain sufficient resources, including trained personnel and properly calibrated and maintained field instruments to adequately perform all field measurements required in this Order. Onsite field measurements shall be performed using handheld devices by trained personnel acting on the Discharger's behalf. A manual containing the proper operating procedures for all onsite field monitoring equipment, shall be maintained onsite or at the water purveyor's office, and shall be available for inspection by State or Regional Water Board staff.

D. Appropriate field meter devices shall be selected consistent with accepted scientific practices and used to ensure the accuracy and reliability of measurements of monitored discharges. All devices shall be properly maintained and calibrated per manufacturer instructions and as necessary to ensure their continued accuracy.

II. MONITORING REQUIREMENTS FOR PLANNED DISCHARGES

A. Event Monitoring Requirements for Superchlorinated, Well development and/or rehabilitation, and Large Volume Discharges.

The Discharger shall monitor all superchlorinated discharges, all discharges from well development and/or rehabilitation activities, and individual discharges greater than 325,850 gallons (one acre-foot) for the constituents specified in Table E-1 and per the frequency specified in Table E-2.

Table E-1. Event Monitoring of Superchlorinated Discharges, Well Development and/or Rehabilitation, and Individual Discharge Events Greater than 325,850 Gallons

Parameter	Units	Sampling [2]	Sample Type
Chlorine, Total Residual [1,3,4]	mg/L	1/Event	Grab[1]
Volume	Gallons	1/Event	Estimate [5]
pH [6]	Standard Units	1/Event	Grab
Turbidity	NTU	1/Event	Visual Estimate
Turbidity for Well Development and/or Rehabilitation Only[1]	NTU	1/Event	Grab[1]

[1] A handheld field meter shall be used, provided the meter utilizes a U.S. EPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. The Discharger shall maintain a calibration and maintenance log for each meter used for monitoring required by this Monitoring and Reporting Program.
[2] Sampling shall take place downstream of management practices, as feasible.
[3] Total chlorine residual shall be monitored with a method sensitive to and accurate at a minimum level of 0.1 mg/L. False positives are acceptable if explanation of the cause is included.
[4] Total Chlorine Residual monitoring is not required of non-chlorinated discharges.
[5.] Calculated estimate using available meter reading information or visual estimate.
[6] pH monitoring is required for superchlorinated discharges only.

Table E-2. Event Frequency Requirements for Superchlorinated Discharges, Well Development and/or Rehabilitation Discharges to a Water of the U.S., and Discharges Greater than 325,850 Gallons

Duration of Discharge	Sampling Requirements
Less than 20 minutes	One sample is required during the first 10 minutes of the discharge.
20 minutes to 60 minutes	One sample is required during the first 10 minutes of the discharge, plus a second sample is required within the last 10 minutes of the discharge.
Greater than 60 minutes	One sample is required within the first 10 minutes, a second sample is required within the next 50 minutes, and a third sample is required approximately within the last 10 minutes of the discharge or as close to the end of the discharge as is feasible.

B. Annual Representative Monitoring Requirements

This Order allows discharges of similar nature to be monitored on a representative basis. Representative monitoring is the use of monitoring results of one water quality monitoring sample to represent other discharges expected to have the same water quality. A representative monitoring measurement must represent discharges of similar nature, meaning discharges that have all the following items in common:

(a) The same general water source (ground water or surface water of similar water quality), and

(b) The same water treatment, and

(c) The same type of implemented BMPs.

The Discharger shall monitor all planned discharges not listed in Section II.A above, using representative monitoring, as previously defined in this section, for the constituents specified in Table E-3 and per the frequency specified in Table E-4.

Table E-3. Annual Representative Monitoring Requirements

Parameter	Units	Sampling[2]	Sample Type[2]
Chlorine, Total Residual [3,4]	mg/L	1/Year	Grab[1]
Volume	Gallons	1/Year	Estimate [5]
Turbidity	NTU	1/Year	Visual Estimate

[1] A handheld field meter shall be used, provided the meter utilizes a U.S. EPA-approved algorithm/method and is calibrated and maintained in accordance with the manufacturer's instructions. The Discharger shall maintain a calibration and maintenance log for each meter used for monitoring required by this Monitoring and Reporting Program.
[2] Sampling shall take place downstream of management practices, as feasible.
[3] Total chlorine residual shall be monitored with a method sensitive to and accurate at a minimum level of 0.1 mg/L. False positives are acceptable if explanation of the cause is included.
[4] Total Chlorine Residual monitoring is not required of non-chlorinated discharges.
[5] Calculated estimate using available meter reading information or visual estimate.

Table E-4. Annual Representative Monitoring Frequency Requirements

Duration of Discharge	Sampling Requirements
Less than 20 minutes	One sample is required during the first 10 minutes of the discharge.
20 minutes to 60 minutes	One sample is required during the first 10 minutes of the discharge, plus a second sample is required within the last 10 minutes of the discharge.
Greater than 60 minutes	One sample is required within the first 10 minutes, a second sample is required within the next 50 minutes, and a third sample is required approximately within the last 10 minutes of the discharge or as close to the end of the discharge as is feasible.

In its annual report, the Discharger shall:

(a) Submit a copy of its site schematic submitted in its application for enrollment with labeled representative monitoring locations, and

(b) Identify the portions of its system that the representative monitoring results represent, and
(c) Identify all changes in its representative monitoring locations that have occurred during the monitoring-year.

C. Annual Discharge Volume Monitoring Requirements

The Discharger shall keep:
(a) A record of the number of direct discharges to a water of the U.S. that is greater than 50,000 gallons, during each calendar year,
(b) An estimate of the total volume discharged to surface water during each calendar year, and
(c) An estimate of the total volume of discharge water directed to a reuse or beneficial use in accordance with section VI. of this Order.

D. Monitoring Not Required

Monitoring is not required for any discharges that:
(a) Do not ultimately reach a water of the U.S., and
(b) Are put to multiple uses or beneficial reuse, in accordance with section VI. of the Order, prior to surface water discharge.

E. Increase in Monitoring Requirements

The Deputy Director may increase the monitoring or frequency at any time to ensure the protection of beneficial uses of the receiving water. Any requirement for increased monitoring will be based on site-specific data or information that indicates a site-specific discharge threatens to cause or contribute to an exceedance of a receiving water quality criteria or objective.

III. RECEIVING WATER MONITORING REQUIREMENTS DURING NON-COMPLIANCE WITH THIS ORDER

The receiving water must be monitored for all direct planned discharges that do not comply with the requirements contained in section IV of the Order and the discharge potentially causes or contributes to an adverse effect or impact to beneficial uses. Receiving water monitoring shall be conducted during or immediately after the Discharger became aware of a non-compliant discharge that adversely effects or impacts beneficial uses of the receiving water. The Discharger shall monitor the point of confluence of the discharge and the receiving water. If the receiving water presents hazards to the monitoring personnel, visual monitoring shall be conducted using telephoto lenses and binoculars. If further hazards exist beyond such measures, monitoring is not required, and the hazards shall be documented in the corresponding monitoring report.

Receiving water monitoring shall consist of digital photographs and documentation of observed effects and impacts the discharge has on the receiving water body including the presence or absence of:

a. Erosion;

b. Floating or suspended matter;
c. Discoloration;
d. Impact on aquatic life;
e. Visible films, sheens, or coatings; and
f. Potential nuisance conditions.

Photographs and documented observations of the receiving water conditions shall be included in the annual monitoring report, and made available to State and Regional Water Board staff upon request.

Receiving water monitoring is not required for emergency discharges.

IV. POST-NOTIFICATION OF EMERGENCY OR NON-COMPLIANT DISCHARGES THAT ADVERSELY EFFECT OR IMPACT BENEFICIAL USES

Within 24 hours of the Discharger becoming aware of an adverse effect(s) or impact on beneficial uses of the receiving water body due to non-compliance with this Order, or due to a system failure or emergency involving a discharge from its drinking water system, the Discharger shall notify the corresponding Regional Water Board and the MS4 operator if applicable, and shall confirm this notification in writing within five days.

The notification shall include all of the following:

a. The location and extent of non-compliance or emergency discharge;
b. The cause of the non-compliance or emergency discharge;
c. The date, time and expected duration of the non-compliance or emergency discharge;
d. The estimated volume of discharge;
e. The applicable receiving water body; and
f. The corrective actions taken (or being taken) to prevent future non-compliance or repair the system failure.

V. PRE-NOTIFICATION OF LARGE PLANNED DISCHARGES GREATER THAN ONE ACRE-FOOT (325,850 GALLONS)

Three (3) days prior to initiation of a planned discharge (or retroactively within 24-hours after the Discharger is informed to conduct an urgent planned discharge) of a volume equal to or greater than one acre-foot (325,850 gallons), the Discharger shall notify the MS4 operator if applicable, and the appropriate Regional Water Board and provide:

a. The start date of discharge
b. The location of discharge and the applicable receiving water
c. The estimated volume of discharge, and
d. The reasons for discharge

VI. REPORTING AND RECORDKEEPING REQUIREMENTS

A. Self-Monitoring Report Requirements

1. Self-monitoring reports including compliant and non-compliant discharge monitoring information shall be maintained in the Discharger's main office and made available upon request of State and Regional Water Board staff.

2. Monitoring periods and reporting for all required monitoring shall be completed according to the schedule in Table E-5 below. Each discharge event that meets the conditions in section II and Table E-1 of this MRP shall be monitored.

Table E-5. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period	Record Keeping Due Date
1/Event or Year	January 1 thru December 31	1 March

3. The Discharger shall arrange and summarize any reported numerical data in a tabular format. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

4. If no discharge occurred during the reporting period, the monitoring report shall report that there was no discharge.

5. Authorized Dischargers shall maintain the results for all monitoring specified in this Monitoring and Reporting Program and as specified in this Order. If a Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the self-monitoring report.

B. REPORTING REQUIREMENTS TO STATE WATER BOARD

1. Dischargers shall report to the State Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act" of 1986.

2. By March 1 of every year, all non-compliant discharge monitoring information contained in the Discharger's self-monitoring report for the past calendar year shall be submitted to the State Water Board annually and shall include all non-compliant monitoring results required in this Monitoring and Reporting Program. All non-compliant discharge monitoring information shall be accompanied by the corrective actions the Discharger has taken to return the discharge to compliance. Dischargers shall also submit the annual discharge volume monitoring requirements specified in section II.C of this Attachment.

3. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify discharge events of non-compliance with the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified non-compliance shall include a description of the requirement that was violated and a description of the violation.
4. Monitoring reports shall be submitted to the State Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

   State Water Resources Control Board
   Division of Water Quality
   NPDES Permitting Unit
   1001 I Street, 15th Floor
   Sacramento, CA 95814

5. At any time during the term of this permit, the Deputy Director may notify authorized Dischargers to electronically submit monitoring reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, each Discharger shall submit a hard copy of its monitoring reports. Subsequent guidance will be provided to the Discharger upon the Deputy Director's notification for electronic submittal of reports. (Direction and guidance for electronic SMR submittals is currently available on the CIWQS Web site at http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml

ATTACHMENT F – FACT SHEET

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This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order. As described in section III.B of the Order, the State Water Board incorporates this Fact Sheet as its findings supporting the issuance of the Order.

I. PERMIT INFORMATION

A. Background

Water wholesalers and purveyors are responsible for developing water supplies and providing drinking water to their communities and customers in accordance with statutory requirements of the federal Safe Drinking Water Act and the California Health and Safety Code. Mandatory system-development and system-maintenance activities often result in surface water discharges, either via storm drain systems or other conveyance systems, or directly to a surface water body.

The Federal Water Pollution Control Act (also referred to as the Clean Water Act) section 402 requires that a discharge of any pollutant or combination of pollutants to surface waters that are waters of the United States, with certain exceptions, be regulated by a National Pollutant Discharge Elimination System (NPDES) permit. (For the purpose of this Order, the terms “waters of the United States”, “surface waters” and “receiving waters” are used interchangeably unless noted otherwise.) On September 22, 1989, the U.S. Environmental Protection Agency (U.S. EPA) granted the State of California, through the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards), the authority to issue general NPDES permits pursuant to title 40 Code of Federal Regulations parts 122 and 123.

Discharges to waters of the U.S. required to be regulated with an NPDES permit, in accordance with the Clean Water Act, include discharges of pollutants from drinking water systems. The Clean Water Act does not include an exemption from federal regulation based on volume or flow of discharge; therefore, all sizes of drinking water systems, including very small systems with small volumes of surface water discharges, are required to be regulated with an NPDES permit. Many drinking water system discharges in California that enter waters of the U.S. (either directly or via a storm water conveyance system) are unregulated. The systems that are regulated are permitted with Regional Water Quality Control Board (Regional Water Board) permits.

The State Water Board recognizes that although the quality of the discharges from different locations within a system (raw water, potable water, chlorinated water, etc.) varies, the set of discharges from the different systems throughout the state are fairly uniform. The discharges are of water that must be discarded as water purveyors conduct similar mandatory activities to assure the water that is ultimately delivered is safe for drinking and other potable uses.

Although the discharges are similar in nature, they are regulated differently throughout the state. Some are not regulated at all. Others are regulated by various Regional Water Boards permits, depending on the region the system is located. Some Regional

Water Boards regulate the raw and potable drinking water discharges using region-wide low threat-type general NPDES permits that regulate a broad range of constituents through differing regulatory approaches. Other Regional Water Board general permits do not address the constituents of concern from these types of discharges, and/or contain requirements that are not feasible for water purveyors to comply without creating obstacles to the proper operation of drinking water systems. The following table illustrates more detail on part of the Regional Water Boards' differing regulatory approaches for discharges from drinking water systems:

Table F-1. Differences in Existing Regional Water Boards' Permit Requirements

Region	Effluent Limitations[0]										
	Chlorine Residual (mg/L)	Settleable Solids (ml/L)	pH (standard units.)	TDS (mg/L)	BOD_5 (mg/L)	Ammonia	Turbidity (Nep Turbidity Units)	O&G (mg/L)	Temp (˚F)	Priority Pollutant	Acute Toxicity
1	0.11[1] and 0.019[2]	0.1	6.5[3] and 8.5[4]	BPO[17]	--	--	--	--	--	--	--
2[5]	--	--	--	--	--	--	--	--	--	--	--
3	0.02	--	--	BPO[17]	--	--	--	--	--	MCLs	--
4	0.1[6]	0.3[6] and 0.1[7]	6.5[3] and 8.5[4]	150[6] and 50[7]	30[6] and 20[7]	--	150[6] and 50[7]	15[6] and 10[7]	86 ˚F	--	90% Survival
5	0.11[1] and 0.019[2]	0.1[6]	[8]6.5 - 8.5 [9]7.5 – 9.5 [10]6.5 – 8.3	--	[11]30[6], 15[12], and 10[7]	--	--	--	--	MCLs	--
6[14]	0.003[4] and 0.002[13]	--	BPO[17]	--	--	BPO[17]	--	--	--	--	--
7	0.11[1] and 0.019[2]	0.2	6.0[3] and 9.0[4]	--	55 and 95	--	75	25	--	--	--
8	0.1[6]	--	6.5[3] and 8.5[4]	BPO[17]	75[6, 15]	--	--	15	--	--	--
9	0.1[16]	--	6.0[3] and 9.0[4]	--	--	--	--	--	--	--	--

0. TDS=Total Dissolved Solids, BOD5=5-day Biochemical Oxygen Demand, O&G=Oil and Grease, Temp=Temperature
1. 4-day Average
2. 1-hour Average
3. minimum value
4. maximum value
5. Region 2 recently issued a tentative individual NPDES Permit for public review and comment
6. Daily Maximum
7. Monthly Average
8. 6.5 minimum and 8.5 maximum for discharges to Sacramento/San Joaquin River Basins
9. 7.5 minimum and 9.5 maximum for discharges to Goose Creek
10. 6.5 minimum and 8.3 maximum for discharges to Tulare Lake Basin
11. Same effluent limits for Total Suspended Solids (TSS)
12. Weekly Average

13. Median value of daily measurements
14. Also has effluent limits for bacteria and dissolved oxygen based on the basin plan objective
15. TSS only
16. 90 percentile of all samples during discharge
17. Basin Plan Objective
18. Region 1 - North Coast Region, 2 - San Francisco Bay Region, 3 - Central Coast Region, 4 - Los Angeles Region, 5 - Central Valley Region, 6 - Lahontan Region, 7 - Colorado River Region, 8 - Santa Ana Region, 9 - San Diego Region

Additionally, most large and small municipalities have Municipal Separate Storm Sewer System (MS4) NPDES permits for discharge of storm water to waters of the United States (U.S.). Some MS4 permit holders (permittees) allow drinking water system discharges to enter their storm water systems as authorized non-storm water discharges, typically through established local agreements. Other MS4 permittees do not allow such discharges to enter their storm water systems unless the State Water Board or Regional Water Board separately regulates those discharges prior to entering the system.

Title 40 Code of Federal Regulations part 122.28 provides for issuance of general permits to regulate a category of point sources if the sources: (1) involve the same or substantially similar types of operations; (2) discharge the same type of waste; (3) require the same type of effluent limitations or operating conditions; (4) require similar monitoring; and (5) are more appropriately regulated under a general order rather than individual orders. Thus:

1. This Order issues NPDES Permit No. CAG140001 with the intent to provide consistent and efficient regulatory coverage and requirements for drinking water system discharges statewide that have a low threat to water quality when properly mitigated through implementation of best management practices.
2. This Order authorizes drinking water system discharges of water that is dedicated to drinking water facilities for the primary purpose of providing safe and reliable drinking water including, but not limited to treatment facilities, storage and distribution systems, transmission systems, and water supply and monitoring wells in drinking water aquifers. Owners or operators of drinking water systems that apply for coverage under this Order and that are issued a Notice of Applicability are hereinafter referred to as “dischargers”. For the purposes of this Order, references to “discharger” or “permittee” in applicable federal and State laws, regulations, plans, and policy are considered equivalent to references to the Dischargers herein.

   Regulatory coverage under this Order serves as authorization for the Discharger to discharge water from its drinking water system(s) to waters of the United States (U.S.) either directly into waters of the U.S. or via other conveyance, including through a municipal storm sewer system. Coverage under this Order does not authorize discharges into a municipal storm water system. The municipal storm water system owner/operator has authority to allow these non-storm water discharges into the system. A municipal storm water system owner/operator retains authority to impose further conditions, restrictions or limitations, above and beyond the requirements of this Order, on water purveyors, as a condition for discharging into the system.

B. Water Purveyors NOT Required to Enroll in This Order

All water purveyors that have discharges to waters of the U.S. as described in this Order require an NPDES permit to discharge. The State Water Board is not mandating that small systems of less than 1,000 service connections enroll in this Order. However, the State Water Board strongly encourages water purveyors with small systems to obtain the regulatory coverage under this Order to comply with the Clean Water Act. The State Water Board recognizes that some water purveyors have obtained regulatory coverage through MS4 permits, or, due to their discharge contributing to an impairment managed by a previously-adopted Total Maximum Daily Load, the discharge must be regulated by a separate individual NPDES permit.

The State Water Board issues statewide NPDES permits for the regulation of storm water discharges from small communities and non-traditional entities. Regional Water Quality Control Boards issue NPDES permits for the regulation of storm water from large (non-small) municipalities. These storm water orders may authorize non-storm water discharges from fire hydrant flushing, operation, maintenance, or testing of potable water systems, and groundwater dewatering systems, similar to discharges covered under this Order. The State Water Board will not require a water purveyor that holds a local agreement with a municipal storm water permittee to obtain regulatory coverage under this Order provided the corresponding Regional Water Board acknowledges in writing that the local agreement demonstrates coverage under the municipal storm water permit.

This Order requires that, **by September 1, 2015**, water purveyors that meet the criteria **below** submit a Notice of Non-Applicability form (Attachment B2) certifying, in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions, that regulatory coverage from this Order is not required.

- The water purveyor discharges solely to a municipal separate storm sewer system(s) (MS4) and has an established local agreement with the MS4 permittee to discharge into its system(s), **AND** the corresponding Regional Water Board Executive Officer provides written confirmation to the State Water Board Deputy Director of Water Quality that the local agreement provides sufficient regulation of the subject drinking water system discharges through an existing MS4 NPDES permit; or
- The water purveyor is an MS4 permittee, or co-permittee, named on a State Water Board or a Regional Water Board issued MS4 permit that also authorizes discharges from drinking water systems, and all drinking water system discharges solely discharge into its own MS4 system.

Also by **September 1, 2015**, this Order requires water purveyors that meet the criteria **below** to submit a Notice of Non-Applicability form (Attachment B2) certifying, in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions, that regulatory coverage from this Order is not required.

- The water purveyor is regulated under an existing NPDES permit issued by the Regional Water Board because a Total Maximum Daily Load (TMDL) was adopted and the Regional Water Board determined that TMDL-specific permit requirements for its drinking water system(s) discharges are appropriate because those discharges may contribute to the impairment of the water body.

Also by **September 1, 2015**, this Order allows water purveyors that meet the criteria **below** the option of submitting a Notice of Non-Applicability form (Attachment B2) certifying, in accordance with section V.B., *Signatory and Certification Requirements*, of Attachment D – Standard Provisions, that regulatory coverage from this Order is not required.

- All discharges from the drinking water system do not discharge to a water of the U.S.

A water purveyor with multiple drinking water systems in California need only submit one Notice of Non-Applicability for its systems that meet the same criterion.

After review of each submitted Notice of Non-Applicability, the State Water Board's Deputy Director of Water Quality (Deputy Director) will either issue 1) a Notice of Non-Applicability Approval or 2) a response letter to the applicant outlining: (a) the missing information that deems the Notice of Non-Applicability incomplete, or (b) why the described discharge is not eligible and thus the water purveyor must obtain coverage under this Order. The water purveyor will have **60 days from the date of the response letter** to submit the items necessary to complete the Notice of Non-Applicability or to submit a complete application package in accordance with section II.C of this Order. A notice may be issued to a water purveyor that holds a drinking water system permit through the State Water Board Division of Drinking Water, and that has not submitted a Notice of Non-Applicability (or an application package for enrollment, as explained later in this Fact Sheet) by September 1, 2015, if that purveyor discharges from its drinking water system to a water of the U.S.

Drinking water systems that serve less than 1,000 connections that serve end users (this does not include water wholesalers), maintain the option to enroll in this Order and are not required to submit the Notice of Non-Applicability form.

C. Facilities and Discharges Covered Under this Order

This Order covers discharges from drinking water systems that qualify as a "community water system" as defined in the California Health and Safety Code, and wholesalers of water to community water systems. Community water systems provide daily drinking water for at least 15 service connections and at least 25 individuals at least 60 days each year. Community water systems must comply with the California Health and Safety Code per the California Code of Regulations titles 17 and 22. Title 17 ensures that water delivered by community water systems is wholesome and potable. Title 22 contains potable water standards, including the primary and secondary maximum contaminant levels (MCLs), and requires monitoring and reporting on surface water and groundwater drinking water sources.

Community water systems authorized to discharge under this Order include the following facilities:

1. **Transmission Systems.** Transmission systems are the pipes, pumps, canals, pump houses, and other components used to move water from the point of origin to storage reservoirs, treatment facilities, and distribution systems. Transmission systems do not have connections to serve end users. Above ground and underground pipes generally range in diameter from 24 inches to 90 inches. Some facilities are open channels. The water in transmission systems may or may not meet standards for human consumption.

2. **Distribution and Storage Systems.** Distribution systems are the pipes and associated pumps, valves, hydrants, storage facilities and other structures that distribute and store potable water from treatment plants, wells, reservoirs, and transmission systems to end users. Distribution pipes generally range in diameter from 2 inches to 24 inches.

3. **Wells in Drinking Water Aquifers.** Drinking water supply wells are installed in borings advanced into the ground to extract groundwater for use as drinking water. These types of wells are typically 12 inches to 36 inches in diameter. Monitoring wells are also in borings advanced into the ground to gage the depth to groundwater for drinking water aquifer management purposes such as groundwater overdraft protection. In addition monitoring wells serve as access points to sample the aquifer to characterize the water quality and to detect contaminants such as bacteria before the contaminant reaches the water supply. Monitoring wells are typically 12 inches or less in diameter. Discharges from water supply and monitoring wells occur during well development, maintenance (including flushing), rehabilitation, and sampling. This Order covers discharges from wells in unpolluted drinking water aquifers, and discharges from polluted drinking water aquifers that are properly treated to not cause or contribute to an adverse effect or impact to beneficial uses of the receiving waters.

4. **Water Treatment Plant or Facility.** Water treatment facilities treat water to the quality that is suitable for potable drinking water in accordance with the federal Safe Drinking Water Act, California Health and Safety Code and the State Water Board Division of Drinking Water permitting requirements. Water treatment systems range from large treatment plants to small treatment facilities including well head treatment apparatuses.

D. Discharge Description

This Order provides regulatory coverage for planned and emergency discharges. Planned discharges are part of a water purveyor's essential activities to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and State Water Board Division of Drinking Water permitting requirements for providing reliable and safe drinking water. Planned discharges include scheduled and unscheduled discharges that take place under the control of the Discharger to comply with regulatory mandates. Emergency discharges occur due to system failures and emergencies. This Order serves as a general

NPDES permit for the discharge to waters of the U.S. of surface water or groundwater that may be altered by chlorine, corrosion inhibiting agents, algaecides, or addition of other chemicals, but that does not adversely affect or impact beneficial uses of the receiving waters.

E. Discharger's Activities

This Order covers discharges that are essential to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and State Water Board Division of Drinking Water permitting requirements for providing reliable and safe drinking water. Discharges from these activities described in detail below are intermittent, short-term or seasonal in nature.

1. **Maintenance and Repair.** Facility maintenance and repairs occur frequently (e.g., multiple times a day) at different locations within a system. Discharges may be necessary when dewatering the repair or maintenance site. Underground facilities require excavation for access, and dewatering is necessary to prevent flooding. The resulting "trench dewatering" discharges are usually turbid because the discharge velocity may be high enough to dislodge and transport sediment from trenches and pits. Discharges may also be necessary to maintain positive water pressure within the drinking water system. Positive pressure may be necessary during repair and replacement of pipes, valves, and other components to prevent sediment, debris, and microorganisms from entering the system.
2. **System Flushing.** Flushing portions of a system may be necessary to replace stagnant water when demand is low, or to remove poor quality drinking water. Flushing may also be needed to respond to consumer complaints. Fire hydrants serve as access portals for flushing water distribution systems. Flushing can also occur from other valves or standpipe connections. Flushing may be part of routine operations, and can occur daily, weekly, monthly, or annually based on seasonal water use or known water quality trends. New system facilities or facilities that are periodically taken out of service for maintenance or in response to low water demands may necessitate flushing with super-chlorinated water prior to full operation.
3. **Pipeline, Tunnel, and Reservoir Drainage.** Occasionally, pipelines, tunnels, and reservoirs must be taken out of service for maintenance, such as inspections, repairs, and upgrades. Planned discharges may occur as often as once per year or as infrequently as once every 20 years. These facilities may also be drained in emergency circumstances due to unanticipated drinking water quality concerns.
4. **Groundwater Pumping.** The most common type of discharge from a supply well is well "blow-off" or purging water from the well. Well blow-off is required to reactivate a well after it has been out of service, to purge the system to collect a monitoring sample, or to purge the system when monitoring indicates that the water supply does not meet drinking water quality requirements. Discharges from water supply wells also occur as a result of well maintenance, such as unclogging a filter screen from sediment and mineral build-up.

