



CONTRACT DOCUMENTS

FOR THE

CONSTRUCTION OF GROUNDWATER WELLS

AT THE

BLYTHE SANITARY LANDFILL

JULY 2022

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NOTICE INVITING BIDS TO CONTRACTORS

The Riverside County Department of Waste Resources, hereinafter called "County," invites sealed bids for:

CONSTRUCTION OF GROUNDWATER WELLS AT THE BLYTHE SANITARY LANDFILL

On or after October 4, 2022, Contract Documents may be examined at