F. Types of Discharges from Discharger's Activities

This Order covers planned and emergency discharges that occur daily throughout the State. Planned discharges are a part of the Discharger's essential activities, described in part in the previous section of this Fact Sheet. Emergency discharges occur when pipelines or other infrastructure break or leak, valves malfunction, or other unanticipated events occur, such as noncompliance with drinking water standards or hydraulic releases necessary to prevent pipeline rupture. Planned and emergency discharges may include, but are not limited to the following:

1. **Planned Discharges include discharges from:**
    a. Water treatment plant operations (excluding filter backwash that is discharged to a water of the U.S.)
    b. Distribution system storage tanks
    c. Distribution system dewatering, flushing, and pressure testing
    d. Fire flow/fire hydrant testing
    e. Meter testing
    f. Automated water quality analyzers
    g. Pressure relief valves
    h. Groundwater supply well flushing
    i. Groundwater well development, rehabilitation, and testing.
    j. Groundwater monitoring for purpose of supply well development, rehabilitation, and testing.
    k. Transmission system installation, cleaning, and testing.
2. **Emergency Discharges include discharges from:**
    a. Emergency system repairs, including transmission system failure or leaks, and distribution system pipe breaks.
    b. Trench dewatering.
    c. Catastrophic events.

G. Water Treatment Methods and Additives

This Order covers discharges to waters of the U.S. of surface water or groundwater that may be altered by chlorine, corrosion-inhibiting or algaecides agents containing metals such as zinc and copper, or other chemicals but that do not adversely affect or impact beneficial uses of the receiving water when properly managed. For disinfection, water purveyors treat their water with chlorine to comply with California Code of Regulations title 22 or to control microbial growth that can lead to corrosion. Chlorine removal, (also referred to as dechlorination) and its effectiveness depends in part on chemical dose and contact time. Discharger's disinfection and dechlorination processes may include, but are not limited to the following:

1. **Disinfection Treatment Methods.**
   a. **Chlorination.** Most dischargers use chlorine to disinfect their drinking water in accordance with California Code of Regulations, title 22, or to control microbial growth that can lead to corrosion. Chlorine reacts with organic matter and pipe materials (such as iron). As a result, the total chlorine residual decreases following chlorine treatment as water flows throughout the distribution system, making a system vulnerable to bacterial regrowth. Dischargers manage the lack of adequate chlorine concentrations in the distribution system by occasionally flushing water from dead end areas or other parts of their system with new water that has a sufficient chlorine residual concentration. Dischargers may also use booster stations to inject additional chlorine.
   b. **Chloramination.** Some Dischargers prefer chloramine over chlorine. Chloramine forms when chlorine and ammonia combine. Chloramine's disinfection power is one-hundredth that of free chlorine, but chloramine is also more stable and less reactive. Chloramine is also more persistent when released into the environment. Chloramine provides longer-lasting, more reliable protection against bacterial regrowth.
   c. **Super-chlorination.** Some treatment processes require superchlorinated treatment of the drinking water. Superchlorination is necessary when disinfecting new facilities, when returning facilities to service after taking them offline, and when contamination is detected. Superchlorinated water typically has a total chlorine residual concentration greater than 4.0 mg/L.

2. **Dechlorination Treatment Methods.** During planned discharges, flows may be connected to devices that add dechlorinating chemicals prior to discharge. During emergency discharges, dissolving pellets or mesh bags containing the dechlorinating chemicals may be placed in the path of the flow.

H. Example Drinking Water Discharge Characteristics

The following table illustrates the typical characteristics of the types of discharges covered by this Order. This table is not inclusive of all potential discharges:

Table F-1. Typical Characteristics of Drinking Water System Discharges

Facility and Discharge Category [1]	Planned or Emergency	Flow Rate (gpm) [2]	Duration [2]	Frequency [2]	Total Residual Chlorine (mg/L) Or Turbidity (NTU) [2]
Transmission Systems					
Dewatering for new construction, maintenance, or inspection [3]	Planned	200 to 3,500	2 hours to 21 days	Once per year to 20 years	0.8 to 2.5 mg/L
Disinfecting of new construction	Planned	200 to 1,350	2 hours to 14 days	Upon start-up	10 to 50 mg/L
Maintenance or construction	Planned	50 to 200	2 to 10 minutes	Once per year to 20 years	0.8 to 2.5 mg/L
Aqueduct dewatering	Planned	250 to 50,000	1 to 2 days	Once per 2 to 10 years	0.8 to 2.5 mg/L
Disinfecting (new pipeline or storage facility after repair) [4]	Both	Up to 3,500	1 hour to 21 days	Upon initial use	25 to 200 mg/L
Water pipeline breaks, pipeline diameter > 24 inches (includes trench dewatering)	Emergency	5 to 3,500	30 minutes to 2 day		0.8 to 2.5 mg/L
Storage Facilities					
Drain valve testing	Planned	5 to 300	60 to 120 minutes	Once per 5 to 10 years	0.8 to 2.5 mg/L
Reservoir rehabilitation pipe flushing	Planned	Varies	Varies		0.8 to 2.5 mg/L
Tank and reservoir draining for maintenance	Planned	200 to 1,350	1 to 14 days	2 per year to 1 per 5 years	0.8 to 2.5 mg/L
Reservoir overflow	Emergency	Varies	Varies	Varies	0.8 to 2.5 mg/L
Distribution Systems					
Standpipe cleaning	Planned	500 to 2,000	1 to 2 days		0.8 to 2.5 mg/L
Water meter field testing	Planned	50 to 1,000	30 to 60 minutes		0.8 to 2.5 mg/L
Dead-end pumping	Both	200 to 2,000	30 minutes to 1 hour	4 to 12 per year	0.8 to 2.5 mg/L
Line flushing through a hydrant	Both	700 to 1,600	≤10 to 60 minutes	1 to 3 per year per hydrant	0.8 to 2.5 mg/L
Distribution system maintenance or pipe breaks, pipeline diameter < 24 inches (includes trench dewatering)	Both	5 to 1,350	10 to 60 minutes		0.8 to 2.5 mg/L

Facility and Discharge Category [1]	Planned or Emergency	Flow Rate (gpm) [2]	Duration [2]	Frequency [2]	Total Residual Chlorine (mg/L) Or Turbidity (NTU) [2]
Water quality management and water quality sampling (e.g., for bacteria; metals; taste; odor; etc.)	Both	100 to 15,000	5 minutes to several hours	1 to 50 (for management); up to 5,000+ events per year (for sampling)	0.8 to 2.5 mg/L
Unauthorized hydrant opening	Emergency	500 to 1,000	60 minutes to 8 hours		0.8 to 2.5 mg/L
Groundwater Well Operations					
Water supply well development	Planned	500 to 5,000	15 to 40 hours	Upon start-up	500 to 25,000 NTU
Water supply well rehabilitations	Planned	500 to 3,500	7 days	As-needed; up to 4 per year	500 to 20,000 NTU
Monitoring well sampling	Planned	15-60	20 minutes to 3 hours per well	Semi-annual or as needed	500 to 5000 NTU
Water supply well disinfection		500 to 3,500	30 minutes to 24 hours	As needed	$\leq$ 200 mg/L
Monitoring well development	Planned	15-60	3-8 hours	Semi-annual or as needed	500 to 25,000 NTU
Discharge by water supply well ("blow-off") for reactivation or monitoring	Both	500 to 3,500	30 minutes to 24 hours	Up to 4 per year (planned); or more frequently for emergency circumstances	500 to 20,000 NTU

Unit Abbreviations:

gpm = gallons per minute

mg/L = milligrams per liter

Footnotes:

[1] Source: Tikkanen, Maria, John Schroeter, Lawrence Y.C. Leong, and Rajagopalon Ganesh, 2001. Guidance Manual for the Disposal of Chlorinated Water. Denver, CO. AWWA Research Foundation and American Water Works Association; with modifications by the Alameda County Water District, Alameda County and San Jose Water Company, Santa Clara County, 2013.

[2] Milligrams per liter or Nephelometric Turbidity Units prior to implementation of best management practice. The data presented are typical ranges; actual conditions may vary outside of these ranges.

[3] This information does not apply to raw unaltered water.

[4] The processes to disinfect water pipelines and storage facilities use different chlorination methods, which have different chlorine contact times. Chlorinated water is dechlorinated before discharge under planned operations.

I. Example Discharges, Potential Threat to Receiving Water and Corresponding Permit Requirements.

As shown above, discharges to waters of the U.S. from the discharger's essential activities may have the potential to impact the receiving water. The threat to water

quality is from toxicity of chlorination or metal-containing agents, loading of solids, large volume discharges, and discharges having high velocities. This Order contains permit requirements specifically targeted to protect the beneficial uses of the receiving water from impacts due to these threats, as shown in the following examples:

1. Direct discharge to inland surface waters, enclosed bays and estuaries

Threat: Toxicity to aquatic life; Potential adverse impact on beneficial uses due to:

(1) concentrations of chemical constituents, (2) sediment and turbidity loading from discharge water and erosion, and (3) hydromodification.

Applicable Permit Requirements:

section IV.A Best Management Practices specifications,
section IV.C.1. Total chlorine effluent limitation,
section VI. Receiving water limitations,
Attachment E., section II. Monitoring requirements,
Attachment E., section VII. Reporting and record-keeping requirements.

2. Discharge to a municipal storm water system where the discharge travels less than 300 feet from the point of discharge into the storm drain system to the receiving water body; if the length of the storm drain conveyance is unknown, the distance shall be a direct 300 feet to a water of the U.S.

Threat: Toxicity to aquatic life; Potential adverse impact on beneficial uses due to:

(1) concentrations of chemical constituents, (2) sediment, debris, trash and turbidity loading from discharge water and street scouring, and (3) hydromodification.

Applicable Permit Requirements:

section IV.A Best Management Practices specifications,
section IV.C.1. Total chlorine effluent limitation,
section VI. Receiving water limitations,
Attachment E., section II. Monitoring requirements,
Attachment E., section VII. Reporting and record-keeping requirements.

3. Discharge to a municipal storm water system where: (1) the discharge travels more than 300 feet, or (2) the receiving water body outside of a 300-foot radius of the location of discharge into the storm drain.

Threat: Potential adverse impact on beneficial uses due to: (1) sediment, debris, trash and turbidity loading from discharge water and street scouring, and (2) hydromodification.

Applicable Permit Requirements:

section IV.A Best Management Practices specifications,
section VI. Receiving water limitations,
Attachment E., section II. Monitoring requirements,
Attachment E., section VII. Reporting and record-keeping requirements.

4. Discharges of superchlorinated, supply well water due to development and rehabilitation, and large volume discharge, either directly or via a storm water system, to waters of the U.S.

Threat: Toxicity to aquatic life. Potential adverse impact on beneficial uses due to:

(1) concentrations of chemical constituents, (2) sediment, debris, trash and turbidity loading from discharge water and street scouring, and

(3) hydromodification.

Applicable Permit Requirements:

section IV.A Best Management Practices specifications,
section IV.B.1. Final total chlorine effluent limitation,
Attachment E., section II. Event Monitoring Requirements for Superchlorinated,
Attachment E., section VII. Reporting Requirements.

5. Discharges from portions of the drinking water system that:

(1) Directly discharge into or discharge to a storm water conveyance system that conveys the discharge into:

i. Storm water capture basin(s),

ii. Low impact development features, or

iii. Other groundwater-recharge system(s); and

(2) Are collected and used for landscape irrigation and/or other beneficial reuse.

Threat: No threat to water of the U.S. or water of the state.

Applicable Permit Requirements: Reporting only. No effluent limits or monitoring requirements. No further waste discharge requirements necessary.

J. Discharge Points and Receiving Waters

Although drinking water system discharges potentially occur along any point of the system alignment, and may occur concurrently, the discharges are considered “point source discharges” – discharges of a pollutant from a distinct point source, as defined more fully in title 40 Code of Federal Regulations part 122.2, to a water of the U.S. Discharges flow directly into receiving waters or indirectly to receiving waters via storm drains and other conveyance systems. Discharges into creeks, rivers, lakes, enclosed bays, estuaries, and the ocean occur throughout the State. The application package for coverage under this Order requires the water purveyor to identify the receiving waters for its discharges. If the system discharges into numerous small tributaries prior to discharging into a major water body, the application only requires a general description of the immediate receiving water bodies and the name of the major downstream water body(ies).

II. NOTIFICATION REQUIREMENTS

A. General Order Application

Dischargers enrolling for coverage under this General Order are required to submit a complete application package, including a Notice of Intent (NOI), Attachment B1 of this Order any time after the effective date of the Permit but no later than **September 1**, **2015**. A water purveyor with multiple community water systems need only submit one complete application package, containing individual NOIs for each of its water systems and obtain one Notice of Applicability for regulatory coverage of all its systems that discharge to waters of the U.S. The application package must include all of the following items to be deemed complete:

1. A Notice of Intent for each community water system, including general information about the water purveyor and the existing or proposed discharge(s).

2. A site map that identifies:
a. The boundaries of the water purveyor's service areas,
b. The general location of the drinking water system,
c. The approximate general location of groundwater supply wells, and
d. The general identification of the portion of the community water system that discharges within a 300-foot conveyance distance from the receiving water(s) and/or within a 300-foot radius of the receiving water(s).

The intent of the site map is to provide general information regarding where the discharges are originating and their locations relative to receiving waters. The site map is part of the application package. Regulatory coverage applies to discharges identified in the application package. By providing boundaries of service areas and/or approximate locations of facilities, regulatory coverage of all potential discharges is included in the Notice of Applicability.

3. An application fee payable to the State Water Board that shall be in accordance with California Code of Regulations, title 23, or subsequent fee regulations updates. The current fee schedule is available at http://www.waterboards.ca.gov/resources/fees.

4. Evaluation of multiple water use or beneficial reuse options, or the reason(s) that the discharge water cannot be placed for multiple uses or beneficial uses, as encouraged by the State Water Board in accordance with Article X, section 2 of the California Constitution, and Water Code section 100 (prohibition of the waste or unreasonable use of water). Pursuant to these state policies, the State Water Board strongly encourages discharges of water from drinking water systems to be captured for multiple uses prior to surface water discharge, or to be routed to groundwater infiltration facilities. Therefore, to obtain coverage under this Order, a water purveyor is required to evaluate its water reuse options. These options include:

a. Discharging into a storm water system that employs low impact development practices or flows into storm water capture basins to recharge groundwater.

b. Collecting and using the water for landscape or agricultural irrigation or other appropriate uses in lieu of potable drinking water supply.

Discharges to land from drinking water systems that do not drain to waters of the U.S. do not need authorization to discharge under an NPDES permit. Discharges to groundwater may require waste discharge requirements issued by the State and/or Regional Water Boards. As an incentive to promote multiple uses of drinking water system discharges, the State Water Board generally will not require separate waste discharge requirements or monitoring for discharges otherwise regulated under this Order that are beneficially reused because they are intermittent and of relatively-good quality (not including waste that threatens ground water quality). A water purveyor must estimate the quantity of water discharged from its system that is beneficially reused, and report it in the annual report. If the entire drinking water system does not discharge to waters of the U.S., NPDES permit coverage is not needed.

5. Receiving water information, including names of receiving water bodies and major downstream water bodies.

6. For applicable discharges into waters of the U.S. identified in section III.K of this Fact Sheet, a TMDL constituent-specific supplement to the application package that includes: a) laboratory analysis of TMDL-specific constituents listed in section III.K, and b) TMDL-specific Best Management Practices to address the constituents.

B. State Water Board Notice of Applicability or Ineligibility for Coverage Under this Order

After the water purveyor's application package is deemed complete, the State Water Board's Deputy Director of Water Quality (Deputy Director) will issue a Notice of Applicability (NOA). Regulatory coverage for the planned and emergency discharges that occur within the areas identified in the application package commences with the date of issuance of a Notice of Applicability to the water purveyor. If the submitted application package is not complete in accordance with this Order, or the discharge is deemed ineligible for coverage under this Order, the Deputy Director will send a response letter to the applicant outlining: (1) the missing information that renders the application package incomplete, or (2) why the described discharge is not eligible for coverage under this Order. The water purveyor has **60 days from the date of the response letter** to provide State Water Board staff the items necessary to complete the application package.

C. Permit Coverage Termination

1. **Termination of Existing Regional Water Board Permit Coverage.** Upon the issuance of the NOA in accordance with this Order, the State Water Board expects the applicable Regional Water Board to terminate regulatory coverage under an existing non-MS4 Regional Water Board NPDES permit for discharges newly

regulated under this Order. The State Water Board expects all Regional Water Board permit coverage of drinking water systems that are not separately regulated due to site-specific TMDL requirements to be terminated within one year of the Adoption Date of this Order.

2. **Termination of Statewide Permit Coverage or Revocation of Notice of Non-Applicability.** The Deputy Director may terminate coverage or revoke a Notice of Non-Applicability Approval (NONAA) under this Order for any of the specified causes, and require application for coverage under an individual or other NPDES permit as set forth in title 40 Code of Federal Regulations part 122.28(b)(3). Causes for permit coverage termination or NONAA revocation include, but are not limited to, the following:
   a. Violation of any term or condition of this Order; or
   b. Misrepresentation or failure to disclose all relevant facts in obtaining permit coverage or non-applicability status under this Order; or
   c. Written request from a Discharger to terminate enrollment because discharge has ceased or that the permit is no longer needed.

   Annual permit fees will be assessed by the State Water Board up to the date of written termination notification from the State Water Board to the Discharger, or the date of a termination request letter from the Discharger to the State Water Board, whichever is applicable.

D. Permit Transfer

A change in ownership of the facilities authorized to discharge through coverage under this Order requires the current owner to provide written notice to the State Water Board at least 30 days in advance of transfer of ownership. The Deputy Director may determine that the new owner must submit an application package to seek coverage under this Order if the nature or location(s) of the discharge(s) have changed from the application package on file.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in the Findings in section III of this Order. This section provides supplemental information, where appropriate, for the plans, policies, and regulations relevant to the discharge.

A. Legal Authorities

This Order serves as Waste Discharge Requirements pursuant to California Water Code article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA, and California Water Code chapter 5.5, division 7 (commencing with § 13370). It shall serve as an NPDES permit for point source

discharges from multiple discharge points to surface waters, storm drains, and other conveyances leading to surface waters.

B. State Implementation Policy

The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP) establishes implementation provisions for priority pollutant criteria, and objectives and provisions for chronic toxicity control. However, section 5.3 of the SIP allows the State Water Board to grant categorical exceptions from meeting priority pollutant criteria/objectives for discharges from drinking water systems conducted by the owners or operators to fulfill statutory requirements mandated by the federal Safe Drinking Water Act and the California Health and Safety Code. The California Toxics Rule contains criteria for 126 priority pollutants that may be present in these drinking water systems discharges. In many cases, discharges from drinking water systems do not comply with all of the applicable priority pollutant criteria (such as for the protection of aquatic life) since potable and treated drinking water are only required to comply with maximum contaminant levels (MCLs) for the protection of public health. A review of the 126 priority pollutants found that there are priority pollutant criteria that are more stringent than the established MCLs.

The planned and emergency drinking water systems discharges covered under this Order are in accordance with the exception granted by the State Water Board through Resolution 2014-0067, allowing water purveyors an exception to comply with priority pollutant criteria for the priority pollutants that have an applicable California Toxic Rule (CTR) criterion more stringent than its corresponding MCL, or do not have an adopted pollutant-specific MCL. The exception was granted in accordance with the requirements set forth in Section 5.3 of the State Implementation Policy.

C. California Ocean Plan

In 1972, the State Water Board adopted the Water Quality Control Plan for Ocean Waters of California (hereinafter Ocean Plan), as amended. The latest Ocean Plan amendment became effective on August 19, 2013. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean waters of the State. To protect the beneficial uses of ocean water, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan and are applicable for those discharges entering directly into the Ocean or indirectly via a storm water system that drains into the Ocean near the location of discharge. This Order does not authorize direct discharges into Areas of Special Biological Significance (ASBS).

Section III.J of the Ocean Plan allows the State Water Board to grant an exception to specified Ocean Plan requirements where the State Water Board determines that the exception will not compromise protection of beneficial uses of ocean waters and the public interest will be served. In many cases, discharges from drinking water systems due to

mandated activities do not comply with all of the established Ocean Plan objectives (such as for protection of aquatic life or human health based on more stringent carcinogenic objectives) since these discharges are only required to comply with MCLs for the purpose of public health and safety. A review of the Ocean Plan pollutant water quality objectives shows that there are a number of pollutants that may occur in mandated drinking water system discharges, with Ocean Plan objectives that are more stringent than the MCLs. State Water Board Resolution 2014-0067 granted an Ocean Plan exception to water purveyors for the pollutants that have an Ocean Plan objective more stringent than its corresponding MCL or do not have an adopted pollutant-specific MCL. The exception was granted in accordance with the Ocean Plan exception requirements.

D. California Environmental Quality Act (CEQA).

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of CEQA, (commencing with section 21100) of Division 13 of the Public Resources Code.

Pursuant to CEQA, Public Resources Code section 21100 et seq., on November 18, 2014 the State Water Board adopted Resolution 2014-0067 approving a Mitigated Negative Declaration (MND) for exceptions from specified requirements of the State Implementation Policy and California Ocean Plan for statewide discharges resulting from mandated activities required by the federal Safe Drinking Water Act and California Health and Safety Code. The MND concludes that discharges from drinking water systems have less than significant impact to the environment with appropriate mitigation incorporated. This Order implements Resolution 2014-0067 and establishes appropriate mitigation requirements for discharges authorized under this Order.

E. Regional Water Boards' Water Quality Control Plans

The Regional Water Boards have adopted Water Quality Control Plans (hereinafter Basin Plans) that designate beneficial uses, establish water quality objectives, and contain implementation programs and policies to achieve those objectives. In addition, the Basin Plans implement State Water Board Resolution No. 88- 63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. The Basin Plans identify typical beneficial uses as follows: municipal and domestic supply, agricultural irrigation, stock watering, process supply, service supply, hydropower supply, water contact recreation, canoeing and rafting recreation, other non-contact water recreation, warm freshwater aquatic habitat, cold freshwater habitat, warm fish migration habitat, cold fish migration habitat, warm and cold spawning habitat, wildlife habitat, navigation, rare, threatened, or endangered species habitat, groundwater recharge, and freshwater replenishment. Requirements of this Order implement provisions contained in the applicable Basin Plans.

F. Antidegradation Policy

Section 131.12 of 40 C.F.R. requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing high water quality be maintained unless degradation is justified based on specific findings. The State Water Board and Regional Water Board's Water Quality Control Plans implement, and incorporate by reference, both the state and federal antidegradation policies. The permitted discharges must be consistent with the antidegradation provision of section 131.12 and State Water Board Resolution 68-16.

Given the nature of a general permit and the broad range of beneficial uses to be protected across the state, it is not feasible to analyze each surface water body in the state to determine which water bodies are of high quality for the constituents in the discharges authorized by this Order. The State Water Board finds that, due to the intermittent, seasonal and temporary characteristics of these discharges, the impact on existing surface water quality from these discharges will be insignificant, as further explained in the MND approved by the State Water Board in Resolution 2014-0067. While surface waters may be temporarily degraded and there may be temporary excursions above water quality objectives in the immediate vicinity of these discharges, any such impacts to surface water quality that may occur are consistent with the maximum social and economic benefit of the people of the state, provided that the discharges comply with this Order. The discharges are a necessary consequence of providing safe, clean, affordable, and accessible drinking water to the people of the state in accordance with the state policy declared in Water Code section 106.3, subdivision (a), and the discharges are mandated by drinking water laws and regulations. The BMPs required under this Order constitute best practical treatment and control of these discharges. Therefore the discharges permitted under this Order are consistent with the antidegradation provision of section 131.12 and the State Water Board Resolution 68-16.

G. Anti-Backsliding Requirements

Sections 402(o)(2) and 303(d)(4) of the CWA and title 40 Code of Federal Regulations part 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. This Order is a new statewide NPDES permit that regulates discharges from community drinking water systems statewide. Some of these same discharges are currently regulated under existing Regional Water Board NPDES permits. Some of these same discharges are not regulated at all. This Order, when implemented, will provide consistent regulatory requirements that apply to discharges from drinking water systems statewide. The following existing Regional Water Board NPDES permits regulate discharges from community drinking water systems, among other types of discharges, and were used to

guide the development of this Order. Existing NPDES permits' effluent limitations and requirements in these Regional Water Board permits were analyzed for the purpose of analyzing backsliding.

The San Francisco Bay Regional Water Board Permit (Order R2-2009-0033) is a general permit applicable only to surface water treatment facilities for potable supply discharges for either long term or short term. The short term discharges include limits for TSS, settleable matter, pH, total chlorine residual, total trihalomethanes (TTHMs), zinc, and acute toxicity. The treatment of any surface waters to make them suitable for drinking includes filtration and disinfection. This treatment is expected to remove any BOD, TSS or settleable matter present in the surface water. For the other effluent limits of TTHMs and zinc, the discharges would be in compliance with MCLs for TTHMs as required by the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements. In addition, pursuant to the SIP and Ocean Plan exceptions, the discharges covered under this Order are not required to comply with zinc objectives. Therefore, there is no need to establish TSS, TTHMs and zinc effluent limitations, nor an effluent limitation for pH.

The Los Angeles Regional Water Board Permit (Order R4-2003-0108) is a general permit for discharges of groundwater from potable water supply wells to surface waters and it includes limits of TSS, turbidity, BOD, settleable solids, chlorine residual, pH, TTHMs, Methyl tertiary butyl ether (MTBE) and a list of 15 volatile organic compounds (VOCs) that are also considered priority pollutants, PCBs, and various limits for TDS, Sulfate, Chloride, Boron and Nitrogen applicable per watershed/stream reach. Groundwater that is suitable for drinking water purposes receives natural or well-head treatment so it is not expected to have BOD, TSS, or settleable solids. For this reason and as previously discussed, there is no need to impose limits for BOD, TSS, settleable solids, pH, and TTHMs. In the case of PCBs and the 15 VOCs, as these are priority pollutants that are granted exceptions, it is not necessary to establish limits for these pollutants. With regards to the limits for TDS, Sulfate, and chloride, compliance with the federal Safe Drinking Water Act, the California Health and Safety Code, and the State Water Board's Division of Drinking Water permitting requirements, should result in compliance with the TDS, sulfate, and chloride limits, so there is no need to impose the same limitations in this Order. With regards to nitrogen, compliance with the nitrate MCL should ensure compliance with the nitrogen limitations. During the effective period of R4-2003-0108 there were no issues of non-compliance with the boron limitations. This is new information to justify that there is no reasonable potential to exceed the boron limits. Therefore, there is no need to impose a boron limitation.

The Central Valley Regional Water Board Permit (Order R5-2013-0074) is a general permit applicable to dewatering activities and other types of low threat discharges to surface waters including discharges from drinking water systems. It includes limitations for Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), settleable solids, pH, and total chlorine residual. Since this Permit applies to a large set of what the Central Valley Water Board considered low threat discharges, it established a wide range of effluent limitations to ensure protection of beneficial uses.

This statewide Order and its requirements are specifically applicable to drinking water systems that discharge either groundwater and/or surface water that have/has received treatment per state regulations. As previously discussed, treated surface water and groundwater suitable for drinking water purposes are not expected to have BOD, TSS, or settleable solids. In addition, sedimentation and erosion control BMPs are required to be implemented to prevent the discharges authorized by this Order from carrying sediment and causing soil erosion that would add TSS and settleable solids in their discharge prior to entering a storm drain or receiving water directly. It is therefore unnecessary to establish effluent limits for BOD, TSS, or settleable solids in this Order.

Community drinking water systems are required to maintain a pH of 7.0 in their distribution systems as part of their corrosion control treatment plans (40 C.F.R. section 141.82(f)). For all other community systems that do not need to maintain a corrosion control plan, it is expected that they will have no issues with pH levels because they have no issues with corrosion of their systems. Including an effluent limitation for pH in this Order would unnecessarily regulate those systems that are already required to comply with a 7.0 pH level and force other community drinking water systems to add additional chemicals prior to discharging, which in turn may add salts and other pollutants that may cause water quality impacts. Therefore, it is unnecessary to include an effluent limitation for pH in this Order.

The San Diego Regional Water Board Permit (Order R9-2010-0003) is a general permit for discharges of hydrostatic test water and potable water to surface waters and storm drains or other conveyance systems. It establishes limits for total chlorine residual and pH. As previously discussed there is no need to include an effluent limit for pH.

This statewide Order requires that discharges be managed by the use of multiple BMPs, and also contains effluent limitations for chlorine residual and turbidity and receiving water limitations for pH, chemical constituents, sediment and total suspended solids, and toxicity, among other requirements. This Order does not include specific effluent limitations for BOD, TSS, settleable solids or settleable matter, pH, TTHMs, zinc, acute toxicity, MTBE, 15 priority pollutants VOCs, PCBs, TDS, sulfate, chloride, boron and nitrogen, which are included in some of the comparable Regional Water Board permits, as described above. To the extent that this Order may impose less stringent limitations than those contained in the existing Regional Water Board permits, applicable exceptions to the anti-backsliding prohibition that are supported by the analysis above include: waters in attainment, where permit requirements are consistent with antidegradation (§ 303(d)(4)(B)); new information available (§ 402(o)(2)(B)(i)); and events beyond dischargers' control (§ 402(o)(2)(C)), due to the mandatory or emergency nature of the discharges. All requirements under this Order, when implemented, will increase the regulatory requirements over drinking water system discharges on a statewide basis. The effluent limitations for chlorine residual and numerical threshold of 100 NTU for turbidity in this Order are as stringent as the Regional Water Board permits. Effluent limits in broader Regional Board General Permits for discharges to inland waters, enclosed bays and estuaries consist of monthly averages of 50 NTU or 75 NTU. The 100 NTU numerical threshold in this Order is an instantaneous numeric action level that requires further implementation of BMPs when

exceeded. An instantaneous action level of 100 NTU for applicable discharges that are short term and intermittent is as protective, if not more protective, than a monthly average of 50 NTU or 75 NTU.

H. Monitoring and Reporting Requirements

Title 40 Code of Federal Regulations part 122.48, requires that all NPDES permits specify requirements for recording and reporting monitoring results. Section 13267 and section 13383 of the Water Code authorize the regional boards to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) in this Order establishes monitoring, recordkeeping, notification, and reporting requirements to implement State and federal requirements. This MRP is provided in Attachment E.

To address the cost of compliance to dischargers and the cost of implementation to the Water Boards, the monitoring and reporting requirements in this Order are designed to provide necessary information for the discharger to make informed decisions regarding implementation of best management practices, and for the reporting of information that has pertinent value to the protection of water quality. This Order implements representative monitoring requirements, allowing one monitoring sample to represent the quality of other repetitive discharges that are similar in nature. Discharges that are considered to be similar in nature include those that have the following elements in common: (1) the same general water supply, (2) undergo the same water treatment, and (3) are managed through the same series of best management practices. This Order additionally requires annual monitoring and reporting of non-compliant discharges, mandatory recordkeeping, Regional Water Board notification of high volume discharges, reporting of estimated annual volumes discharged to surface water and reporting of the estimated volume of water put to multiple uses prior to surface water discharge or routed to ground water infiltration.

I. Endangered Species Act

This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code § 2050 et. seq) or the Federal Endangered Species Act (16 U.S.C.A. § 1531 et. seq). This Order requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

J. Impaired Water Bodies on CWA 303(d) List

Under section 303(d) of the 1972 CWA, states, territories, and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after discharges of point sources of pollution have installed the minimum required levels of pollution control technology. On

October 11, 2011, U.S. EPA gave final approval to California's 2010 section 303(d) List of Water Quality Limited Segments. The Basin Plans reference this list of Water Quality Limited Segments (WQLSs), which are defined as "…*those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources* (40 C.F.R. part 130.2(j))." The Basin Plans also state, "*Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment*." Impaired waters are those waters not meeting quality standards pursuant to section 303(d) of the CWA, thus do not support beneficial uses. States must also prioritize the water bodies on the list and develop action plans, called total maximum daily loads (TMDLs) to improve the water quality. California impaired waters, as approved by the State Water Board, are listed on http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/2010_combo303d.xls.

This Order does not authorize discharges from new drinking water systems (not an expansion of an existing system) into an impaired water body that is impaired for a constituent that exists in the new discharge at a concentration greater than the criteria used to establish the impairment of the water body.

K. Applicable Total Maximum Daily Loads (TMDLs) with Waste Load Allocations (WLAs) to Water Purveyors

TMDLs in California are developed either by the Regional Water Boards or by U.S. EPA. TMDLs developed by Regional Water Boards are designed as Basin Plan amendments and include implementation provisions. TMDLs developed by U.S. EPA typically contain the total load and load allocations required by section 303(d), but do not contain comprehensive implementation provisions. This stems from the fact that U.S. EPA authorities related to implementation of nonpoint source pollution control measures are generally limited to education and outreach as provided by CWA section 319. TMDLs are currently required for all waters and pollutants on the 303(d) list. TMDLs must consider and include allocations to both point sources and nonpoint sources of listed pollutants. Although the abbreviation stands for "Total Maximum Daily Load," the limitations contained in a TMDL may be other than "daily load" limits. There also can be multiple TMDLs on a particular water body, or there can be one TMDL that addresses numerous pollutants. The basis for grouping pollutants into one TMDL is typically whether or not there can be a common analytical approach to the assessment or a common management response to the impairment.

A review of Regional Water Board TMDLs found that, as of the adoption date of this Order, only the Los Angeles Regional Water Board and the San Diego Regional Water Board have existing (previously adopted) TMDLs in their basin plans that may indirectly imply that waste load allocations are applicable to the discharges from drinking water systems regulated under this General Order. In many of the existing TMDLs, waste

load allocations apply to general categories of discharges (such as “other NPDES discharges”, “general NPDES discharges” or “minor NPDES discharges”) that indirectly include discharges from drinking water systems.

The State Water Board is required to ensure that the effluent limits in this Order are “consistent with the assumptions and requirements of any available waste load allocation for the discharge.” (40 C.F.R. § 122.44(d)(1)(vii)(B).) Although these TMDLs apply to the discharges that are authorized under this Order, none of the TMDLs or supporting staff reports indicate that the discharges from drinking water systems authorized under this Order are significant sources of the relevant pollutants. Based on the data that is currently available, and due to the high quality and intermittent and short-term nature of the discharges from drinking water systems authorized under this Order, it is unlikely that these discharges contribute to the impairment of the TMDL-related water bodies. The State Water Board has determined that the intermittent, short-term and seasonal discharges regulated under this Order do not contribute to the impairment, and requirements more stringent than those included in this Order will not contribute to the actions needed to address the impairment. Therefore, it is consistent with the assumptions and requirements of the waste load allocation in these TMDLs for this Order to not include any TMDL-specific effluent limitations. However, due to the existing language in the TMDLs identified in this section, the State Water Board is requiring laboratory sampling to be included in the application process of this Order, to confirm that pollutants in the subject drinking water system discharges are not at levels that are contributing to the existing impairment. The State Water Board is also requiring that applicants describe and implement applicable TMDL pollutant-specific management practices to reduce the subject pollutant concentration to the maximum extent possible. The data submitted will be evaluated on a case by case basis and in consultation with Regional Board staff. The evaluation will be based on specific factors such as the amount of discharge, duration of discharge, type of pollutant, and consideration of the applicable established Waste Load Allocations for each TMDL to determine whether the conditions of this Order address the applicable TMDL requirements.

If the Deputy Director determines that any of these TMDLs, or any newly approved TMDLs, establish waste load allocations that should be implemented through TMDL-specific permit requirements for the discharges from drinking water systems that are authorized under this Order, the water purveyor will be required to enroll in this Order and maintain enrollment unless and until the Regional Water Board issues an individual or general permit for those discharges contributing to the impairment. Alternatively, if further TMDLs are adopted that address pollutants that are likely to be in discharges from drinking water systems, and allocate waste loads specifically to water purveyors regulated under this Order, the State Water Board may consider adding additional TMDL-specific permit requirements to Attachment G of this Order in a subsequent permit amendment or renewal.

To facilitate a water purveyor’s identification of an applicable TMDL in the Los Angeles and San Diego regions, the following table has been provided to identify the receiving water bodies and corresponding pollutants for which an applicant must provide an application supplement, in accordance with Section II.C.4 of this Order. The table

below includes only the TMDL-specific constituents that may pertain to drinking water discharges and/or additional pollutants the discharges assimilate as they flow into receiving waters. A summary providing general information regarding each TMDL adopted by U.S. EPA or the Regional Water Boards for the Los Angeles and San Diego regions that are applicable to the discharges from drinking water systems authorized under this Order, is provided following the table.

Table F-2. Los Angeles Regional Water Boards' 303(d) list Waterbodies and applicable TMDL-specific constituents

TMDL WATERBODY	TMDL CONSTITUENT
Ballona Creek	Copper Lead Zinc
Ballona Creek Estuary	Cadmium Copper Lead Silver Zinc TSS Chlordane DDTs DDD Total PCBs
Ballona Creek, Ballona Estuary and Sepulveda Channel	Total Coliform E. coli
Calleguas Creek	Boron Total Dissolved Solids Sulfate Chloride Chronic Toxicity Unit (TU_c) Chlorpyrifos Diazinon Chlordane 4,4-DDD 4,4,-DDE 4,4,-DDT Dieldrin PCBs Toxaphene
Calleguas Creek, Reach 1, 2, 3, 4, 5, 9, 10, 11, 12, and 13	Copper Nickel
Calleguas Creek, Reach 4 and 5	Selenium

Colorado Lagoon	Chlordane Dieldrin Lead Zinc PAHs PCBs DDT
Dominguez Channel	Toxicity
Dominguez Channel and Torrance Lateral	Copper Lead Zinc
Dominguez Channel Estuary	PAHs Chlordane Dieldrin
Dominguez Channel Estuary and Greater Harbor Waters	Copper Lead Zinc 4-4-DDT Total PCBs
Compton Creek	Copper Lead
Echo Lake	Total Nitrogen Total Phosphorus
El Dorado Park Lake	Total Nitrogen Total Phosphorus Mercury
Lake Calabasas	Total Nitrogen Total Phosphorus
Lincoln Lake	Total Nitrogen Total Phosphorus
Long Beach City Beaches and the Los Angeles River Estuary	Total Coliform
Los Angeles Harbor	Total Coliform

Los Angeles River	Nitrate-nitrogen Nitrite-nitrogen Nitrate-nitrogen + nitrite-nitrogen Cadmium Copper Lead Zinc E. coli
Los Angeles River above LA-Glendale WRP	Ammonia
Los Angeles River below LA-Glendale WRP	Ammonia
Los Angeles River Reach 1	Copper Lead
Los Angeles River Reach 2 and Arroyo Seco	Copper Lead
Los Angeles River Reach 3 above LA- Glendale WRP and Verdugo	Copper Lead
Los Angeles River Reach 3 below LA- Glendale WRP	Copper Lead
Los Angeles River Reach 4	Copper Lead
Los Angeles River Reach 5,6 and Bell Creek	Copper Lead Selenium
Los Angeles River Burbank Western Channel, above WRP	Copper Lead
Los Angeles River Burbank Western Channel, below WRP	Copper Lead
Los Angeles River tributaries	Ammonia
Los Cerritos Channel	Copper Lead Zinc
Macado Lake	Total PCB DDD (all congeners) DDE (all congeners) DDT (all congeners) Total DDT Chlordane Dieldrin

Malibu Creek	E. coli
Malibu Creek Lagoon	Total Coliform
Marina Del Rey Mothers Beach and Back Basins	Total Coliform
Park Lake, Peck Rd	Total Nitrogen Total Phosphorus
Rainbow Creek	Total Nitrogen Total Phosphorus
Rio Hondo Reach 1	Copper Lead Zinc
San Gabriel River Estuary	Copper
San Gabriel River, Reach 1	Copper
San Gabriel River, Reach 2	Lead
San Gabriel River, Coyote Creek	Copper Lead Zinc
San Gabriel River, San Jose Creek, Reach 1 and 2	Selenium
Santa Clara River	Total Coliform E. coli
Santa Clara River, Reach 7	Ammonia as Nitrogen Nitrate plus Nitrite as Nitrogen
Santa Clara River, Reach 3	Ammonia as Nitrogen Nitrate plus Nitrite as Nitrogen
Santa Fe Dam Park Lake	Total Nitrogen Total Phosphorus
Santa Monica Bay	Total Coliform
Upper Santa Clara River, Reach 3	Chloride
Upper Santa Clara River, Reaches 4B, 5 and 6	Chloride
Ventura Coastal (Miscellaneous)	Total Coliform
Ventura River	Total Nitrogen Total Phosphorus

Table F-3. San Diego Regional Water Boards' 303(d) list Waterbodies and applicable TMDL-specific constituents

TMDL WATERBODY	POLLUTANT
Alisa Hydrologic Subarea	Total Coliform
Chollas Creek	Copper Lead Zinc
Chollas Hydrologic Subarea	Total Coliform
Dana Point Hydrologic Subarea	Total Coliform
Lower San Juan Hydrologic Subarea	Total Coliform
Miramar Reservoir Hydrologic Subarea	Total Coliform
Mission San Diego Hydrologic Subarea & Santee Hydrological Subarea	Total Coliform
Rainbow Creek	Total Nitrogen Total Phosphorus
San Clemente Hydrologic Subarea	Total Coliform
San Dieguito Hydrologic Subarea	Total Coliform
San Joaquin Hills Hydrologic Subarea & Laguna Hills Hydrologic Subarea	Total Coliform
San Marcos Hydrologic Subarea	Total Coliform
San Luis Rey Hydrologic Subarea	Total Coliform
Scripps Hydrologic Subarea	Total Coliform
Tecolote Hydrologic Subarea	Total Coliform

Summary of Los Angeles Region Water Quality Control Board TMDLs

The following is a summary of TMDLs in the Los Angeles region that have waste load allocations for general NPDES discharge categories, followed by a general description. Table F-2 in this section lists the 303(d) list water bodies and TMDL-specific constituents. These TMDLs have been adopted by the Regional Water Board, and approved by the State Water Board and/or the U.S. EPA under Clean Water Act section 303(c), prior to the adoption date of this Order. This Order solely implements the requirements of existing TMDLs; this Order does not modify an existing TMDL or basin plan language. Further detailed information on the summary of listed TMDLs below, as adopted by the Regional Water Quality Control Boards or U.S. EPA, can be found at the following websites:

http://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/
or
http://epa.gov/region09/water/tmdl/final.html

1. Total Maximum Daily Load for Nitrogen, Phosphorus, Mercury, Trash, Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) in the Los Angeles Area Lakes

U.S. EPA established TMDLs in the following nine lakes in the Los Angeles region, for the following pollutants:

- Peck Road Park Lake: nitrogen, phosphorus, chlordane, DDT, dieldrin, PCBs, trash
- Lincoln Park Lake: nitrogen, phosphorus, trash
- Echo Park Lake: nitrogen, phosphorus, chlordane, dieldrin, PCBs, trash
- Lake Calabasas: nitrogen, phosphorus
- El Dorado Park Lakes: nitrogen, phosphorus, mercury
- Legg Lakes (North, Center and Legg): nitrogen, phosphorus
- Puddingstone Reservoir: nitrogen, phosphorus, chlordane, DDT, PCBs, mercury, dieldrin
- Santa Fe Dam Park: nitrogen, phosphorus
- Lake Sherwood: mercury

The NPDES permits in the watersheds draining to the impaired lakes include municipal separate storm sewer system (MS4) permits, a California Department of Transportation (Caltrans) storm water permit, general construction storm water permits, general industrial storm water permits, and a general NPDES permit. Other than the MS4 and Caltrans storm water permits, there are no major individual NPDES permits in the watersheds draining to the impaired lakes. Sources of pollutants include discharges of potable water used to maintain lake levels.

2. Total Maximum Daily Load for Chloride in the Upper Santa Clara River

Chloride levels in Reach 3 of the Santa Clara River exceed the water quality objective (WQO) of 80 mg/L for chloride in Reach 3 established in the Water Quality Control Plan, Los Angeles Region (Basin Plan). U.S. EPA established a TMDL for Reach 3. There are two major point sources that discharge into Reach 3, the Santa Paula and Fillmore Water Reclamation Plants. Minor point source discharges to Reach 3 include:

- storm water regulated under the NPDES municipal stormwater permit
- runoff from construction sites regulated under the statewide construction general NPDES permit,
- storm water regulated under the Caltrans statewide NPDES permit,
- runoff from industrial sites regulated under the statewide industrial facility general NPDES permit, and
- dewatering operations regulated under NPDES permits

In addition, elevated chloride concentrations are causing impairments of the water quality objective of 100 mg/L in Reach 5 (EPA 303(d) list Reach 7) and Reach 6 (EPA 303(d) list Reach 8) of the Santa Clara River (SCR). These reaches were on the 1998 and 2002 Clean Water Act (CWA) 303(d) lists of impaired water bodies as impaired due to chloride. The objectives for these reaches were set to protect all beneficial uses; agricultural beneficial uses have been determined to be most sensitive, and not currently attained at the downstream end of Reach 5 (EPA 303(d) list Reach 7) and Reach 6 (EPA 303(d) list Reach 8) in the Upper Santa Clara River (USCR). Irrigation of salt sensitive crops such as avocados, strawberries, and nursery crops with water containing elevated levels of chloride results in reduced crop yields. Chloride levels in groundwater in Piru Basin underlying the reach downstream of Reach 5 are also rising.

3. Total Maximum Daily Load for Bacteria in the Santa Monica Bay

Many of the beaches along Santa Monica Bay (SMB) were listed on the California's 1998 section 303(d) List, due to impairments for coliform or for beach closures associated with bacteria generally. The Los Angeles Regional Board adopted TMDLs to address bacteriological water quality impairments for 44 beaches along Santa Monica Bay located in Los Angeles County, California. WLA(s) are expressed as the number of sample days at a shoreline monitoring site that may exceed the following single sample numeric targets:

- Total coliform density shall not exceed 10,000/100ml.
- Fecal coliform density shall not exceed 400/100ml
- Enterococcus density shall not exceed 104/100ml
- Total coliform density shall not exceed 1000/100 ml if the ratio of fecal-to-total coliform exceeds 0.1.

With the exception of isolated sewage spills, storm water runoff conveyed by storm drains and creeks is the primary source of elevated bacterial indicator densities to the SMB beaches during wet weather. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. All responsible jurisdictions and responsible agencies (local agencies that are responsible for discharges from a publicly owned treatment works to the SMB watershed or directly to the Bay, permittees or co-permittees on a municipal storm water permit, the California Department of Transportation, and other agencies that have jurisdiction over a beach adjacent to SMB) within a subwatershed are jointly responsible for complying with established allowable number of exceedance days.

4. Total Maximum Daily Load for Nutrients in the Los Angeles River

Reaches of the Los Angeles River and its tributaries were listed as impaired for nitrogen compounds (ammonia, nitrate, and nitrate) and related effects such as

algae, pH, odor, and scum on the 2002 303(d) list. These reaches were listed because numeric and narrative water quality objectives for nitrogen compounds and related effects were exceeded, thereby impairing warm, freshwater, and wildlife habitats, and recreation beneficial uses.

The principal source of nitrogen compounds to the Los Angeles River is discharges from the Donald C. Tillman Water Reclamation Plant (WRP), the Los Angeles-Glendale WRP, and the Burbank WRP. During dry weather period, the major POTWs contribute 84.1% of the total dry weather nitrogen load. Urban runoff, storm water, and groundwater discharge may also contribute nitrate loads. Further evaluation of these sources is set forth in the Implementation Plan

Concentration based WLAs for nitrogen compounds are allocated to minor point sources enrolled under NPDES or WDR permits including but not limited to Tapia Water Reclamation Plant (WRP), Whittier Narrows WRP, Los Angeles Zoo WRP, industrial and construction storm water, and municipal storm water and urban runoff from municipal separate storm sewer systems (MS4s). The WLA(s) are listed by receiving water and established as the applicable one-hour and thirty-day average effluent limitations at the point of discharge.

5. Total Maximum Daily Load for Nutrients in the Santa Clara River

Discharge of wastes containing nitrite, nitrate and ammonia to the Santa Clara River causes exceedances of water quality objectives for ammonia, nitrate and nitrite established in the Basin Plan. The Santa Clara River is listed as impaired by ammonia in Reach 3 and by nitrate plus nitrite in Reach 7 on the 2002 303(d) list of impaired water bodies. Reach 8 of the Santa Clara River is included on the State Monitoring List for organic enrichment/dissolved oxygen, which may be caused by excessive nitrogen. Nitrate and nitrate are biostimulatory substances that can cause eutrophic effects such as low dissolved oxygen and algae growth. Excessive ammonia can cause aquatic life toxicity.

The principal source of ammonia, nitrite, and nitrate to the Santa Clara River is discharges from the Saugus and Valencia Water Reclamation Plants (WRPs) and the Fillmore and Santa Paula Publicly Owned Treatment Works (POTWs). Agricultural runoff, storm water discharge and groundwater discharge may also contribute nitrate loads. Further evaluation of these sources is set forth in the Implementation Plan.

Concentration-based waste loads are allocated to major point sources of ammonia and nitrate+nitrite in Reach 3, which include the Fillmore and Santa Paula POTWs; concentration-based waste loads are allocated to major point sources of ammonia and nitrite+nitrate in Reaches 7 and 8, which include the Valencia and Saugus WRPs. Concentration-based waste loads are also allocated to municipal, industrial and construction storm water sources regulated under NPDES permits and minor discharges enrolled under NPDES or WDR permits. The allocations for minor point sources are based on the water quality

objectives for ammonia, nitrite, nitrate and nitrite plus nitrate. The WLAs are established as one-hour and thirty day average concentrations.

6. Total Maximum Daily Load for Bacteria in the Marina del Rey Mothers Beach and Back Basins

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Marina del Rey Harbor (MdRH) Mothers' Beach and back basins. Dry-weather urban runoff and storm water conveyed by storm drains are the primary sources of elevated bacterial indicator densities to MdRH Mothers' Beach and back basins during dry and wet-weather. As of December 2002, there were seven dischargers located within the Marina del Rey watershed. These dischargers were issued general NPDES permits, general industrial and/or general construction storm water permits. The bacteria loads associated with these discharges are largely unknown, since most do not monitor for bacteria. However, these discharges are not expected to be a significant source of bacteria.

The Los Angeles County MS4 and Caltrans storm water permittees and co-permittees are assigned waste load allocations (WLAs) expressed as the number of daily or weekly sample days that may exceed the single sample targets identified under "Numeric Target" at a monitoring site. Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection.

According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

7. Total Maximum Daily Load for Bacteria in the Los Angeles Harbor

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use of Inner Cabrillo Beach and the potential REC-1 uses of the Main Ship Channel in the Los Angeles Harbor.

Dry-weather urban runoff and storm water conveyed by storm drains are major sources of elevated bacterial indicator densities to Inner Cabrillo Beach and the Main Ship Channel during dry and wet-weather. As of March 2004, there are 15 active individual and 15 active general, NPDES permits for discharges to the Inner or Outer Los Angeles Harbor including the Terminal Island Treatment Plant. While the fecal coliform counts in the wastewater field indicate a contribution of bacteria to the Harbor by the Terminal Treatment Plant, the wastewater field is sufficiently diluted and the bacterial densities are so much lower in the Harbor than the high bacterial densities and exceedances at the sites at Cabrillo Beach and in the Main Ship Channel that it appears that the

Treatment Plant is not a significant source of bacteria to the Beach or to the Ship Channel.

Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

8. Total Maximum Daily Load for Bacteria in Malibu Creek and Lagoon

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Malibu Creek, Lagoon, and adjacent beach. Fecal coliform bacteria may be introduced from a variety of sources including storm water runoff, dry-weather runoff, onsite wastewater treatment systems, and animal wastes. Waste Load Allocations (WLAs) are expressed as the number of daily sample days that may exceed the single sample limits as identified under "Numeric Target." WLAs are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection.

The responsible jurisdictions and responsible agencies are the County of Los Angeles, County of Ventura, the cities of Malibu, Calabasas, Agoura Hills, Hidden Hills, Simi Valley, Westlake Village, and Thousand Oaks; Caltrans, and the California Department of Parks and Recreation. The responsible jurisdictions and responsible agencies include the permittees and co-permittees of the municipal storm water (MS4) permits for Los Angeles County and Ventura County, and Caltrans. In addition, according to the TMDL, discharges from Tapia WWRF and effluent irrigation, and general construction storm water permits are not expected to be a significant source of bacteria.

9. Total Maximum Daily Load for Metals in the Los Angeles River

Segments of the Los Angeles River and its tributaries are on the Clean Water Act section 303(d) list of impaired waterbodies for copper, cadmium, lead, zinc, aluminum and selenium. The metals subject to this TMDL are toxic pollutants, and the existing water quality objectives for the metals reflect national policy that the discharge of toxic pollutants in toxic amounts be prohibited. When one of the metals subject to this TMDL is present at levels exceeding the existing numeric objectives, then the receiving water is toxic. The beneficial uses impaired by metals in the Los Angeles River and its tributaries are those associated with aquatic life and water supply, including wildlife habitat, rare, threatened or endangered species, warm freshwater habitat, wetlands, and groundwater recharge.

There are significant differences in the sources of metals loadings during dry weather and wet weather. During dry weather, most of the metals loadings are in the dissolved form. The three major publicly owned treatment works (POTWs) that discharge to the river (Tillman WRP, LA-Glendale WRP, and Burbank WRP) constitute the majority of the flow and metals loadings during dry weather. The storm drains also contribute a large percentage of the loadings during dry weather because although their flows are typically low, concentrations of metals in urban runoff may be quite high. The remaining portion of the dry weather flow and metals loadings represents a combination of tributary flows, groundwater discharge, and flows from other permitted NPDES discharges within the watershed.

TMDLs are developed for reaches on the 303(d) list and for reaches where recent data indicate additional impairments. Addressing the impairing metals throughout the Los Angeles River watershed will ensure that the metals do not contribute to an impairment elsewhere in the watershed. Metals allocations are therefore developed for upstream reaches and tributaries that drain to impaired reaches. These TMDLs address wet- and dry-weather discharges of copper, lead, zinc and selenium and wet-weather discharges of cadmium.

Impairments related to cadmium only occur during wet weather. Impairments related to selenium are confined to Reach 6 and its tributaries. Dry-weather impairments related to zinc only occur in Rio Hondo Reach 1. The aluminum listing was based on water quality objectives set to support the municipal water supply beneficial use (MUN). MUN is a conditional use in the Los Angeles River watershed. The United States Environmental Protection Agency (U.S. EPA) has determined that TMDLs are not required for impairments of conditional uses.

10. Total Maximum Daily Load for Metals in Ballona Creek

Ballona Creek is on Clean Water Act Section 303(d) list of impaired waterbodies for dissolved copper, dissolved lead, total selenium, and dissolved zinc and Sepulveda Canyon Channel is 303(d) listed for lead. TMDLs are developed for reaches on the 303(d) list and metal allocations are developed for tributaries that drain to impaired reaches. Recent data indicates that selenium is not present at levels exceeding existing numeric targets and is not impairing the designated beneficial uses. Therefore a TMDL for selenium is not included. This TMDL address dry- and wet-weather discharges of copper, lead, and zinc in Ballona Creek and Sepulveda Canyon Channel.

There are significant differences in the sources of copper, lead, and zinc loadings during dry weather and wet weather. During dry weather, most of the metals loadings are in the dissolved form. Storm drains convey a large percentage of the metals loadings during dry weather because although their flows are typically low, concentrations of metals in urban runoff may be quite high. During dry years, dry weather loadings account for 25-35 percent of the annual metals loadings. Additional sources of dry weather flow and metals loading include groundwater

discharge and flows from other permitted NPDES discharges within the watershed. During wet weather, most of the metals loadings in Ballona Creek are in the particulate form and are associated with wet-weather storm water flows.

Concentration-based dry- and wet-weather waste load allocations are assigned to the minor NPDES permits and general non-storm water NPDES permits that discharge to Ballona Creek or its tributaries.

11. Total Maximum Daily Load for Toxic Pollutants in the Ballona Creek Estuary

Ballona Creek Estuary (Estuary) is on the Clean Water Act Section 303(d) list of impaired water bodies for cadmium, copper, lead, silver, zinc, chlordane, DDT, PCBs, PAHs and toxicity in sediments. Urban storm water has been recognized as a substantial source of metals. Numerous researchers have documented that the most prevalent metals in urban storm water (i.e., copper, lead, zinc, and to a lesser degree cadmium) are consistently associated with suspended solids. Because metals are typically associated with fine particles in storm water runoff, they have the potential to accumulate in estuarine sediments where they may pose a risk of toxicity.

TMDLs are developed for cadmium, copper, lead, silver, zinc, chlordane, DDT, and PCBs within the sediments of the Ballona Creek Estuary. WLAs are assigned to point sources for the Ballona Creek watershed. A grouped mass-based waste load allocation is developed for the storm water permittees (Los Angeles County MS4, Caltrans, General Construction and General Industrial permittees) by subtracting the load allocations from the total loading capacity.

Sediment based waste load allocations are assigned to minor NPDES permits and general non-storm water NPDES permits that discharge to Ballona Creek or its tributaries. The Los Angeles Water Board implements an approach for compliance for these waste load allocations by establishing a total suspended solids (TSS) effluent limitation together with a concentration-based limit for the each specific TMDL pollutant.

12. Total Maximum Daily Load for Toxicity in Calleguas Creek

Discharge of wastes containing chlorpyrifos, diazinon, other pesticides and/or other toxicants to Calleguas Creek, its tributaries and Mugu Lagoon cause exceedances of water quality objectives for toxicity established in the Basin Plan. Source analysis determined that agricultural and urban uses are the largest sources of chlorpyrifos and diazinon in the watershed.

A waste load of 1.0 TUc is allocated to the major point sources (POTWs) discharging to the Calleguas Creek Watershed. Minor sources include NPDES

permittees other than wastewater treatment plants, and urban storm water co-permittees (MS4s) discharging to the Calleguas Creek watershed.

A WLA of 1.0 TUc is allocated to minor point sources. In addition, WLAs for acute and chronic toxicity for diazinon and chloropyrifos are allocated to the minor point sources.

13. Total Maximum Daily Load for Organochlorine (OC) Pesticides and Polychlorinated Biphenyls (PCBs) in Calleguas Creek

Eleven of fourteen reaches in the Calleguas Creek Watershed (CCW) were identified on the 2002 303(d) list of water-quality limited segments as impaired due to elevated levels of organochlorine (OC) pesticides and/or polychlorinated biphenyls (PCBs) in water, sediment and/or fish tissue. Additionally, Mugu Lagoon was listed as impaired for sedimentation/siltation. OC pesticides and PCBs can bioaccumulate in fish tissue and cause toxicity to aquatic life in estuarine and inland waters. Siltation may transport OC Pesticides and PCBs to surface waters and impair aquatic life and wildlife habitats.

Monitoring data from major NPDES discharges and land use runoff were analyzed to estimate the magnitude of OC pesticides and PCBs loads to Calleguas Creek, its tributaries and Mugu Lagoon. The largest source of OC pesticides in the listed waters is agricultural runoff. Most PCB residues are due to past use of PCBs as coolants and lubricants in transformers, capacitors, and other electrical equipment. Atmospheric deposition is also a potential source of PCBs. Urban runoff and POTWs are minor sources of OC pesticides and PCBs.

14. Total Maximum Daily Load for Toxics in the Marina del Rey Harbor

The back basins of Marina del Rey Harbor are on the Clean Water Act Section 303(d) list of impaired water bodies for chlordane, copper, lead, zinc, PCBs, DDT, dieldrin, sediment toxicity and a fish consumption advisory. Review of available data during the development of this TMDL indicated that dieldrin and DDT are no longer causes of impairment. The following designated beneficial uses are impaired by chlordane, copper, lead, zinc, PCBs, and toxicity: water contact recreation (REC1); marine habitat (MAR); wildlife habitat (WILD); commercial and sport fishing (COMM); and shellfish harvesting (SHELL).

Urban storm water has been recognized as a substantial source of metals. Numerous researchers have documented that the most prevalent metals in urban storm water (i.e., copper, lead, and zinc) are consistently associated with suspended solids. Because metals are typically associated with fine particles in storm water runoff, they have the potential to accumulate in marine sediments where they may pose a risk of toxicity. Similar to metals, the majority of organic constituents in storm water are associated with particulates.

Waste load allocations (WLA) are assigned to point sources for the Marina del Rey watershed. A grouped mass-based waste load allocation is developed for the storm water permittees (Los Angeles County MS4, Caltrans, General Construction and General Industrial) by subtracting the load allocations from the total loading capacity. Sediment concentration-based waste load allocations are developed for other point sources in the watershed.

15. Total Maximum Daily Load for Bacteria in Ballona Creek, the Ballona Estuary, and the Sepulveda Channel

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use designated for Ballona Estuary and Sepulveda Channel, limited water contact recreation (LREC) designated for Ballona Creek Reach 2, and non-contact recreation (REC-2) beneficial uses of Ballona Creek Reach 1.

The major contributors of flows and associated bacteria loading to Ballona Creek and Estuary are dry- and wet-weather urban runoff discharges from the storm water conveyance system. Run-off to Ballona Creek is regulated as a point source under the Los Angeles County MS4 Permit, the Caltrans Storm Water Permit, and the General Construction and Industrial Storm Water Permits. In addition to these regulated point sources, the Ballona Estuary receives input from the Del Rey Lagoon and Ballona Wetlands through connecting tide gates.

The Los Angeles County MS4 and Caltrans storm water permittees and co-permittees are assigned waste load allocations (WLAs) expressed as the number of daily or weekly sample days that may exceed the single sample targets equal to the TMDLs established for the impaired reaches.

Waste load allocations are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

16. Total Maximum Daily Load for Metals in the Calleguas Creek Watershed

Three of fourteen reaches in the Calleguas Creek Watershed (CCW) including Revolon Slough, Lower Calleguas Creek – Reach 2, and Mugu Lagoon are identified on the 2002 Clean Water Act Section 303(d) list of water-quality limited segments as impaired due to elevated levels of metals and selenium in water. The 303(d) listings, which were approved by the State Water Resources Control Board in February 2003, require the development of Total Maximum Daily Loads (TMDLs) to establish the maximum amount of pollutants a water body can receive without exceeding water quality standards.

Significant sources of metals and selenium include urban runoff, agricultural runoff, groundwater seepage, and POTW effluent. For mercury, open space was also a significant source. Sources were also analyzed as a function of wet and dry weather. Higher loads were delivered during wet weather for all constituents, due to the association between metals and particulate matter.

In the case of copper, nickel, and selenium, waste load allocations (WLAs) were developed for both wet and dry-weather. The dry-weather WLAs apply to days when flows in the stream are less than the 86th percentile flow rate for each reach. The wet-weather WLAs apply to days when flows in the stream exceed the 86th percentile flow rate for each reach. Annual mass loads of mercury in suspended sediment were developed according to low, medium, and high annual flow categories. Final WLAs were established for POTWs, permitted storm water dischargers, and for all other NPDES dischargers.

17. Total Maximum Daily Load for Salts in the Calleguas Creek Watershed

Eleven of fourteen reaches in the Calleguas Creek Watershed (CCW) are identified on the 2002 Clean Water Act Section 303(d) list of water quality limited segments as impaired due to elevated levels of boron, chloride, sulfate, or total dissolved solids (TDS) (these constitutions are commonly referred to as salts). Sources of salts in the watershed include water supply (water imported from the State Water Project or Freeman Diversion and deep aquifer groundwater pumping), water softeners that discharge to publicly owned treatment works (POTWs), POTW treatment chemicals, atmospheric deposition, pesticides and fertilizers, and indoor water use (chemicals, cleansers, food, etc.). Salts that are transported during dry weather to the surface water are quantified via the following mechanisms: groundwater pumping, groundwater exfiltration, POTWs, dry weather urban and agricultural runoff. Wet weather loadings from each of these sources have the potential to be significant, but tend to be lower in concentration and do not occur during the critical conditions for salts. Wet weather loads are significant from the perspective of transporting stranded salts off the watershed.

The TMDL includes WLAs for five POTWs, permitted storm water dischargers, and all other NPDES dischargers. Concentration-based WLAs are assigned to all other NPDES dischargers based on the Basin Plan objectives.

18. Total Maximum Daily Load for Bacteria in the Harbor Beaches of Ventura County

Elevated bacteria indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Kiddie Beach and Hobie Beach. Kiddie and Hobie Beach are referenced in the Staff Report as the Harbor Beaches of Ventura County. Bacteria sources in the Harbor Beaches of Ventura County include anthropogenic and non-anthropogenic sources and point and non-point sources. Each of these sources contributes to the elevated levels of bacteria

indicator densities at the Harbor Beaches of Ventura County during dry- and wet-weather.

WLAs are expressed as allowable exceedance days. According to the TMDL, discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

19. Total Maximum Daily Load for OC Pesticides, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCB), and Metals in the Colorado Lagoon

Colorado Lagoon is identified on the 1998, 2002, and 2006 Clean Water Act Section 303(d) lists of water quality limited segments as impaired due to elevated levels of OC pesticides, PCBs, sediment toxicity, PAHs, and metals in fish tissue and sediment. The point sources of OC pesticides, PCBs, PAHs, and metals discharged to Colorado Lagoon are urban runoff and storm water discharges from MS4s and the California Department of Transportation (Caltrans).

Mass-based WLAs for MS4 permittees including the City of Long Beach, Los Angeles County Flood Control District, and Caltrans are allocated to the five major storm drain outfalls that currently discharge to the lagoon. Concentration-based WLAs for sediment are also assigned to these mentioned permittees. For all other point sources such as minor NPDES permits, other storm water and non-storm water permittees, sediment concentration-based WLAs are also assigned.

20. Total Maximum Daily Load for Bacteria in the Santa Clara River

Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use designated for the Santa Clara River (SCR) Estuary and Reaches 3, 5, 6, and 7. Recreating in waters with elevated bacterial indicator densities has long been associated with adverse human health effects. The significant contributors of bacteria loading to the SCR and Estuary are dry- and wet-weather urban runoff discharges from the storm water conveyance system.

General NPDES permits, individual NPDES permits, the Statewide Industrial Stormwater General Permit, the Statewide Construction Activity Storm Water General Permit, and the Statewide Stormwater Permit for Caltrans Activities are assigned WLAs of zero (0) allowable exceedance days of the single sample targets for both dry and wet weather and no exceedances of the geometric mean targets.

Discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria.

21. Total Maximum Daily Load for Toxics in Machado Lake

Machado Lake is identified on the 1998, 2002, 2006, and 2008 Federal Clean Water Act Section 303(d) lists of impaired water bodies due to chlordane, DDT, dieldrin, Chem A, and PCBs in fish tissue. Chem A (the abbreviation for 'chemical group A') is a suite of bio-accumulative pesticides that includes chlordane and dieldrin. The 1998 303(d) listing (and subsequent listings) for Chem A was predominately based on fish tissue concentrations of chlordane and dieldrin; there was only minimal detection of other Chem A pollutants in 1983 and 1984. Chlordane and dieldrin have been recently detected in fish tissue, while other Chem A pollutants have not been detected in 25 years. Therefore, this TMDL only addresses the Chem A pollutants (chlordane and dieldrin) that are causing impairment.

Because of potential harm to human health and the environment, the use of these pollutants has been banned for many years; however, the physiochemical properties of the pollutants cause them to persist in the environment. These pollutants, bound to soil particles, are easily transported with surface runoff to water bodies. Contaminated sediments accumulate in the receiving water bodies and aquatic organisms are exposed to the toxic pollutants. Sediment toxicity has been documented at Machado Lake, and it is likely that pesticides and PCBs contribute to the toxic condition of the sediments. Moreover, all of these pollutants biomagnify as they move up the food chain, thereby increasing concentrations in higher trophic-lever aquatic organisms and wildlife.

22. Total Maximum Daily Load for Bacteria in the Los Angeles River

General NPDES permits, individual NPDES permits, the Statewide Industrial Storm Water General Permit, the Statewide Construction Activity Storm Water General Permit, and WDR permittees in the Los Angeles River Watershed are assigned WLAs of zero (0) days of allowable exceedances of the single sample target for both dry and wet weather.

Discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria. Therefore, the WLAs for these discharges are zero (0) days of allowable exceedances for all three time periods and for single sample limits.

23. Total Maximum Daily Load for Metals and Toxics in the Los Angeles and Long Beach Harbors

The waters of Dominguez Channel and the Greater Los Angeles and Long Beach Harbor area are impaired by heavy metals and organic pollutants. These water bodies are included on the State’s Clean Water Act 303(d) impaired waters list for one or more of the following pollutants: cadmium, chromium, copper, mercury, lead, zinc, chlordane, dieldrin, toxaphene, DDT, PCBs, certain PAH compounds, benthic community effects and toxicity. These impairments exist in

one or more environmental media—water, sediment, or tissue. Impairments in fish tissue are for DDT, PCBs, toxaphene, chlordane and dieldrin. Beneficial uses designated in these waters to protect aquatic life include the marine habitat use (MAR) and rare, threatened or endangered species habitat use (RARE). In addition, the estuaries (EST) are recognized as areas for spawning, reproduction and/or early development (SPWN), migration of aquatic organisms (MIGR), and wildlife habitat (WILD). Dominguez Channel also has an existing designated use of warm freshwater habitat (WARM) and the Los Angeles River Estuary has the designated use of wetland habitat (WET). Beneficial uses associated with human use of these waters include recreational use for water contact (REC1), non-contact water recreation (REC2), industrial service supply (IND), navigation (NAV), commercial and sport fishing (COMM), and shellfish harvesting (SHELL).

24. Total Maximum Daily Load for Algae, Eutrophic Conditions and Nutrients in the Ventura River and its Tributaries

The Ventura River Estuary and Reaches 1 and 2 are on the Clean Water Act (CWA) section 303(d) list as impaired for algae and eutrophic conditions. San Antonio Creek and Cañada Larga are on the CWA section 303(d) list as impaired for nitrogen and dissolved oxygen, respectively. Recent data confirm these impairments and demonstrate additional impairments for low dissolved oxygen in the Estuary, San Antonio Creek, and Reaches 1-4. The algae and nutrient related impairments are caused by excessive loading of nutrients, particularly nitrogen and phosphorus, to Ventura River and its tributaries. The water quality impairments due to eutrophication and increased nutrient loading occur during the dry season when algae growth primarily occurs. For purposes related to this TMDL, the dry season is defined as occurring from May 1 to September 30.

Waste load allocations addressing point and non-point sources of nutrients are assigned to discharges to the Ventura River watershed**.**

25. Total Maximum Daily Load for Metals in the San Gabriel River

Segments of the San Gabriel River and its tributaries are on the Clean Water Act section 303(d) list of impaired water bodies for copper, lead, zinc, and selenium. The constituents subject to this TMDL are toxic pollutants, and the existing water quality objectives for these constituents reflect national policy that the discharge of toxic pollutants in toxic amounts be prohibited. When one of the constituents subject to this TMDL is present at levels exceeding the existing numeric objectives, then the receiving water is toxic. The beneficial uses impaired by metals and selenium in the San Gabriel River and its tributaries are those associated with aquatic life and water supply, including wildlife habitat, rare, threatened or endangered species, warm freshwater habitat, wetlands, and groundwater recharge.

TMDLs are developed for reaches on the 303(d) list and for reaches where recent data indicate additional impairments. Addressing the impairing metals and selenium throughout the San Gabriel River watershed will ensure that they do not contribute to impairments elsewhere in the watershed. Metals and selenium allocations are therefore developed for upstream reaches and tributaries that drain to impaired reaches.

These TMDLs address dry-weather impairments of copper in the estuary and selenium in San Jose Creek Reach 1 and wet-weather impairments of lead in San Gabriel River Reach 2 and copper, lead, and zinc in Coyote Creek.

26. Total Maximum Daily Load for Metals in the Los Cerritos Channel

Los Cerritos Channel was included on the 1998, 2002 and 2006 California 303(d) lists as an impaired water body for copper, zinc, and lead. (Regional Board, 1998 and California State Water Resources Control Board, 2002 and 2006.)

The NPDES permits in the Los Cerritos Channel Freshwater Watershed include municipal separate storm sewer system (MS4) permits, the California Department of Transportation (Caltrans) storm water permit, general construction storm water permits, general industrial storm water permits, minor NPDES permits, and general NPDES permits.

Concentration based waste load allocations are established for minor NPDES permits and general non-storm water permits that discharge to the Los Cerritos Channel to ensure that these discharges do not contribute to exceedances of the California Toxic Rule criteria. The waste load allocation for these metals is based on dry and wet weather flows.

27. Total Maximum Daily Load for Indicator Bacteria in the Long Beach City Beaches and Los Angeles River Estuary

General NPDES permits, individual NPDES permits, the Statewide Industrial Storm Water General Permit, the Statewide Construction Activity Storm Water General Permit, the Statewide General Waste Discharge Requirements for Sanitary Systems, and the Vessel General Permit in the Long Beach City Beaches Watershed are assigned WLAs of zero (0) days of allowable exceedances for all time periods for the single sample targets and no exceedances of the 30-day geometric mean targets because they are not expected to be a significant source of indicator bacteria.

<u>San Diego Regional Board TMDLs</u>

Continuing the listing from above, the following is a summary of the TMDLs in the San Diego region that have waste load allocation for general NPDES discharge categories, followed by a general summary. Further detailed information on the already adopted

TMDLs can be found at the following website:

http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/index.shtml

28. Total Maximum Daily Load for Metals in Chollas Creek

Chollas Creek was placed on the Clean Water Act (CWA) section 303(d) List of Water Quality Limited Segments (List of Water Quality Limited Segments) in 1996 for the metals copper, lead, and zinc. Storm water samples from Chollas Creek collected between 1994 and 2003 periodically exceeded California Toxics Rule (CTR) water quality criteria for copper, lead, and zinc, dissolved copper, lead and zinc concentrations in Chollas Creek violate numeric water quality criteria for copper, lead, and zinc promulgated in the California Toxics Rule, and the narrative objective for toxicity. Concentrations of these metals in Chollas Creek threaten and impair the designated beneficial uses of warm freshwater habitat (WARM), and wildlife habitat (WILD). For Chollas Creek, essentially all metals sources (point and nonpoint) are discharged through municipal separate storm sewer systems (MS4) that are regulated under waste discharge requirements (WDRs), NPDES Permits. The point source discharges that could affect Chollas Creek are the MS4 discharges, storm water discharges from industrial sites, and discharges of extracted groundwater. All point source discharges to Chollas Creek will be required to achieve this WLA.

This TMDL establishes concentration-based WLAs set equal to 90 percent of the numeric water quality objectives for copper, lead, and zinc, as defined in the California Toxics Rule. Because the concentration of these metals resulting in toxic effects varies significantly with hardness, the resulting WLAs are hardness dependent.

29. Total Maximum Daily Load for Total Nitrogen and Total Phosphorus in Rainbow Creek

Nitrate, total nitrogen, and total phosphorus concentrations in Rainbow Creek exceed the inorganic chemicals nitrate and biostimulatory substances water quality objectives. These exceedances threaten to unreasonably impair the municipal supply (MUN), warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD) beneficial uses of Rainbow Creek. Excessive nutrient levels in Rainbow Creek promote the growth of algae in localized areas, creating a nuisance condition, that unreasonably interferes with aesthetics and contact and non-contact water recreation (REC1, REC2) and threatens to impair WARM, COLD and WILD beneficial uses. State highways, agricultural fields and orchards, commercial nurseries, residential and urban areas, and septic tank disposal systems contribute to increased nutrient levels in Rainbow Creek as a result of storm water runoff, irrigation return flows, and ground water contributions to the creek.

WLAs for the discharge of total nitrogen and total phosphorus into Rainbow Creek were established. Identified dischargers of total nitrogen and total phosphorus loading include Caltrans, County of San Diego and nonpoint sources. The TMDL provides WLAs of 2 percent of the total annual TMDL for both total nitrogen and total phosphorus for additional point sources, however the TMDL Implementation Action Plan does not provide for the assignment of WLAs to unidentified point source discharges, effectively resulting in the prohibition of discharges of total nitrogen and total phosphorus into Rainbow Creek.

30. Total Maximum Daily Load Indicator Bacteria in Twenty Beaches and Creeks in the San Diego Region for Direct Discharges Only

Bacteria densities in the Pacific Ocean at various beach and coastal creek mouth segments (referred to hereafter as “beaches”) exceed water quality objectives (WQOs) for indicator bacteria. Bacteria densities in ocean water at these beaches unreasonably impair and threaten to impair the water quality needed to support the contact water recreation (REC-1) designated beneficial use. Bacteria densities in the waters of Aliso Creek, San Juan Creek, Tecolote Creek, Forrester Creek, the (lower) San Diego River, and Chollas Creek exceed WQOs for indicator bacteria. Bacteria densities in these creeks unreasonably impair and threaten to impair the water quality needed to support REC-1. The federal Clean Water Act requires the establishment of Total Maximum Daily Loads (TMDLs) for pollutants that exceed the WQOs needed to support designated beneficial uses, i.e., that cause or contribute to exceedances of state “water quality standards”.

Unidentified point sources have not been assigned WLAs, which is equivalent to being assigned a WLA of zero. No discharges of bacteria are expected or allowed from unidentified point sources under the dry or wet weather TMDLs.

IV. RATIONALE FOR DISCHARGE SPECIFICATIONS AND EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants discharged into waters of the United States. The control of pollutants discharged during drinking water system discharge events is established primarily through required Best Management Practices specifications established to require water purveyors to implement a minimum level of pollutant control through best management practices that are proven to be effective in the water supply industry. Numeric effluent limitations are established for chlorine in circumstances where the water discharged from a drinking water system poses an immediate threat to aquatic life with receiving waters. There are two principal bases for effluent limitations: 40 C.F.R. section 122.44(a) requires that permits include applicable technology-based limitations and standards, and 40 C.F.R. section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable water quality objectives and criteria to protect the beneficial uses of receiving waters.

A. Applicable Objectives and Criteria

This Order authorizes discharges to inland surface waters, enclosed bays, estuaries and the ocean, statewide. The water quality objectives and criteria applicable to these receiving waters are contained in the corresponding Basin Plan(s), other water quality control plans, and policies, such as the State Implementation Plan and the California Ocean Plan, that implement federal and state water quality objectives.

1. **Regional Boards Basin Plans Objectives.** Basin Plans specify various narrative and numeric water quality objectives, including the maximum contaminant levels (MCLs) in California Code of Regulations, title 22. Typical narrative objectives most relevant to this Order are listed below:

   a. **Toxicity.** The toxicity objective typically states, "All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms." U.S. EPA water quality criteria were used to translate this objective with respect to chlorine. U.S. EPA's recommended 1-hour average acute criterion for chlorine is 0.019 mg/L and its 4-day average chronic criterion is 0.011 mg/L (the acute or chronic criteria are not to be exceeded more than once every three years on average in any single location).

   b. **pH.** The pH objective in basin plans vary; some objectives are fixed numeric objectives while others provide a numeric range such as *"the pH shall not to be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels."*

   c. **Sediment.** Sediment objectives in basin plans vary; however, the basin plans typically provide a narrative objective such as, *"The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses."*

   d. **Settleable Material.** The settleable material objectives in basin plans vary; however, the basin plans typically provide a narrative objective such as, *"Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses."*

   e. **Suspended Material.** The suspended material objectives in basin plans vary; however, the basin plans typically provide a narrative objective that typically states, *"Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."*

   f. **Turbidity.** The turbidity objectives in basin plans vary; some objectives are fixed numeric objectives while others provide a narrative objective such as, *"Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity*

relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU."

2. **California Toxic Rule (CTR) Criteria.** The CTR specifies numeric aquatic life and human health criteria for numerous priority pollutants. Some human health criteria are for consumption of "water and organisms" and others are for consumption of "organisms only." The criteria applicable to "water and organisms" apply to many receiving waters subject to this Order because they are potential drinking water sources with the municipal and domestic supply (MUN) beneficial use. In accordance with Resolution 2014-0067, this Order implements a SIP exception to the CTR criteria for a number of priority pollutants on the basis that these discharges are less than significant with mitigation, and that mandated activities to protect public safety and health are held paramount.

3. **Ocean Plan Water Quality Objectives.** The Ocean Plan specifies in Table 1 of the Ocean Plan numeric water quality objectives for the protection of Marine Aquatic Life and Human Health (Carcinogens and non-carcinogens) for numerous priority pollutants. In accordance with Resolution 2014-0067, this Order implements an exception to the Ocean Plan water quality objectives for a number of priority pollutants on the basis that these discharges are less than significant with mitigation, and that mandated activities to protect public safety and health are held paramount.

4. **Sediment Quality Objectives.** The *Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1, Sediment Quality* contains a narrative water quality objective: "Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities in bays and estuaries of California." This objective is to be implemented by integrating three lines of evidence: sediment toxicity, benthic community condition, and sediment chemistry. The policy requires that if the Water Board determines that a discharge has reasonable potential to cause or contribute to an exceedance of this objective, it is to impose the objective as a receiving water limit.

B. Technology-Based Effluent Specifications and Effluent Limitations

CWA section 301(b) and 40 C.F.R. section 122.44 require that permits include conditions meeting technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet water quality standards. The CWA requires U.S. EPA to develop effluent limitations guidelines (ELGs), and standards representing application of best practicable treatment control technology (BPT), best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and best available demonstrated control technology for new sources (NSPS). CWA section 402(a)(1) and 40 C.F.R. section 125.3 authorize the use of Best Professional Judgment to derive technology-based requirements and effluent limitations on a case-by-case basis when ELGs are unavailable.

1. Technology-Based Best Management Practices Effluent Specifications

This Order does not establish technology-based effluent limitations because U.S. EPA has not established ELGs for the types of discharges this Order authorizes. Moreover, data necessary to develop technology-based effluent limitations on a case-by-case basis for each water body in California, using Best Professional Judgment, are unavailable. The State Water Board finds that the technology-based effluent limitations in Regional Water Board Basin Plans apply to discharges that are continuous in nature and contain "wastes". This statewide Order regulates intermittent and seasonal discharges of drinking water that are short-term, and in and of themselves do not contain the degree of "waste" contained in municipal or industrial wastewater or storm water. Therefore technology-based effluent limitations are not included.

The State Water Board finds that technology is available to control solids in drinking water system discharges, and chemical constituents such as chlorine and other chemical agents added to the water supply source, treatment, and distribution process. Therefore numeric and narrative technology-based best management practices specifications are included in this Order. Attachment C of this Order provides example of such BMPs.

To assure that implemented BMPs are effective, this Order requires:

- Dischargers to assure that quality assurance and quality control protocol is implemented to assure best management practices, monitoring, and reporting are effective, valid, and in compliance with this Order. A Discharger shall train all personnel operating the drinking water system and responding to emergency discharges to assure the quality assurance and quality control protocol is properly implemented.
- For planned discharges, a Discharger shall implement BMPs prior to and during discharges that enter a water of the U.S. For planned but unscheduled or automated discharges from pressure relief valves and unchlorinated pump-to waste wells, BMPs shall be implemented unless infeasible (e.g., inaccessible, inadequate space). For emergency discharges, the BMPs shall be implemented as soon as feasible following assurance that public safety, property, and infrastructure are protected.
- In fulfilling the requirements of this section, the Discharger may implement the example BMPs contained in Attachment C, or proven BMPs per updated approved guidance established by industry experts, professional associations, or entities (e.g. *2014 Edition of the BMP Manual for Drinking Water System Releases* published by the California-Nevada Section of the American Water Works Association).
- The Discharger shall maintain a documented log of all BMPs implemented for its different types of discharges that enter a water of the U.S, and make it available to State and Regional Water Board staff upon request.

- The Discharger shall modify its BMPs as necessary to maintain compliance with the requirements of this Order. If monitoring results or other available information demonstrates that the discharge is not in compliance, the Discharger shall determine the source of non-compliance, and develop and implement new or revised BMPs as necessary. As part of this process, the Discharger shall validate the effectiveness of any new or revised BMPs to comply with the requirements of this Order. All non-compliance and corresponding corrective actions to address non-compliance are required to be reported to the State Water Board in the annual report, as required in the Monitoring and Reporting Program (Attachment E) of this Order. A log documenting the additional or revised BMPs shall be made available upon request by staff of the State and/or Regional Water Board.

2. **Toxicity (Chlorine and other chemical agents).** This Order translates the narrative toxicity objective with respect to chlorine by using U.S. EPA's water quality criteria for chlorine. Water distribution systems are usually chlorinated to meet the minimum total chlorine residual requirements in California Code of Regulations, title 22. According to the most recent Annual Consumer Confidence Reports from various water agencies, the typical average total chlorine residual concentration in a distribution system is about 2.0 mg/L, which is roughly 100 times U.S. EPA's acute water quality criterion of 0.019 mg/L. However, chlorine in water discharges can dissipate from volatilization and reaction with dirt and organic matter on streets and storm drain systems. Based on the analysis in section IV.C. below, reasonable potential for toxicity exists only for superchlorinated waters and other chlorinated waters that are in closer proximity to receiving waters (within 300 feet). For all other discharges, this Order establishes narrative technology-based specifications, specifying that proven management practices must be implemented to treat or control pollutants from its discharges to maintain compliance with this Order.

   At minimum, this Order requires that dischargers properly manage all planned discharges and implement proven dechlorination or chemical-control BMPs provided by professional associations or institutes such as the American Water Works Association, to assure that beneficial uses of the receiving water body(ies) are not adversely affected or impacted. Such BMPs include natural dissipation of chlorine in the discharge prior to it reaching the surface water body. For emergency discharges, the Discharger shall implement BMP procedures as soon as feasible while concurrently protecting public health and safety. Attachment C of this Order provides example of such dechlorination BMPs.

   Copper and zinc are known constituents in chemical agents used for to control algae in water supplies and control corrosion in drinking water facilities. Management practices proven to control copper and other metals during pesticide applications are not the same management practices needed to control these metals in drinking water system discharges. Although the State Water Board has granted a regulatory exception to CTR constituents including copper and zinc, the State Water Board expects dischargers to implement BMPs to reduce metals concentrations to the best

extent possible. Attachment C of this Order provides example BMPs for copper and zinc concentration reduction specifically in drinking water system discharges.

3. Solids (Sediment, Settleable Material, Suspended Material, Debris, and Turbidity)

Various discharges from drinking water systems may contain sediment as follows:

- Sediment accumulates at the dead ends of distribution systems during periods of low water demand. The sediment within a system must be flushed periodically.
- Raw transmitted water may contain sediment due to naturally occurring minerals and organic debris.
- Trench dewatering can result in relatively high sediment loads, depending on soil type, flow rate and duration, and excavation size.
- Discharges from new well development and inactive well rehabilitation may have high sediment loads due to drilling mud, cuttings, and removal of solids from the bottom of the well and around the screen casing.

Discharges can also contribute to sediment loading, solids loading and erosion within receiving waters due to high flows and volumes. Such discharges can dislodge sediment and transport it to receiving waters, or destabilize and erode shorelines or other natural receiving water features.

At minimum, this Order requires that dischargers implement BMP for planned discharges to:

- Prevent riparian erosion and hydromodification by implementing flow dissipation, erosion control, and hydromodification-prevention measures; and
- Minimize sediment discharge, turbidity and color impacts by implementing sediment, turbidity, erosion and color control measures.

For groundwater supply well operations, this Order requires dischargers to implement treatment systems or BMPs for all groundwater well development, rehabilitation, or operation discharges to waters of the U.S. to assure these discharges:

- Do not cause or contribute to an exceedance of the receiving water limitation for turbidity in Section V.G. of this Order, and
- Comply with a turbidity action level of 100 Nephelometric Turbidity Units (NTUs) or less in the discharge. An exceedance of the turbidity numeric action level of 100 NTU is not a violation of this Order, but any exceedance does require the Discharger take action to modify, change, or enhance BMPs when the turbidity level is greater than 100 NTU, until the turbidity level is 100 NTU or less.

4. **Instream Sediment Quality.** Pollutants in some receiving water sediments may be present in quantities that alone or in combination are toxic to benthic communities. Efforts are underway to identify stressors causing such conditions. Due to the relative clean nature of potable water, it is unlikely that these discharges contribute to sediment toxicity. However, to date there is no evidence either way; therefore, the State Water Board cannot draw a definitive conclusion about reasonable potential for these discharges to cause or contribute to exceedances of the sediment quality objectives.

C. Water Quality Based Effluent Limitations

1. Scope and Authority

This Order contains water quality-based effluent limitations (WQBELs) that implement water quality objectives and criteria that protect beneficial uses. CWA section 301(b) and 40 C.F.R. section 122.44(d) require that permits include limitations more stringent than federal technology-based requirements where necessary to achieve applicable water quality standards. According to 40 C.F.R. section 122.44(d)(1)(i), permits must include effluent limitations for all pollutants that are or may be discharged at levels that have a reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective, WQBELs must be established using: (1) U.S. EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting a narrative criterion, supplemented with relevant information (40 C.F.R. § 122.44[d][1][vi]). The process for determining reasonable potential and calculating WQBELs is intended to establish effluent limitations for discharges to comply with applicable water quality objectives established to protect designated beneficial uses of receiving waters.

2. Need for Water Quality Based Effluent Limitations (Reasonable Potential Analysis)

Assessing whether a pollutant has reasonable potential to exceed a water quality objective or criterion is the fundamental step in determining whether a water quality based effluent limitation is required. As explained below, this Order finds reasonable potential for toxicity due to the chlorinated drinking water system discharges.

a. **Analysis for Numeric Objectives and Promulgated Criteria.** The State Implementation Plan (SIP), section 1.3 sets forth the method used in this Order for assessing whether a pollutant has reasonable potential to exceed a numeric water quality objective or promulgated criterion. The analysis begins with identifying the maximum effluent concentration (MEC) observed for each pollutant based on available effluent concentration data and the ambient background concentration (B). The SIP, section 1.4.3 states that ambient

background concentrations are either the maximum ambient concentration observed or, for water quality objectives intended to protect human health, the arithmetic mean of observed concentrations. There are three triggers in determining reasonable potential and the need for a numeric effluent limitation:

- Trigger 1 is activated if the maximum effluent concentration is greater than or equal to the lowest applicable water quality objective (MEC $\geq$ water quality objective).

- Trigger 2 is activated if the ambient background concentration observed in the receiving water (B) is greater than the water quality objective (B > water quality objective) *and* the pollutant is present in any effluent sample.

- Trigger 3 is activated if a review of other information indicates that a WQBEL is needed to protect beneficial uses.

The Ocean Plan provides a similar method for assessing reasonable potential as described in Appendix V of the Ocean Plan.

Water in drinking water systems is required to comply with maximum contaminant levels (MCLs) per state regulations; therefore for pollutants that have MCLs more stringent than the CTR or Ocean Plan water quality objectives, this Order finds those priority pollutants do not have reasonable potential to exceed a water quality objective. However for the remaining priority pollutants for which the MCL is not the most stringent applicable water quality objective, an exception to those objectives has been granted through Resolution 2014-0067.

b. Analysis for Toxicity due to Chlorine. This Order translates the narrative toxicity objective with respect to chlorine by using U.S. EPA's water quality criteria for chlorine. Water distribution systems are usually chlorinated to meet the minimum total chlorine residual requirements in California Code of Regulations title 22. According to the most recent Annual Consumer Confidence Reports from various water agencies, the typical average total chlorine residual concentration in a distribution system is about 2.0 mg/L, which is roughly 100 times U.S. EPA's acute water quality criterion of 0.019 mg/L. However, chlorine in water discharges can dissipate from volatilization and reaction with dirt and organic matter on streets and storm drain systems. Based on the analysis below, reasonable potential for toxicity exists only for superchlorinated waters and other chlorinated waters that are in closer proximity to receiving waters (within 300 feet). Therefore this Order contains numeric chlorine water quality based effluent limitations for superchlorinated discharges and chlorinated water discharged within 300 feet of a surface water body.

Numeric effluent limitations are not included in this Order for sediment, settleable material, and suspended material, as there is no readily available means to translate the sediment, settleable material, and suspended material objectives into numeric WQBELs appropriate for the many receiving waters that could be affected by the discharges covered by this Order. This Order controls sediment,

settleable material, and suspended material through BMPs as discussed above in this fact sheet.

All 126 priority pollutants in the California Toxic Rule and pollutants with Ocean Plan water quality objectives have also been considered. The pollutants with MCLs as the most stringent water quality objective have shown no reasonable potential because these discharges are already required to comply with MCLs per state regulations and State Water Board Division of Drinking Water permits. For the remaining pollutants, a categorical SIP and Ocean Plan exception has been granted, therefore there is no reasonable potential since the exceptions lead to no applicable numeric criteria for these discharges.

3. Calculation of Water Quality Based Effluent Limitations (WQBELs)

Regulations at 40 C.F.R. section 122.44(k)(3) require numeric WQBELs unless numeric WQBELs are infeasible. This Order imposes numeric WQBELs for total residual chlorine because it is feasible and necessary to calculate numeric WQBELs for this toxic pollutant in order to protect beneficial uses in the receiving water bodies. Field chlorine meters are readily available and used to measure chlorine in drinking water system discharges, therefore it is feasible to collect representative total residual chlorine concentration data to determine compliance.

The total chlorine residual WQBEL established in this Order for discharges to inland surface waters, enclosed bays and estuaries is 0.019 mg/L based on U.S. EPA's acute water quality criterion for chlorine, which is expressed as a one-hour average. The total chlorine residual WQBEL established in this Order for discharges to the ocean is 0.008, mg/L based on the Ocean Plan criteria for chlorine. The numeric WQBELs for total residual chlorine are applicable to: (1) all superchlorinated discharges, and (2) chlorinated discharges located within 300 feet of a receiving water body.

According to a controlled field study conducted by East Bay Municipal Utilities District (EBMUD), when dechlorination BMPs are properly implemented, the total chlorine residual concentration in chlorinated discharges is fully neutralized within 200 feet to concentrations below a minimum level of 0.1 mg/L (Tikkanen et. al, 2001, *Guidance Manual for Disposal of Chlorinated Water*). The study analyzed samples from nine fire hydrants discharging at varying flow rates and treated with dechlorination BMPs within the EBMUD jurisdiction. Similarly, the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) analyzed samples from ten fire hydrants discharging at varying flow rates and treated with dechlorination BMPs in the Cities of Palo Alto, San Jose and Sunnyvale. Based on the SCVURPPP study, eight of the discharge events monitored achieved full neutralization (to concentrations below 0.1 mg/L) by 160 feet. The two remaining discharge events spiked above the minimum level of 0.1 mg/L, but ultimately achieved full neutralization within 425 feet. The spike in concentration was suspected to be due to turbidity interference.

Based on these data and adding an additional safety factor due to the immediate toxicity to aquatic life from chlorine, the State Water Board determines that discharges where dechlorination BMPs (chemically or naturally) have been properly implemented that are more than 300 feet from a receiving water body do not pose a reasonable potential to exceed the applicable total residual chlorine water quality objective. Thus, the numeric WQBEL is not applicable to such discharges.

The turbidity numeric WQBEL established in this Order for discharges to the ocean is 225 NTU based on the Ocean Plan criteria for turbidity. The numeric WQBELs for turbidity is applicable to all discharges located within 300 feet of the ocean. These discharges pose a reasonable potential to cause exceedance of ocean turbidity water quality objective due to high solids levels in drinking water systems discussed in detail above in this fact sheet.

V. DISCHARGES NOT AUTHORIZED BY THIS ORDER

This Order implements the regulatory exceptions granted to water purveyors by Resolution 2014-0067. Requirements in this Order are designed for discharges described in the corresponding Mitigated Negative Declaration (attached to Resolution 2014-0067) that, when properly mitigated through the implementation of BMPs, monitoring, and reporting, do not pose a significant threat to the environment. .

Discharges not authorized by this Order include:

- Discharges other than those authorized in the Notice of Applicability issued by the Deputy Director of Water Quality; or
- Discharges to a water of the U.S. with a total maximum daily load (TMDL) that prescribes a waste load allocation to a water purveyor, where the Deputy Director determines that the requirements of this Order are not consistent with the assumptions and requirements of the TMDL, and thus compliance with this Order is not sufficient for the water purveyor to comply with the imposed TMDL requirements; or
- Discharges from new drinking water systems (not an expansion of an existing system) into an impaired water body that is impaired for a constituent that exists in the new discharge at a concentration greater than the criteria used to establish the impairment of the water body; or
- Direct discharges into areas designated by the State Water Board as Areas of Special Biological Significance (ASBS).

VI. RATIONALE FOR RECEIVING WATER LIMITATIONS

The receiving water limitations in this Order are established in accordance with federal and State water quality standards per the CWA and regulations adopted thereunder, and

narrative and numeric water quality objectives in the Regional Water Boards' Basin Plans and State Water Board water quality control plans and policies.

VII. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

Title 40 Code of Federal Regulations part 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorize the Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment E) of this Order, establishes monitoring, recordkeeping and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in Attachment E of this Order.

A. Effluent Monitoring

Pursuant to the requirements of title 40 Code of Federal Regulations part 122.44(i)(2), reporting of effluent monitoring is required for all constituents with effluent limitations and specifications. Effluent monitoring is necessary to assess compliance with effluent limitations and specifications, assess the effectiveness of the implemented BMPs and treatment process (where applicable), and to assess the impacts of the discharge on the receiving water.

Effluent monitoring requirements have been established in this Order to provide: (1) the Discharger with necessary information to make informed decisions regarding the implementation of effective management practices, and (2) the State Water Board to determine compliance with effluent specifications and limitations. Required effluent monitoring includes event monitoring and representative monitoring as follows:

1. **Event Monitoring.** This Order requires monitoring of all superchlorinated discharges, all discharges from well development and rehabilitation activities, and individual discharge events that are greater than 325,850 gallons (one acre-foot). The Discharger shall monitor all such events per the sample types and frequencies specified in Attachment E.

2. **Annual Representative Monitoring.** This Order allows discharges of similar nature to be monitored on a representative basis. Representative monitoring is the use of monitoring results of one water quality monitoring sample to represent other discharges expected to have the same water quality. A representative monitoring measurement must represent discharges of similar nature, meaning discharges that have all the following items in common:

   (i) The same general water source (ground water or surface water of similar water quality), and

   (ii) The same water treatment, and

(iii) The same type of implemented BMPs.

The Discharger shall monitor all planned discharges not defined as events (Item 1. above) using representative monitoring per the sample types and frequencies specified in Attachment E. In its annual report, the Discharger shall:

(a) Submit a copy of its site schematic submitted in its application for enrollment with labeled representative monitoring locations, and
(b) Identify the portions of its system in which the representative monitoring results represent, and
(c) Include any changes in its representative monitoring locations that have occurred during the monitoring-year, as applicable.

3. Annual Discharge Volume Monitoring Requirements

This Order requires the Discharger to monitor and keep record of:
(a) The number of direct discharge to a water of the U.S that is greater than 50,000 gallons, during each calendar year,
(b) An estimate of the total volume discharged to surface water during each calendar year, and
(c) An estimate of the total volume of discharge water directed to a reuse or beneficial use in accordance with section VI. of this Order.

4. Monitoring Not Required

This Order does not establish monitoring requirements for any discharges that: (a) do not ultimately reach a water of the U.S., (b) are implemented for multiple uses or routed to a beneficial reuse, in accordance with section V. of the Order, prior to surface water discharge, or (c) are emergency discharges.

B. Receiving Water Monitoring

This Order requires visual receiving water monitoring for all direct planned discharges that do not comply with the requirements contained in section IV of the Order, and that may potentially adversely affect or impact beneficial uses of the receiving waters. Receiving water monitoring shall be conducted during or immediately after the Discharger became aware of a non-compliant discharge that adversely effects or impacts beneficial uses of the receiving water. The Discharger shall monitor the point of confluence of the discharge and the receiving water. If the receiving water presents hazards to the monitoring personnel, visual monitoring shall be conducted using telephoto lenses and binoculars. If further hazards exist beyond such measures, monitoring is not required, and the hazards shall be documented in the corresponding monitoring report.

C. Post-Notification Requirements

Within 24 hours of the Discharger becoming aware of an adverse effect(s) or impact on beneficial uses of the receiving water body due to non-compliance with this Order, or

due to a system failure or emergency involving a discharge from its drinking water system, the Discharger shall notify the corresponding Regional Water Board and the MS4 operator, and the Discharger shall confirm this notification in writing within five days. The notification shall include all of the following:

1. The location and extent of non-compliance or emergency discharge;
2. The cause of the non-compliance or emergency discharge;
3. The date, time and expected duration of the non-compliance or emergency discharge;
4. The estimated volume of discharge;
5. The applicable receiving water body; and
6. The corrective actions taken (or being taken) to prevent future non-compliance or repair the system failure.

D. Pre-Notification Requirements

Three (3) days prior to initiation of a planned discharge (or retroactively within 24-hours after the Discharger is informed to conduct an urgent planned discharge) of a volume equal to or greater than one acre-foot (325,850 gallons), the Discharger shall notify the MS4 operator, if applicable, and the appropriate Regional Water Board and provide:

1. The start date of discharge
2. The location of discharge and the applicable receiving water
3. The estimated volume of discharge, and
4. The reasons for discharge

E. Reporting and Recordkeeping Requirements

1. This Order requires the Discharger to maintain self-monitoring reports, including compliant and non-compliant discharge monitoring information, in its main office and to make those reports available upon request of State and Regional Water Board staff.

2. Monitoring periods and reporting for all required monitoring shall be completed according to the schedule in Attachment E.

3. The Order requires the Discharger to arrange and summarize any reported numerical data in a tabular format.

4. If a Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the self-monitoring report.

5. The Order requires the Discharger to report to the State Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act" of 1986.

6. This Order requires the Discharger to report, by March 1 of every year, all non-compliant discharge monitoring information contained in the Discharger's self-monitoring report for the past calendar year. All non-compliant discharge monitoring information shall be accompanied by the corrective actions the Discharger has taken to return the discharge to compliance. Identified non-compliance must include a description of the requirement that was violated and a description of the violation.

7. The Discharger is required to attach a cover letter to the report that clearly identifies discharge events of non-compliance with the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions.

F. Increase in Monitoring Requirements

The Deputy Director may modify the monitoring and reporting requirements at any time to ensure the protection of the beneficial uses of the receiving water. The modified requirements will be based on site-specific data or information indicating that a site-specific discharge threatens to cause or contribute to an exceedance of a receiving water quality criteria or objective.

At any time during the term of this permit, the Deputy Director may notify authorized Dischargers to electronically submit monitoring reports using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, each Discharger shall submit a hard copy of its monitoring reports. Subsequent guidance will be provided to the Discharger upon the Deputy Director's notification for electronic submittal of reports. (Direction and guidance for electronic SMR submittals is currently available on the CIWQS Web site at http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml

VIII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 Code of Federal Regulations part 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 Code of Federal Regulations part 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 Code of Federal Regulations part 122.42.

Title 40 Code of Federal Regulations part 122.41(a)(1) and (b) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. Title 40 Code of Federal Regulations part 123.25(a) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with

40 Code of Federal Regulations part 123.25, this Order omits federal conditions that address enforcement authority specified in 40 Code of Federal Regulations part 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Special Reopener Provisions

The reopener provisions in this Order provide an explanation of the State Water Board authority to reopen this Order in accordance with 40 Code of Federal Regulations part 122.62. For example, the State Water Board is developing a Proposed Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California, which when adopted is intended to establish consistent standards and implementation procedures for regulating chlorine statewide. This provision is the avenue by which the State Water Board may reopen this Order to include a revised reporting level to determine compliance with effluent limitations for total residual chlorine if a statewide policy for total residual chlorine is adopted during the term of this Order.

IX. PUBLIC PARTICIPATION

The State Water Board adopted this Order that serves as a statewide general NPDES permit for low threat discharges from drinking water systems on November 18, 2014. State Water Board staff developed the draft Order using input from water purveyors and other interested parties over the course at least two years. The language and requirements in the draft order were developed to eliminate, where possible, unnecessary interference with mandated activities to protect public health. State Water Board staff held nine stakeholder meetings statewide and other verbal correspondences to incorporate the most crucial concerns related to small systems, and the feasibility and cost of permit compliance. The State Water Board encouraged public participation at the August 5, 2014 public hearing, the October 21, 2014 workshop meeting and the November 18, 2014 adoption meeting for this item.

A. Notification of Interested Parties

The State Water Board notified interested agencies, parties, and persons of its intent to consider adoption of this general Order for low threat discharges from drinking water systems and provided them with an opportunity to submit their written comments and recommendations. Notification was provided to interested parties through specific mailings, distribution through the Water Board Lyris Email System and through publication in the following newspapers for the following communities:

- Inter-City Express - Alameda County
- Tahoe Daily Tribune - Alpine County
- Fresno Bee - Fresno County
- Imperial Valley Press - Imperial County
- Los Angeles Daily Journal - LA County
- Orange County Recorder - Orange County

- Daily Recorder - Sacramento County
- San Diego Commerce - San Diego County
- New Times - San Luis Obispo County
- Record Searchlight - Shasta County
- Sonoma County Herald - Sonoma County

B. Public Comments

A draft Order was issued for public comment and review on June 6, 2014. Interested persons were invited to submit written comments concerning the draft Order. A revised draft Order was issued on July 3, 2014, mainly incorporating TMDL implementation language to the previously issued draft Order. For State Water Board staff and the State Water Board to be fully responsive and consider public comments, all comments were required to be submitted to the State Water Board by noon on August 19, 2014.

C. Public Hearing

The State Water Board held a public hearing on the draft Order during its regular Board meeting on the following date and time and at the following location:

Date:	August 5, 2014
Time:	9:00 a.m.
Location:	California Environmental Protection Agency Headquarters Office 1001 I Street, 2nd Floor Sacramento, CA 95814

Interested persons were invited to attend. At the public hearing, the State Water Board heard testimony pertinent to the subject discharges, and this Order. Oral testimony was heard; however, for accuracy of the record, important testimony was required to be submitted in writing.

The State Water Board considered comments that were provided orally at the public hearing, and in writing in accordance with the public notice issued for this Order, for the development of the final draft permit. Due to the numerous changes to the draft permit, a subsequent public workshop was held on October 21, 2014, and further oral comments were heard as the final draft permit was considered for adoption on November 18, 2014.

All pertinent dates, documents and agendas were kept updated and accessible on the NPDES Program Page of the State Water Board website at the following web address: http://www.waterboards.ca.gov/water_issues/programs/npdes/.

D. Waste Discharge Requirements

This Order serves as statewide Waste Discharge Requirements (WDRs) pursuant to California Water Code, article 4, chapter 4, division 7 (commencing with § 13260). This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by the U.S. Environmental Protection Agency

(U.S. EPA), and California Water Code chapter 5.5, division 7 (commencing with § 13370). This Order shall serve as a statewide general NPDES permit for point source discharges from single or multiple discharge points to surface waters, storm drains, and other storm water conveyances leading to waters of the U.S.

Due to the drought conditions and the State of California water conservation goals, the State Water Board strongly encourages water purveyors with a discharge authorized under this Order to place the discharge water to multiple uses prior to surface water discharge, or to a beneficial reuse. The multiple use or beneficial reuse of the discharges authorized under this Order generally does not require coverage under waste discharge requirements if the discharge is collected and reused for landscape irrigation or other uses in a manner that augments the existing supply, or if the discharge is directly or indirectly discharged to:

- Storm water capture basin(s),
- Low impact development features
- Other groundwater-recharge system(s), or

Discharges from drinking water systems to land that do not drain to waters of the U.S. do not need authorization to discharge under an NPDES permit. Although discharges to groundwater may require waste discharge requirements issued by the State and/or Regional Water Boards, as an incentive to promote multiple uses of drinking water system discharges, the State Water Board generally will not require waste discharge requirements or monitoring for such drinking water system discharges that are beneficially reused rather than discharged to a water of the U.S. A water purveyor must estimate and report in its annual report, the quantity of water that would otherwise have been discharged but is used multiple times or is beneficially reused for this provision to apply.

E. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding this Order must register on the Drinking Water Systems Discharge Permit lyris listing at http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml, by selecting 'Water Quality Topics', then selecting 'Drinking Water Systems Discharges'.

F. Additional Information

Requests for additional information or questions regarding this Order should be directed to Ms. Diana Messina, staff of the State Water Board, at diana.messina@waterboards.ca.gov.

ATTACHMENT G – WATER BODIES WITH TOTAL MAXIMUM DAILY LOADS (TMDLs) AND WASTE LOAD ALLOCATIONS (WLAs) TO WATER PURVEYORS

As of the adoption date of this Order, no already-adopted TMDLs have established WLAs that apply exclusively to discharges from drinking water systems regulated under this Order. Due to the nature of the discharges authorized under this Order, it is unlikely that these discharges contribute to the impairment of the TMDL-related water bodies; therefore existing TMDL-related requirements that include WLAs to general categories of discharges are not applicable.

This Attachment is reserved for the State Water Board to include additional permit requirements in a subsequent permit renewal to implement future TMDLs that:

1) address pollutants likely to be in discharges from drinking water systems, and

2) allocate waste loads specifically to water purveyors regulated under this Order.

ATTACHMENT H - MAP OF THE REGIONAL WATER QUALITY CONTROL BOARDS

To find the Regional Water Board for a particular location, click on the map or enter a street address at the following website:*http://www.waterboards.ca.gov/waterboards_map.shtml#rwqcbs*

Or click on the map below:

ARMY CORPS OF ENGINEERS 404

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF

NOV - 2 2010

Regulatory Division

SUBJECT: File Number 286620N

H.B.M.W.D. NOV - 8 2010

Ms. Carol Rische
Humboldt Bay Municipal Water District
P.O. Box 95
Eureka, California 95502

Dear Ms. Rische:

Enclosed is your signed copy of a Department of the Army permit (Enclosure 1) to discharge approximately 25,000 cubic yards of fill annually over a ten-year period at the Humboldt Bay Municipal Water District's Essex surface water diversion and Ranney Well Collector facilities. The facilities are located on the Mad River near Blue Lake in Humboldt County, California.

Please complete the appropriate parts of "Project Status" form (Enclosure 2), and return it to this office as your work progresses. You are responsible for ensuring that the contractor or workers executing the activity authorized herein are knowledgeable of the terms and conditions of this authorization.

Should you have any questions regarding this matter, please call Carol Heidsiek of our Regulatory Branch at 707-443-0855. Please address all correspondence to the Regulatory Branch and refer to the File Number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available through the Forms and Contacts Block on our website: www.spn.usace.army.mil/regulatory/.

Sincerely,

for Torrey A. DiCiro
Lieutenant Colonel, U.S. Army
Commanding

Enclosures

Copies Furnished (w/encl 1 only):

US FWS, Arcata, CA
US NMFS, Arcata, CA
CA CC, Eureka, CA
CA DFG, Redding, CA
CA RWQCB, Santa Rosa, CA

DEPARTMENT OF THE ARMY PERMIT

PERMITTEE: Carol Rische
Humboldt Bay Municipal Water District

PERMIT NO.: 286620N

ISSUING OFFICE: San Francisco District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The discharge of approximately 25,000 cubic yards (CY) of fill annually over a ten-year period at the Humboldt Bay Municipal Water District's Essex surface water diversion and Ranney Well Collector facilities including: 1) the placement of 1,050 CY of gravel fill to construct a berm 500 lineal feet in length, 6 feet high, and approximately 50 feet wide across the river to the north bank; 2) maintain adequate flow to direct diversion facility through excavation of 275-2,225 CY of fill; 3) construct and maintain temporary access roads, platforms, gravel berms, and ramps to water collectors numbered 1, 2, 4, and 5 by excavating up to 10,950 CY; and 4) maintain and repair existing rock jetties/dikes/revetments/rip-rap by refilling/rebuilding with 7,000-10,000 CY of fill. This work shall be performed in accordance with the drawings labeled: "HBMWD ESSEX PROJECT," sheets 1-16, dated February 5, 2004.

Project Location: Humboldt Bay Municipal Water District's water supply and diversion operations on the Mad River between the Railroad Bridge near Blue Lake to the Highway 299 Bridge, in the Essex area of Humboldt County, California

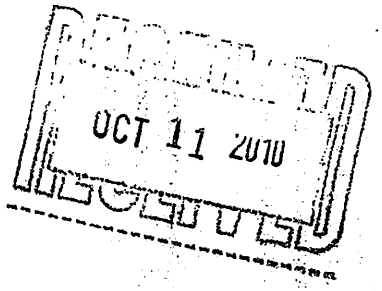
Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2020. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.


OCT 11 2010

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions. Please note that your certificate expires October 15, 2012. You must obtain a new certification in order for your Corps permit to remain valid until December 31, 2020.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

7. You understand and agree that, if future operations by the United States require the removal, relocation or other alteration of the structure or work authorized herein, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, you will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

Special Conditions:

1. This Corps permit does not authorize you to take an endangered species. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit or a Biological Opinion (BO) under ESA Section 7 with "incidental take" provisions with which you must comply). The NOAA Fisheries BO dated August 20, 2010, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take authorized by the BO, whose terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take and it would also constitute non-compliance with this Corps permit. NOAA Fisheries is the appropriate authority to determine compliance with the terms and conditions of its BO and with the ESA.

2. The permittee shall construct the gravel berm by obtaining gravel near Station No. 6 from the dry portion of the adjacent point bar (obtain gravel outside of the wetted channel) and by constructing the berm so that gravel fill placed within the wetted channel would be limited to the shortest possible distance necessary to tie in with the existing rock weir.

3. The permittee, after constructing the temporary berm, shall prepare the gravel bar where gravel fill was obtained in such a manner so that no depressions on the gravel bar remain (this would prevent inadvertent trapping of fish during times of river water level fluctuation) and the permittee shall slope the gravel bar so that it drains towards the wetted channel.

4. The permittee shall, prior to placing fill for the temporary berm near Station No. 6, visually inspect the wetted channel portion of the fill area to ensure no fish would be harmed during the fill activity. If fish are present in the wetted channel area, the permittee shall coordinate with NOAA Fisheries in implementing the rescue and relocation of fish to suitable habitat not affected by construction. The inspection for fish in the channel and the rescue and relocation operation shall be conducted in accordance with the protocols of NOAA Fisheries and the California Department of Fish and Game (CDF&G). If fish mortality occurs during construction activity in the vicinity of the berm, all construction activity shall cease and the CDF&G, NOAA Fisheries, and the Corps of Engineers shall be notified immediately. Work shall not resume until the aforementioned agencies recommend corrective action.

5. The permittee shall require the contractor to restrict the refueling, service, and repair of all earth-moving equipment and work vehicles to upland locations above Ordinary High Water and away from the riverbanks in order to prevent spillage of fuel, oil, hydraulic and other fluids from reaching the Mad River and its tributaries. All staging, parking, and service areas should be enclosed by some form of structure (fencing, K-rails, or other barriers) to separate these areas from the river.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Carol Risch _____ 10/6/2010 _____

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

James M. Hucles _____ 11/2/10 _____

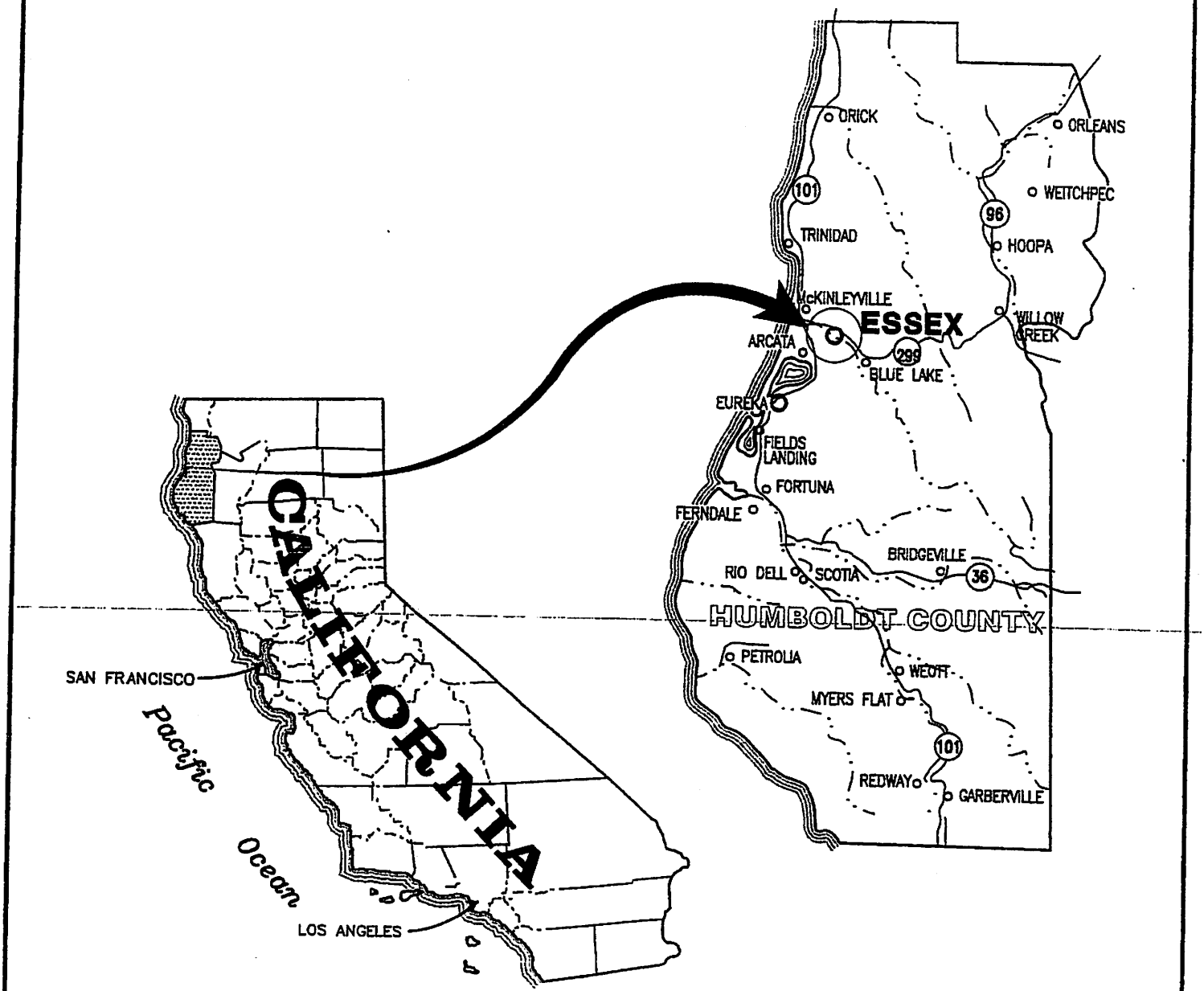
(DATE)

Torrey A. DiCiro
Lieutenant Colonel, U.S. Army
Commander

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE) (DATE)



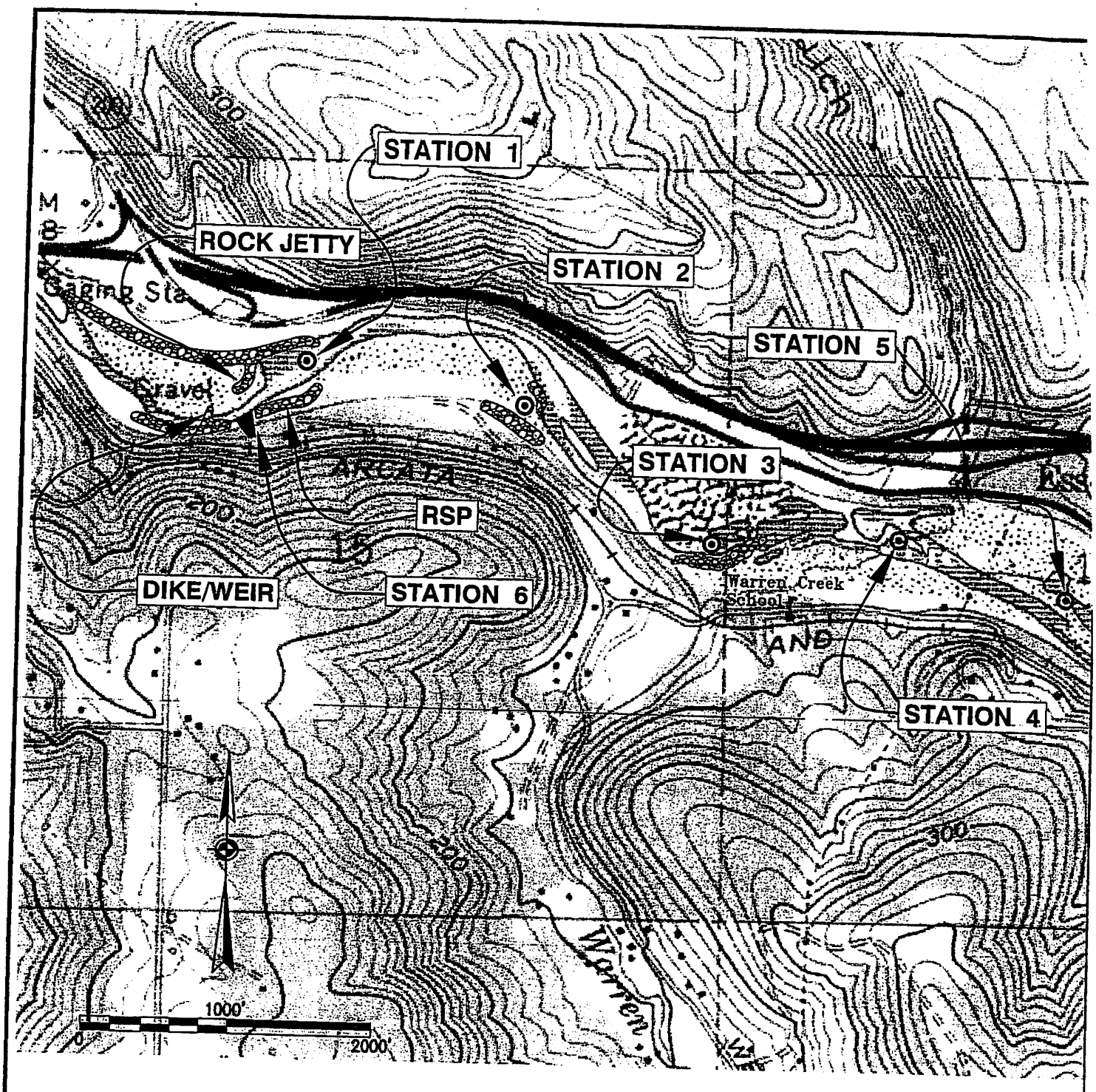
PURPOSE: Maintinance of Existing Public Water System
DATUM NGVD

LOCATION MAP

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

Sheet 1

WINZLER KELLY



SITE LOCATION

PURPOSE: Maintinance of Existing Public Water System
DATUM MSL

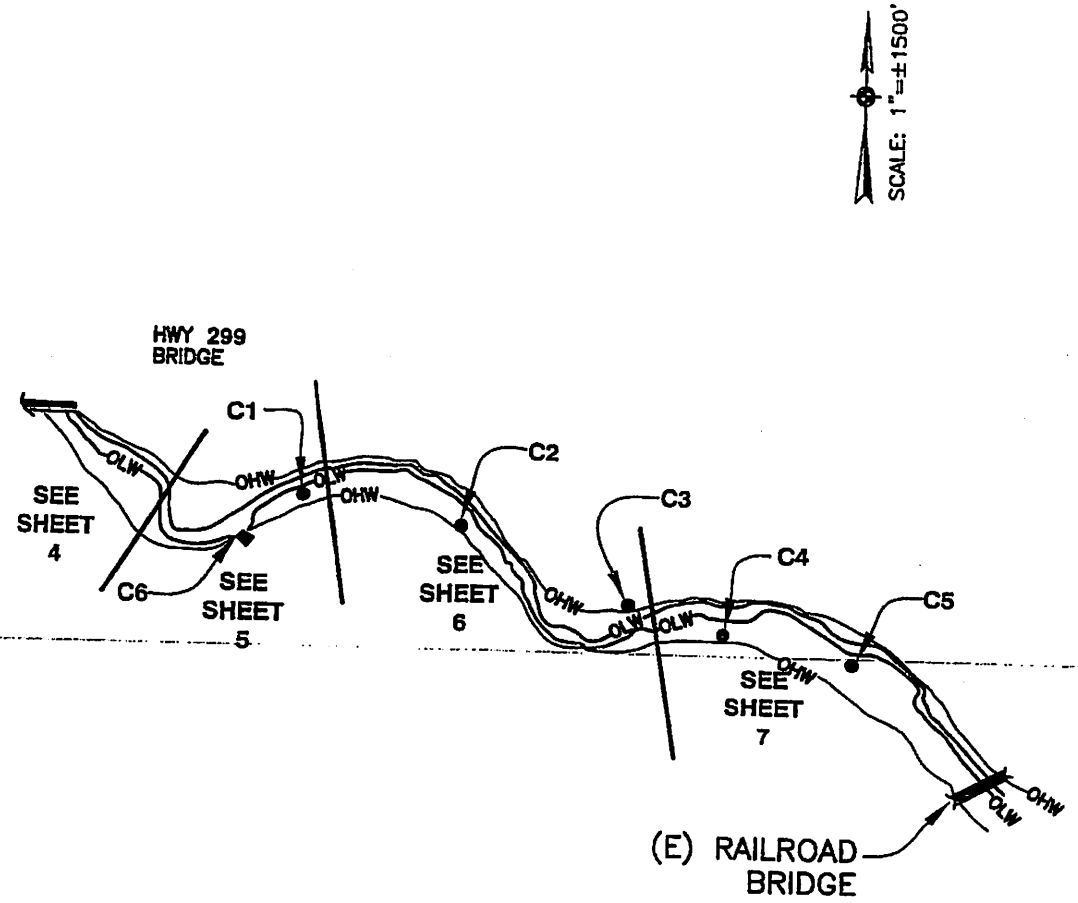
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

Sheet 2

WINZLER KELLY

03105506\dwg\05506f02.dwg date: 02/05/04 @ 11 am



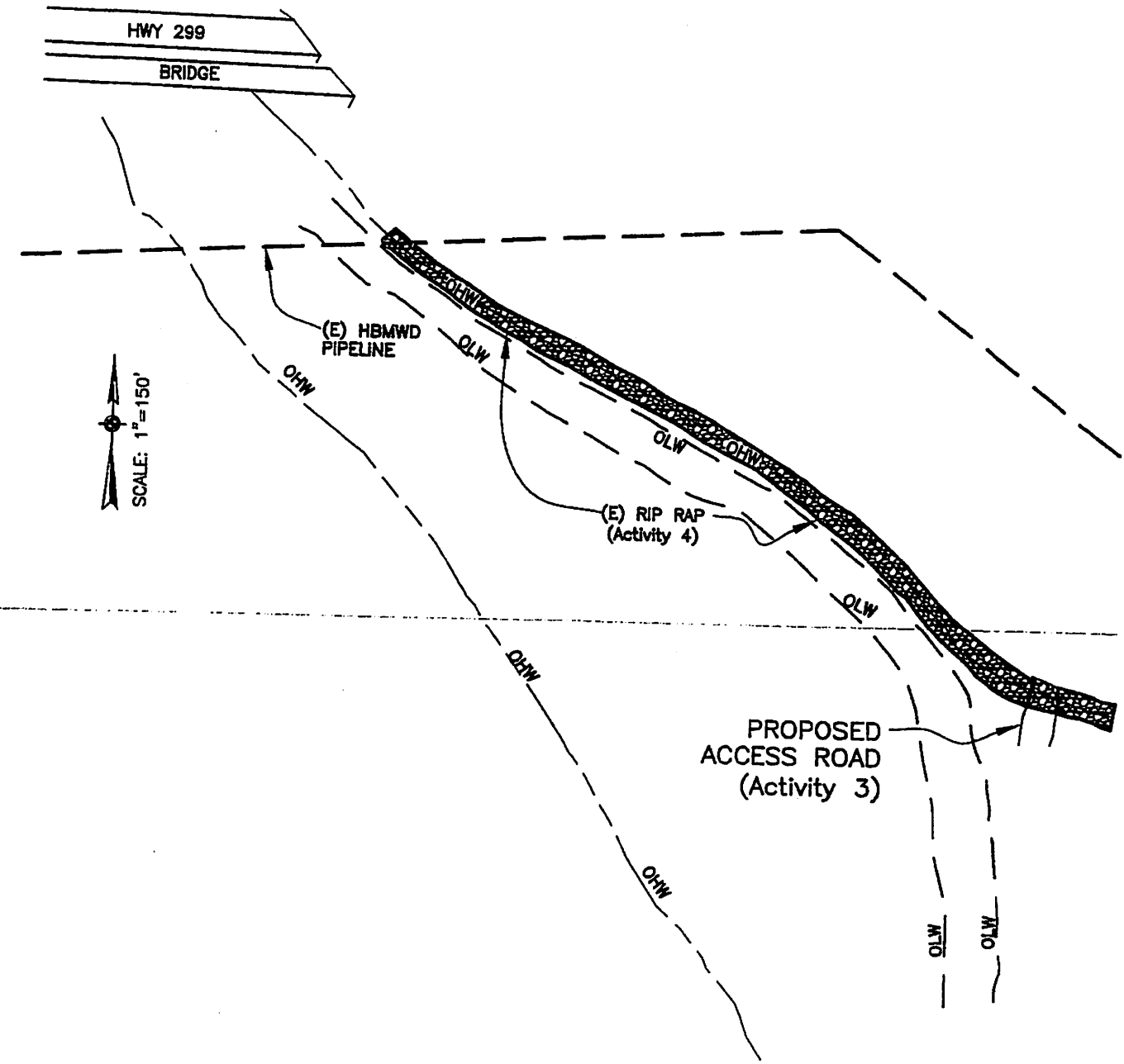
C1 = COLLECTOR LOCATION

PLAN VIEW OF PROJECT

PURPOSE: Maintainance of Existing public Water System
DATUM N/A
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

WINZLER & KELLY



PLAN VIEW DOWNSTREAM OF STATION No.6

PURPOSE: Ramp to Provide Maintainance Access to Rip-Rap, Dike, Channel Rip-Rap to Provide Permanent Bank Protection

DATUM N/A

ADJACENT PROPERTY OWNERS See Block 24

IN Mad River

AT Essex

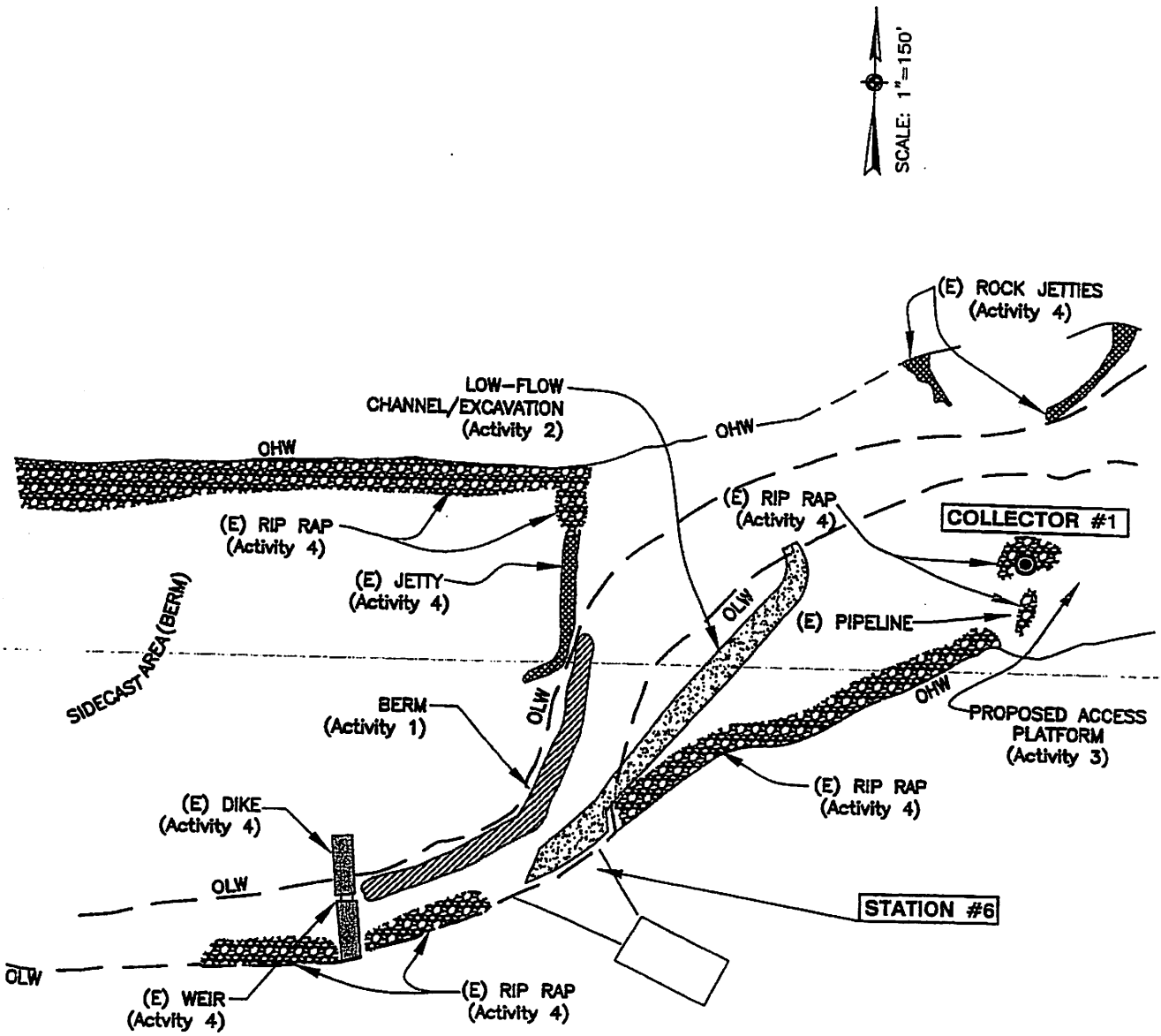
COUNTY OF Humboldt **STATE** CA

APPLICATION BY

Humboldt Bay Municipal Water District

Sheet 4

WINZLER & KELLY



PLAN VIEW OF STATIONS No.1 & No.6

PURPOSE: Maintain Proper Flow and Water Surface Elevation at Station #6

DATUM N/A

ADJACENT PROPERTY OWNERS See Block 24

IN Mad River

AT Essex

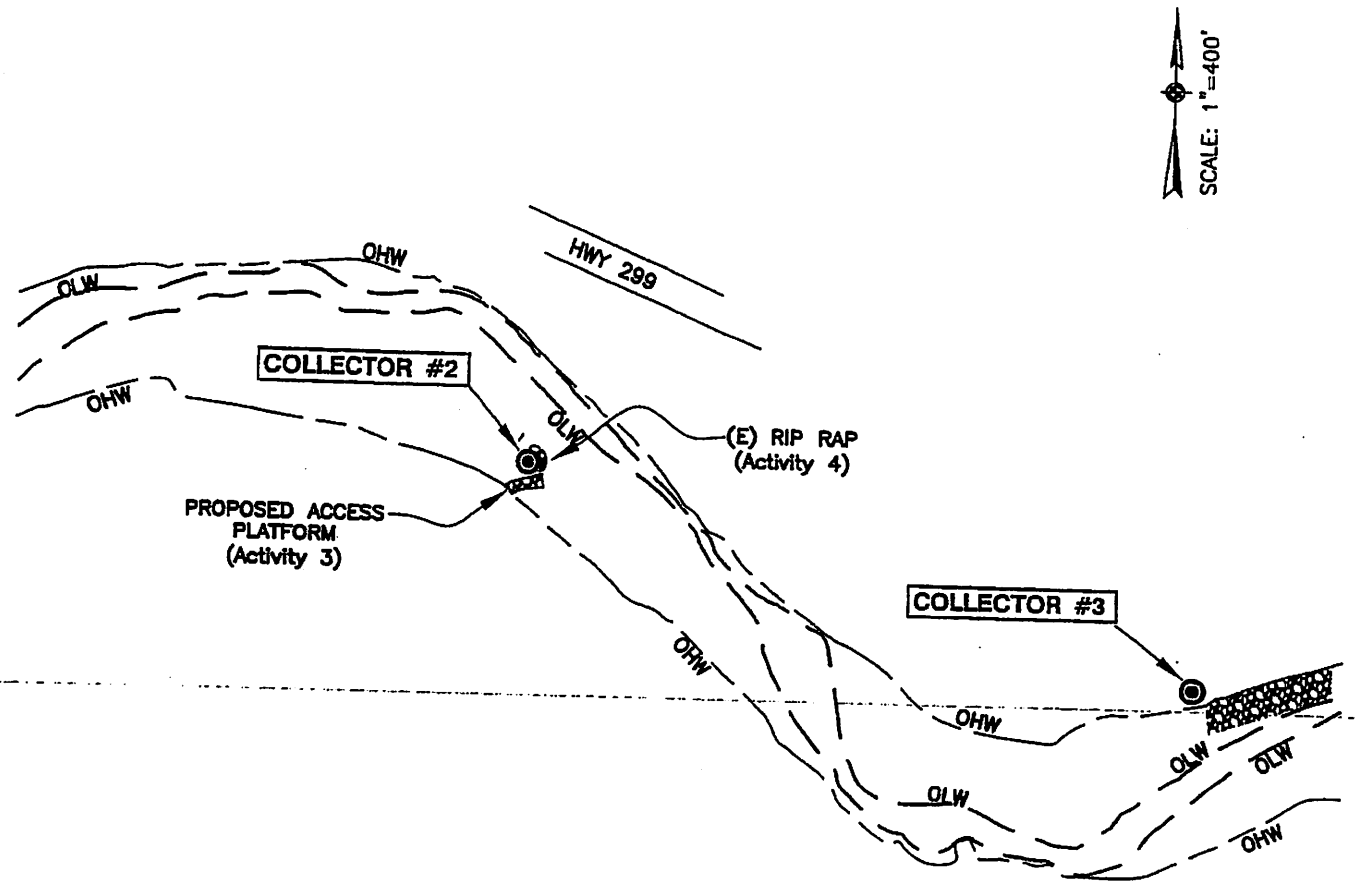
COUNTY OF Humboldt **STATE** CA

APPLICATION BY
Humboldt Bay Municipal Water District

Sheet 5

WINZLER & KELLY

date: 02/05/04 @ 11 am



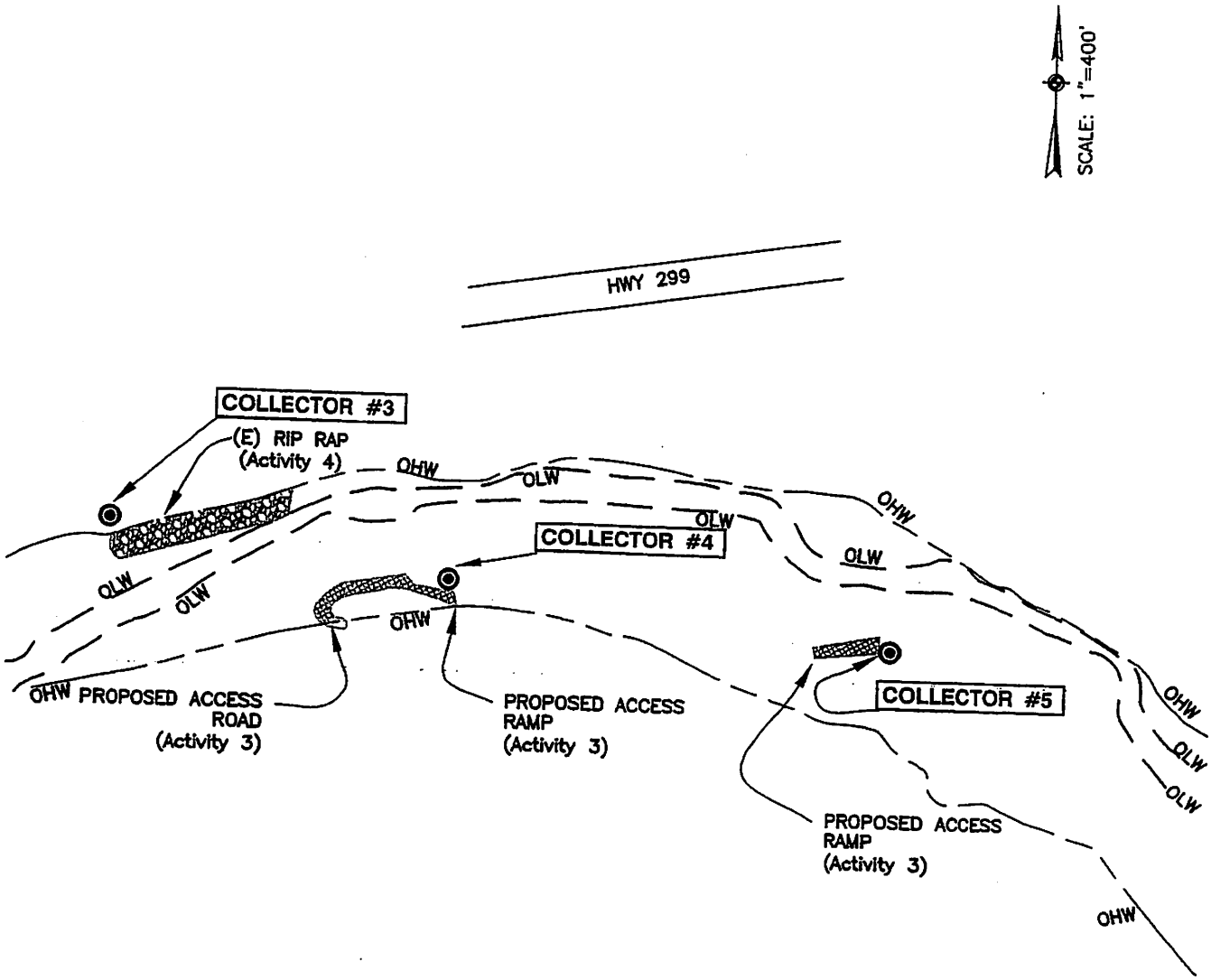
date: 02/05/04 @ 11 am

PLAN VIEW OF STATIONS No.2 & No.3

PURPOSE: Public Water Supply
DATUM N/A
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

WINZLER & KELLY



date: 02/05/04 @ 11 am

PLAN VIEW OF STATIONS No.3, No.4 & No.5

PURPOSE: Public Water Supply

DATUM N/A

ADJACENT PROPERTY OWNERS See Block 24

IN Mad River

AT Essex

COUNTY OF Humboldt **STATE** CA

APPLICATION BY

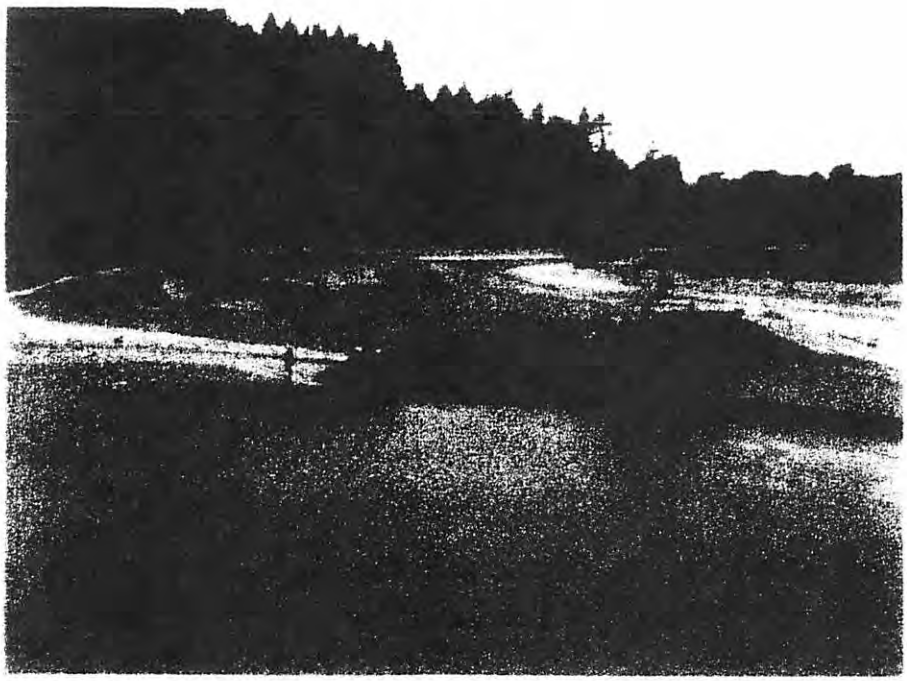
Humboldt Bay Municipal Water District

Sheet 7

WINZLER KELLY

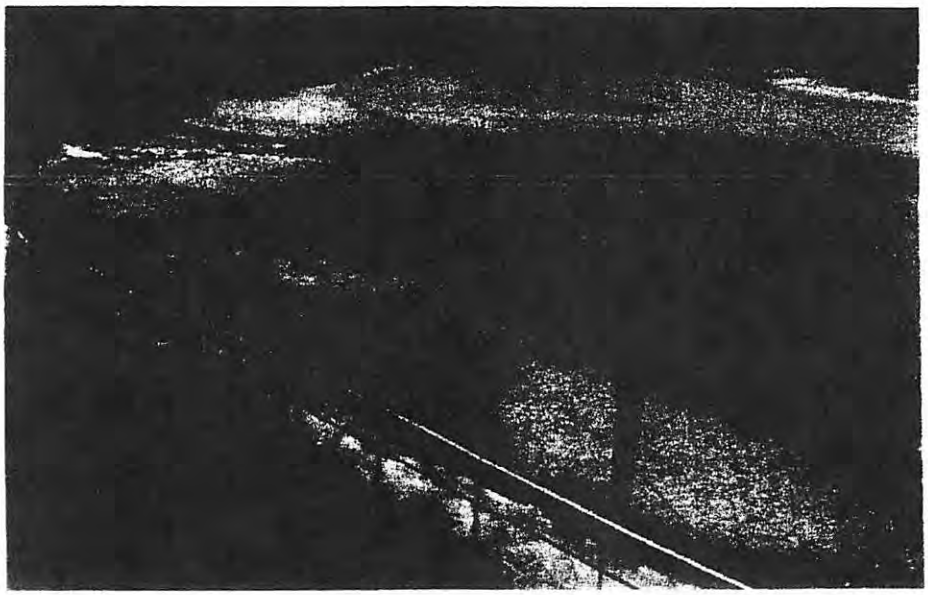
Purpose: Maintain Proper Flows to Surface Diversion (Station 6)

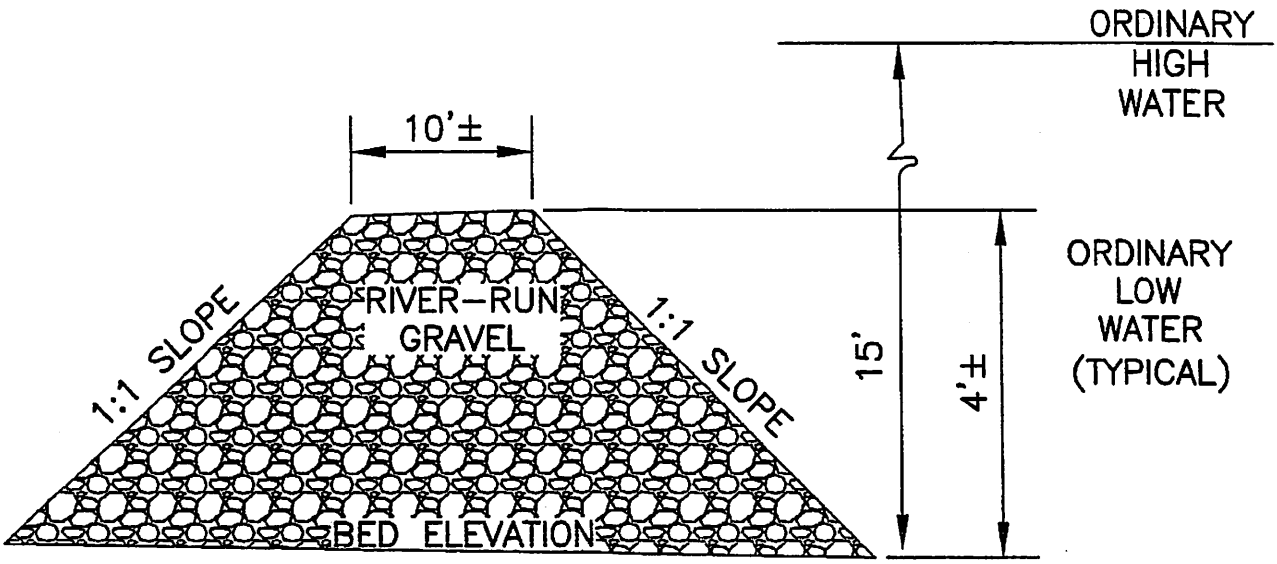
Plan View Activities 1 & 2



Above: Berm During Construction (with federally-licensed biologist in the river protecting fish)

Below: Completed Berm connecting to existing rock weir (as viewed from Station 6)





TYPICAL CROSS SECTION OF BERM
N.T.S.

TYPICAL LOW-FLOW BERM (Activity 1)

PURPOSE: Maintain Proper Flow to Surface Diversion at Station #6

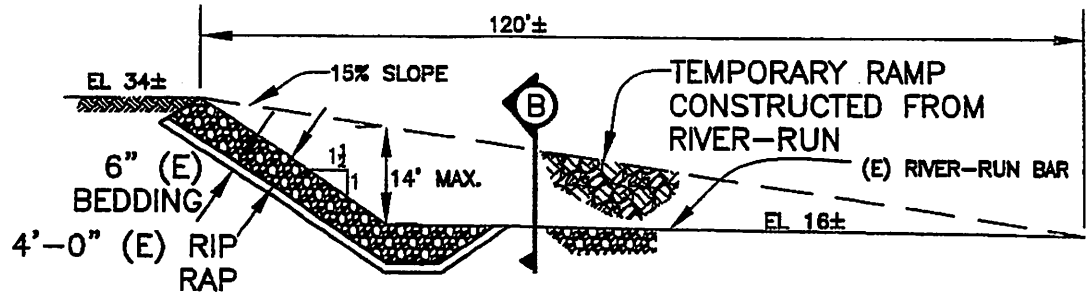
DATUM MSL

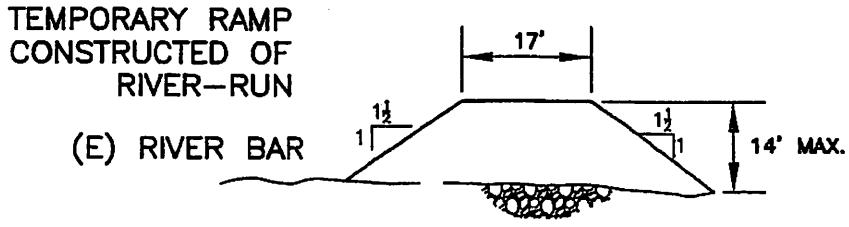
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

WINZLER & KELLY

05105506\dwg\05506f12.dwg date: 02/05/04 @ 11 am

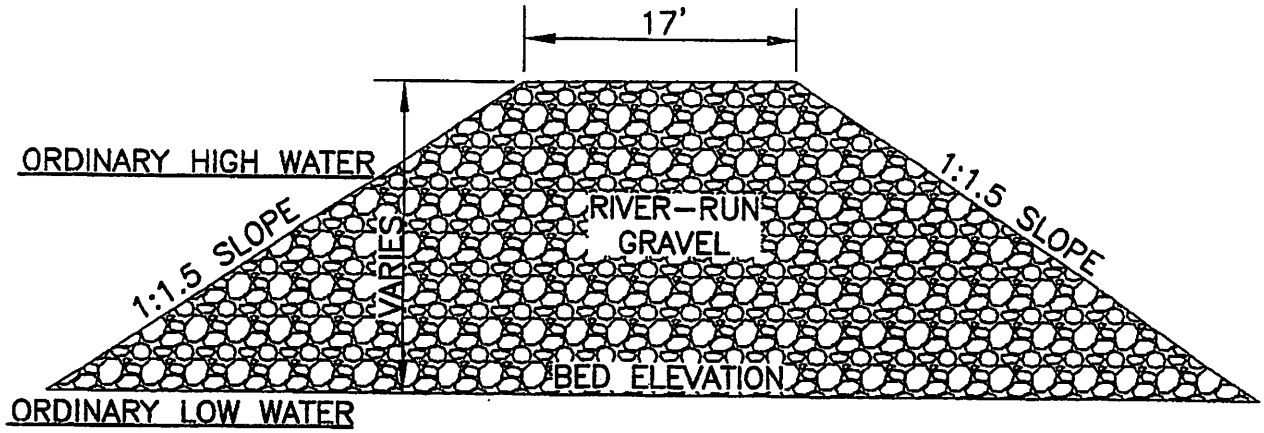




TYPICAL SECTION ACCESS ROAD (Activity 3)

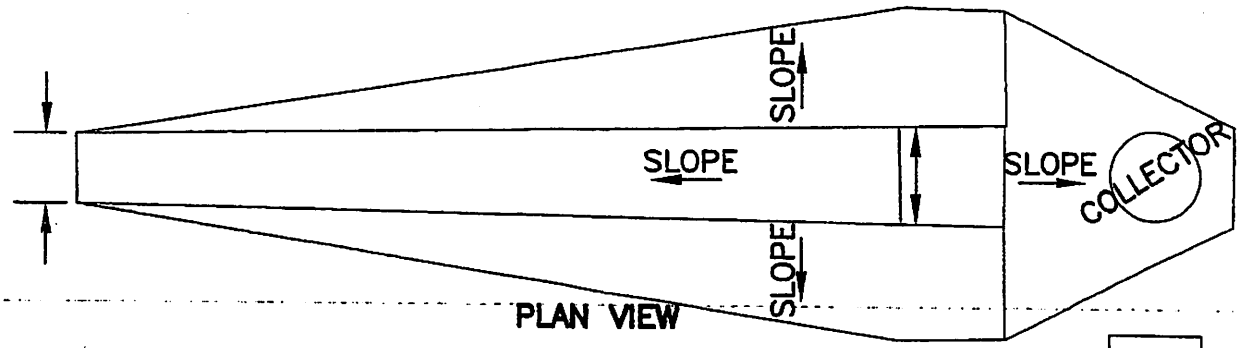
PURPOSE: Provide Vehicle Access to River Bed
DATUM NGVD
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

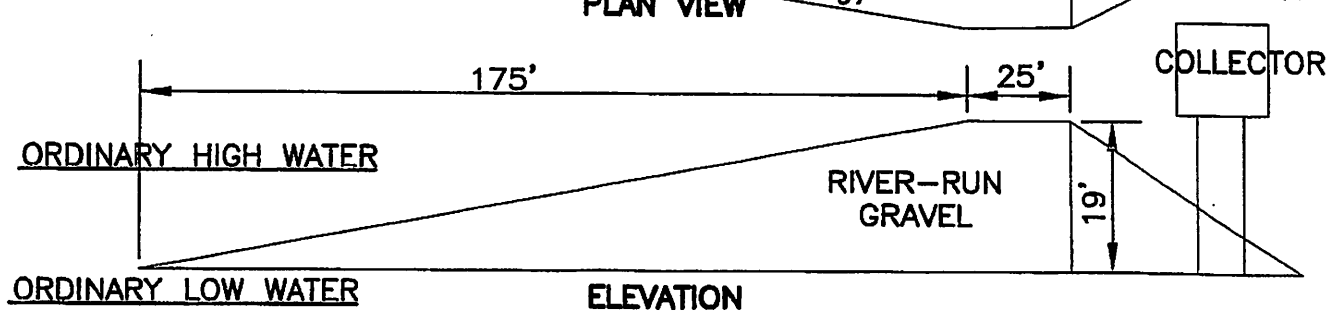


TYPICAL CROSS-SECTION OF ACCESS RAMP

SCALE: 1"=10'



PLAN VIEW



ELEVATION

NOTE: SCALE: 1"=40'

RAMPS ARE CONSTRUCTED BY PUSHING RIVER-RUN GRAVEL FROM THE SURROUNDING RIVER BED. CONSTRUCTION OCCURS IN THE DAY, AT LOW-FLOW CONDITIONS OUTSIDE THE LOW-FLOW CHANNEL. NO EQUIPMENT IS STORED ON RIVER BED.

TYPICAL ACCESS RAMP (Activity 3)

PURPOSE: Provide Access to Maintain Collectors

DATUM NGVD

ADJACENT PROPERTY OWNERS See Block 24

IN Mad River

AT Essex

COUNTY OF Humboldt **STATE** CA

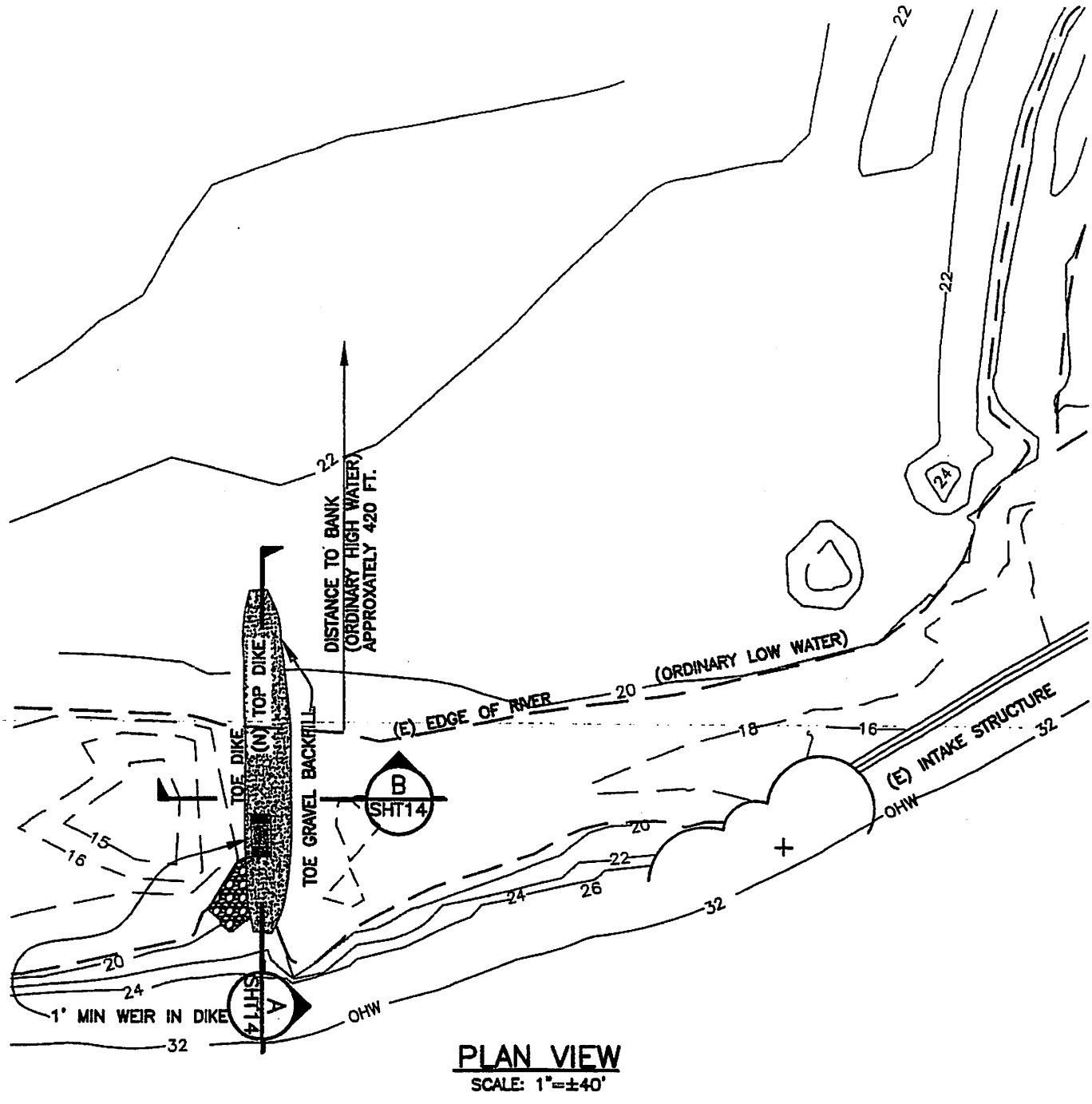
APPLICATION BY

Humboldt Bay Municipal Water District

Sheet 12

WINZLER & KELLY

03105506\dwg\05506f12.dwg date: 02/05/04 @ 11 am



PLAN VIEW
SCALE: 1"=±40'

LOW FLOW CHANNEL DIKE WITH WEIR - PLAN VIEW
(Activity 4)

PURPOSE: Maintain Proper Flow to Surface Diversion at Station #6

DATUM NGVD

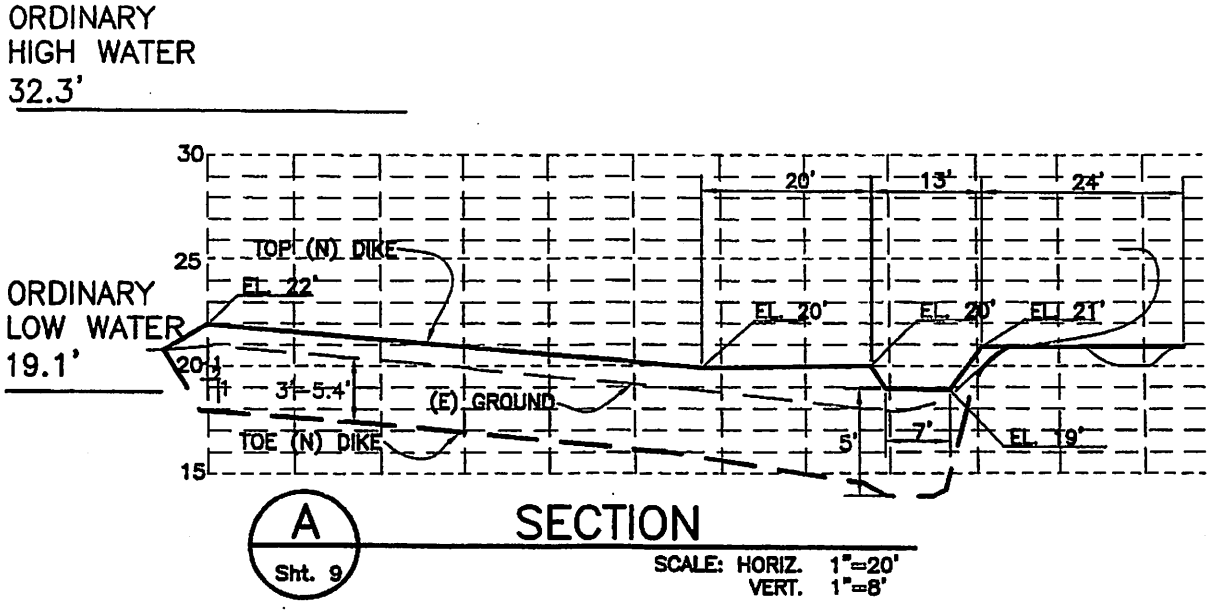
ADJACENT PROPERTY OWNERS See Block 24

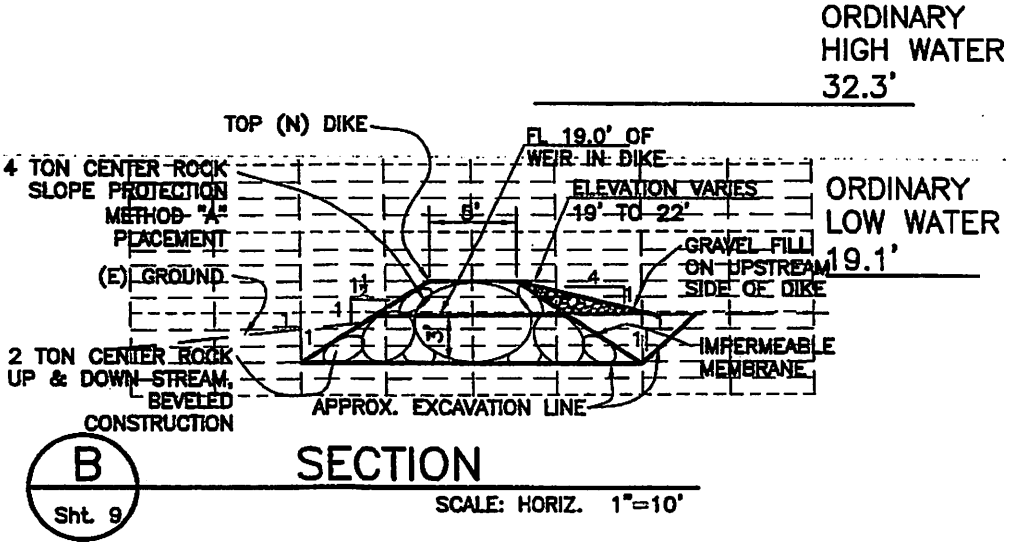
IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

Sheet 13

WINZLER & KELLY

03105506\dwg\05506f09.dwg date: 02/05/04 @ 11 am





LOW FLOW CHANNEL DIKE
DIKE/WEIR (Activity 4)

PURPOSE: Maintain Proper Flows to Surface Diversion Station #6

DATUM NGVD

ADJACENT PROPERTY OWNERS See Block 24

IN Mad River

AT Essex

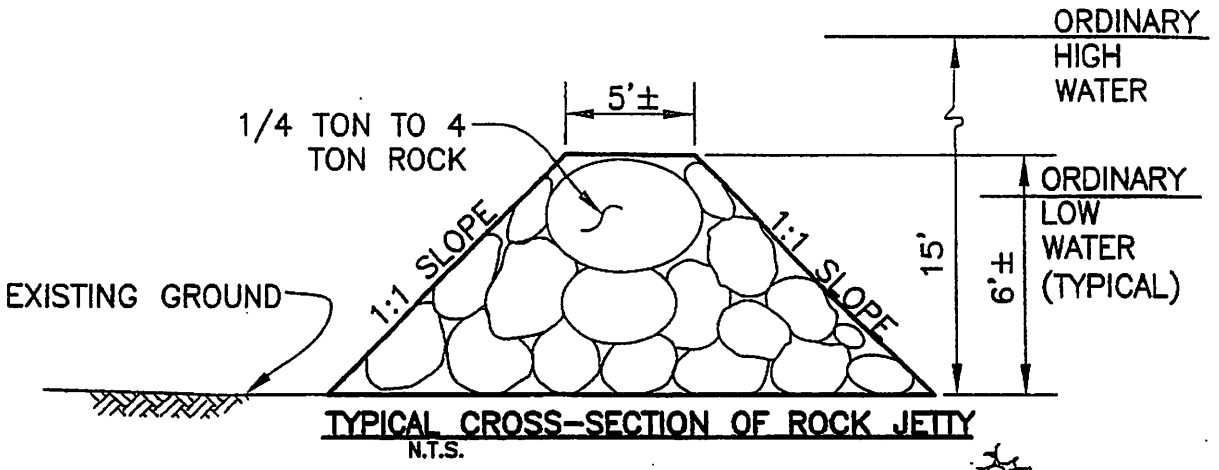
COUNTY OF Humboldt **STATE** CA

APPLICATION BY
Humboldt Bay Municipal Water District

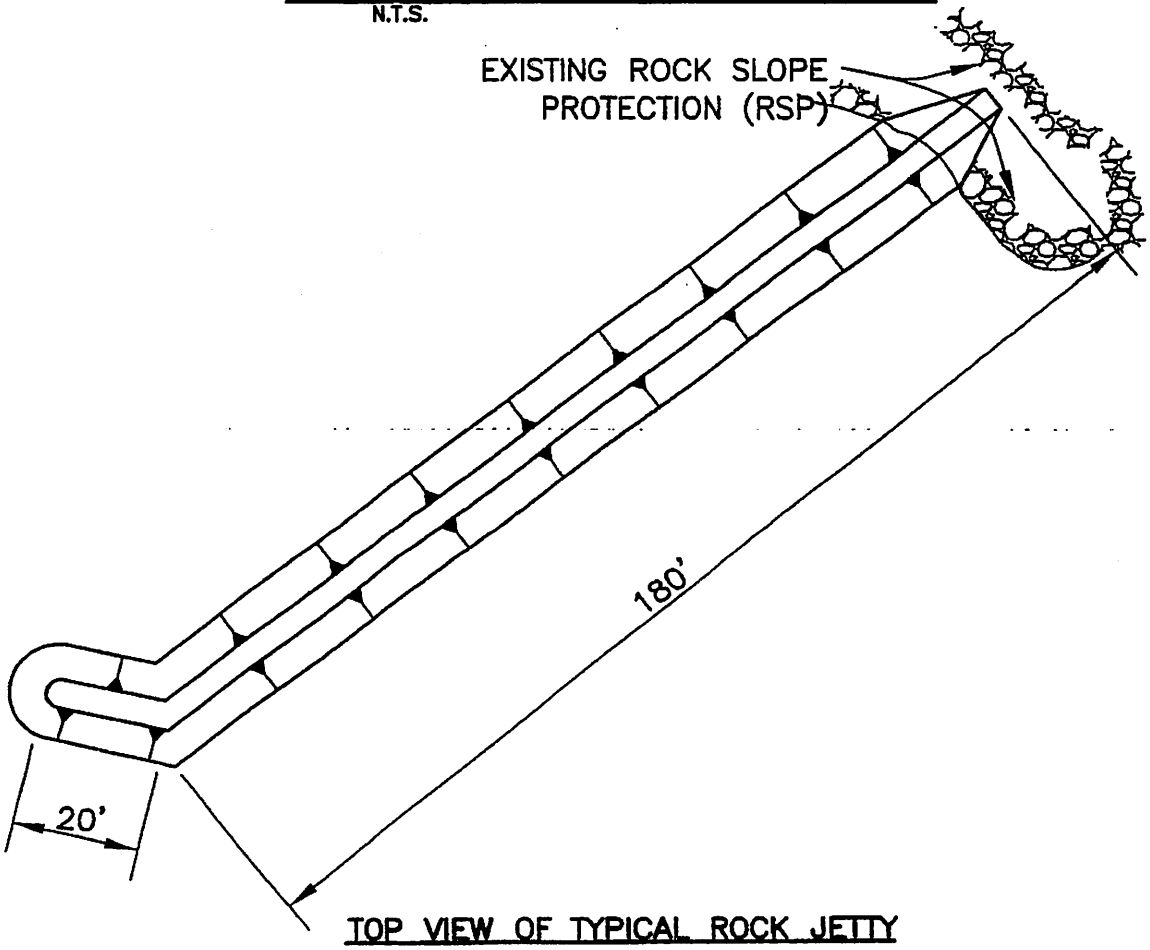
Sheet 14

WINZLER & KELLY

03103506 \dwg03506F10.dwg date: 02/05/04 @ 11 am



TYPICAL CROSS-SECTION OF ROCK JETTY
N.T.S.



TOP VIEW OF TYPICAL ROCK JETTY
N.T.S.

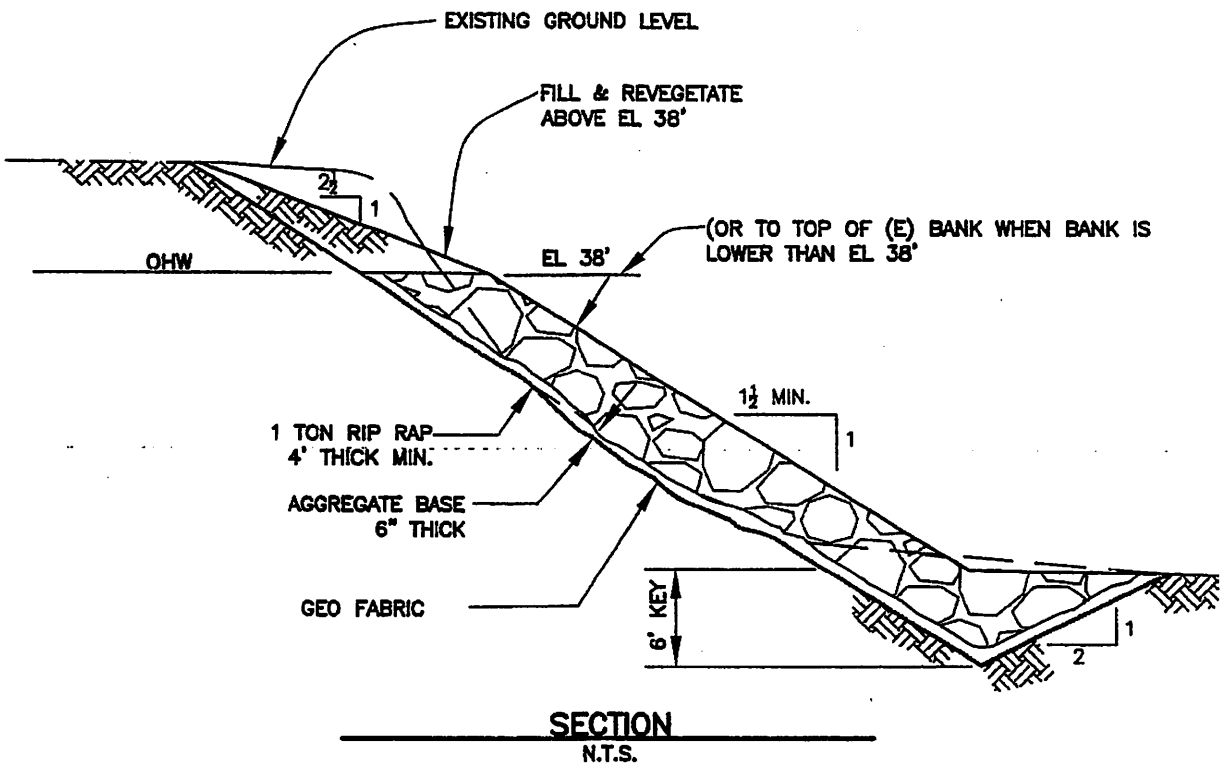
TYPICAL ROCK JETTY (Activity 4)

PURPOSE: Maintain Proper Flows to Surface Diversion Station #6
DATUM MSL
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

WINZLER & KELLY

03105506\dwg\05506f15.dwg date: 02/05/04 @ 11 am



SECTION
N.T.S.

TYPICAL SECTION ROCK SLOPE PROTECTION (Activity 4)

PURPOSE: Repair Existing Bank Protection Where Necessary
DATUM NGVD
ADJACENT PROPERTY OWNERS See Block 24

IN Mad River
AT Essex
COUNTY OF Humboldt **STATE** CA
APPLICATION BY
Humboldt Bay Municipal Water District

WINZLER & KELLY

California Regional Water Quality Control Board
North Coast Region
Geoffrey M. Hales, Acting Chairman

Linda S. Adams
Secretary for
Environmental Protection

www.waterboards.ca.gov/northcoast
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

Arnold
Schwarzenegger
Governor

January 7, 2010

In the Matter of

Water Quality Certification

for the

HUMBOLDT BAY MUNICIPAL WATER DISTRICT – MAD RIVER OPERATIONS
WDID No. 1B03079WNHU

APPLICANT:	Humboldt Bay Municipal Water District
RECEIVING WATER:	Mad River
HYDROLOGIC UNIT:	Blue Lake Hydrologic Area No. 109.10
COUNTY:	Humboldt
FILE NAME:	Humboldt Bay MWD – Mad River Operations

BY THE EXECUTIVE OFFICER:

1. On October 19, 2009, the Humboldt Bay Municipal Water District (Applicant) filed an application for water quality certification (certification) under section 401 of the Clean Water Act (33 U.S.C. § 1341) with the California Regional Water Quality Control Board, North Coast Region (Regional Water Board) for activities associated with ongoing operation, maintenance, excavation, berm construction, and protection of existing water supply structures in a two-mile reach of the Mad River between the railroad bridge in Blue Lake and the Highway 299 Bridge near Essex. The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858 on December 14, 2009, and posted information describing the project on the Regional Water Board's website. We did not receive any public comments on this project.

2. The Applicant is the only water supplier in the greater Humboldt Bay area. The Applicant sells "raw" water to industrial users on the Samoa Peninsula and treated water to the cities of Arcata, Blue Lake, and Eureka, as well as the Fieldbrook, Humboldt, Manila, and McKinleyville Community Services Districts. Operation and maintenance activities include channel dredging, excavation, and the use of excavated materials to create a berm parallel to the low-flow channel between an existing rock jetty on the north bank and an existing rock weir downstream of Station 6. Excavation activities may be conducted between Stations 1 and Station 6, and in

front of Station 6, on an as needed basis when aggradation blocks the flow of water into the forebay.

3. Temporary access roads, platforms, gravel berms, and ramps may be constructed to allow the Applicant to work on pumps housed in collectors 1, 2, 4, and 5. Temporary access structures will be constructed out of the low-flow channel and during low-flow periods by moving river-run gravel material from the surrounding area using heavy equipment. Gravel berms 3- to 4-feet high, 20-feet wide, and 350-feet long are constructed adjacent to the collectors. The berms prevent the water elevation at Pump Station 6 from dropping too low for the water to flow into the pumps. A channel approximately 10-feet deep, 12-feet wide, and 300-feet long will also be excavated in the river gravel to connect Pump Station 6 with the low-flow river channel. The exact configuration of the berm and channel are based on the amount of aggraded gravel in front of the pump Station 6 and the location of the low-flow river channel.

4. The project will result in temporary impacts to approximately 750 linear feet and 1.35 acre of stream channel. The proposed project will result in less than 0.01 acre of permanent impact to the stream channel. Compensatory mitigation is not required for the proposed project. Under Section 10 of the federal Endangered Species Act (ESA), the Applicant elected to pursue an Incidental Take Permit for its Mad River activities and has an approved Habitat Conservation Plan (HCP). The purpose of the HCP is to describe conservation, mitigation, and monitoring measures that the Applicant will undertake to minimize and mitigate adverse impacts to three ESA listed salmonid species: chinook salmon, coho salmon, and steelhead trout. Noncompensatory mitigation includes the use of Best Management Practices for sediment and turbidity control and for operation of heavy equipment in the stream channel. Disturbed areas on the gravel bar where fill materials are obtained shall also be graded in such a manner that no depressions remain on the gravel bar and the bar is sloped to drain towards the wetted channel. Project activities are generally conducted on an annual basis between June 1 and October 15.

5. The Applicant has obtained authorization from the United States Army Corps of Engineers to perform the project under Individual Permit (File No. 286620N), pursuant to Clean Water Act, section 404. The Applicant has also obtained a Lake or Streambed Alteration Agreement from the California Department of Fish and Game (#00-0048).

6 On January 27, 2000, the Applicant adopted a Mitigated Negative Declaration (MND, SCH# 1999122026) for the project, in order to comply with CEQA. The Applicant adopted an addendum to the MND on January 11, 2001. The Regional Water Board has considered the environmental document and any proposed changes incorporated into the project or required as a condition of approval to avoid significant effects to the environment.

7. This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification," which requires compliance with all conditions of this water quality certification.

Receiving Water:	Mad River in the Blue Lake Hydrologic Area No. 109.10
Filled or Excavated Area:	Area Temporarily Impacted: 1.35 acre of stream channel Area Permanently Impacted: <0.1 acre of stream channel
Total Linear Impacts:	Length Temporarily Impacted: 750 linear feet of stream channel Length Permanently Impacted: None
Dredge Volume:	None
Latitude/Longitude:	Upstream : 40.90126 N/124.03051 W Downstream : 40.90785 N/124.05851 W

Accordingly, based on its independent review of the record, the Regional Water Board certifies that the Humboldt Bay Municipal Water District's Mad River Operations (WDID No. 1B03079WNHU), as described in the application, will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that the Applicant complies with the following terms and conditions:

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330 and title 23, California Code of Regulations, section 3867.

2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to title 23, California Code of Regulations, section 3855, subdivision (b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. This certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 2200, and owed by the Applicant.

4. The Regional Water Board shall be notified annually in writing at least five working days (working days are Monday – Friday) prior to the commencement of ground disturbing activities, with details regarding the construction schedule, in order to allow staff to be present onsite during construction, and to answer any public inquiries that may arise regarding the project.

5. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washings, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this Order, shall be allowed to enter into or be placed where it may be washed by rainfall into waters of the State. When operations are completed, any excess material or debris shall be removed from the work area.

6. Fueling, lubrication, maintenance, operation, and storage of vehicles and equipment shall not result in a discharge or a threatened discharge to waters of the United States. At no time shall the applicant use any vehicle or equipment, which leaks any substance that may impact water quality. Staging and storage areas for vehicles and equipment shall be located outside of waters of the United States.

7. All activities and BMPs shall be implemented according to the submitted application and the conditions in this certification.

8. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete the project.

9. A copy of this Order and the application documents submitted by the Applicant for this certification shall be provided to all contractors and subcontractors conducting the work, and shall be in their possession at the work site.

10. Visual observations for increased turbidity shall be conducted whenever a project activity has the potential to increase turbidity in the Mad River. Field turbidity measurements shall be collected whenever a visible increase in turbidity is observed. Turbidity measurements shall be collected upstream (within 50 feet) of the source of turbidity (any project activities that cause a turbidity increase) and downstream (within 500 feet) of the source of turbidity. The monitoring frequency shall be a minimum of once every two hours during periods of increased turbidity or until turbidity levels are no longer increasing as a result of project activities. If turbidity levels are greater than 20 percent above background levels 500 feet downstream of the turbidity source, the distance to the downstream extent of the turbidity increase (greater than 20 percent above background) shall be determined and that distance shall be promptly reported to Regional Water Board staff.

11. A turbidity monitoring report shall be submitted to the Regional Water Board by January 1 each year. The annual report shall contain a written summary of all activities conducted during the year, all turbidity measurements that were collected in accordance with Additional Condition 10, a description of the BMPs that were used to control turbidity, photos showing project areas before implementation of annual activities, photos showing project areas following implementation of annual activities, and photos of BMPs that were used.

12. The suspended sediment load of the Mad River shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

13. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any water quality problem arises, the associated project activities shall cease immediately until adequate BMPs are implemented. The Regional Water Board shall be notified promptly and in no case more than 24 hours after the unauthorized discharge or water quality problem arises.

14. Prior to implementing any change to the project that may have a significant or material effect on the findings, conclusions, or conditions of this Order, the Applicant shall obtain the written approval of the Regional Water Board Executive Officer.

15. All project work shall be conducted as described in this Order and in the application submitted by the Applicant. If the Regional Water Board is not notified of a significant alteration to the project, it will be considered a violation of this Order, and the Applicant may be subject to Regional Water Board enforcement actions.

16. The Regional Water Board may add to or modify the conditions of this Order, as appropriate, to implement any new or revised water quality standards and implementation plans adopted and approved pursuant to the Porter-Cologne Water Quality Control Act or Section 303 of the Clean Water Act.

17. The Applicant shall provide Regional Water Board staff access to the project site to document compliance with this certification.

18. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable State or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any State law authorizing remedies, penalties, process or sanctions constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification. In response to a suspected violation of any condition of this certification, the Regional Water Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the Regional Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this certification, the Regional Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

19. In the event of any change in control of ownership of land presently owned or controlled by the Applicant, the Applicant shall notify the successor-in-interest of the existence of this Order by letter and shall forward a copy of the letter to the Regional Water Board at the above address.

To discharge dredged or fill material under this Order, the successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, and the address and telephone number of the person(s) responsible for contact with the Regional Water Board. The request must also describe any changes to the project proposed by the successor-in-interest or confirm that the successor-in-interest intends to implement the project as described in this Order.

20. Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited to and all proposed mitigation being completed in strict compliance with the Applicant's project description, and b) compliance with all applicable requirements of the Water Quality Control Plan for the North Coast Region (Basin Plan).

21. The authorization of this certification for any dredge and fill activities expires on January 7, 2015. Conditions and monitoring requirements outlined in this certification are not subject to the expiration date outlined above, and remain in full effect and are enforceable.

If you have any questions or comments please call Dean Prat at (707) 576-2801.

Catherine Kuhlman
Executive Officer

010710_DLP_HumBayMWD_MadR_401cert.doc

Original to: Ms. Carol Rische, Humboldt Bay Municipal Water District, P.O. Box 95, Eureka, CA 95502

Copies to: U.S. Army Corps of Engineers, District Engineer, 601 Startare Drive, Box 14, Eureka, CA 95501
Ms. Jane Hicks, U.S. Army Corps of Engineers, Regulatory Functions, 1455 Market Street, San Francisco, CA 94103-1398

PROJECT STATUS

Please use the forms below to report the dates when you start and finish the work authorized by the enclosed permit. Also if you suspend work for an extended period of time, use the forms below to report the dates you suspended and resumed work. The second copy is provided for your records. If you find that you cannot complete the work within the time granted by the permit, please apply for a time extension at least one month before your permit expires. If you materially change the plan or scope of the work, it will be necessary for you to submit new drawings and a request for a modification of your permit.

(cut as needed) ----------

Date:_____

NOTICE OF COMPLETION OF WORK under Department of the Permit No 286620N
TO: District Engineer, US Army Corps of Engineers, RegulatoryDivision,1455 Market Street, 16th Floor, San Francisco, CA 94103-1398

In compliance with the conditions of Permit No 286620N, this is to notify you that work was completed on _____.

Permittee: Ms. Carol Rische,Humboldt Bay Municipal Water District
P.O. Box 95, Eureka, California 95502

(cut as needed----------

Date:_____

NOTICE OF RESUMPTION OF WORK under Department of the Permit No 286620N .
TO: District Engineer, US Army Corps of Engineers, Regulatory Division, 1455 Market Street, 16th Floor, San Francisco, CA 94103-1398

In compliance with the conditions of Permit No 286620N, this is to notify you that work was resumed on _____.

Permittee: Ms. Carol Rische,Humboldt Bay Municipal Water District
P.O. Box 95, Eureka, California 95502

(cut as needed----------

Date:_____

NOTICE OF SUSPENSION OF WORK under Department of the Permit No 286620N
TO: District Engineer, US Army Corps of Engineers, Regulatory Division, 1455 Market Street, 16th Floor, San Francisco, CA 94103-1398

In compliance with the conditions of Permit No 286620N, this is to notify you that work was suspended on _____.

Permittee: Ms. Carol Rische,Humboldt Bay Municipal Water District
P.O. Box 95, Eureka, California 95502

(cut as needed----------

Date:_____

NOTICE OF COMMENCEMENT OF WORK under Department of the Permit No 286620N
TO: District Engineer, US Army Corps of Engineers, Regulatory Division, 1455 Market Street, 16th Floor, San Francisco, CA 94103-1398

In compliance with the conditions of Permit No 286620N, this is to notify you that work commenced on _____.

Permittee: Ms. Carol Rische,Humboldt Bay Municipal Water District
P.O. Box 95, Eureka, California 95502

(cut as needed----------

Date:_____

APPENDIX E – SITE PHOTOS

Photo 1: Collector 2, facing northwest

Photo 2: Collector 2, facing northwest

Photo 3: Top of Collector 2

Photo 4: Collector 2 Ladder

Photo 5: Collector 2, facing southwest

Photo 6: Collector 2 access and dewatering pipe alignment (to the right), and staging area, facing northwest

Photo 7: Collector access and dewatering pipe alignment, facing northwest

Photo 8: Contractor laydown / staging area approximately 250 feet east of percolation pond, facing south

Photo 9: Collector 2 access with staff parking lot in the background, facing west

Photo 10: Collector 2 access with public parking lot to the right, facing east

Photo 11: Collector 2 access with public parking lot behind photographer, facing north

Photo 12: Percolation pond area, facing northwest

Photo 13: Percolation pond area, facing east

Photo 14: Dewatering pipe alignment, facing west

Photo 15: Dewatering pipe alignment, facing southwest

Photo 16: Dewatering pipe alignment, facing southwest

Photo 17: Dewatering pipe alignment with Pump Station 6 in background, facing south

Photo 18: Dewatering pipe alignment viewing Pump Station 6, facing south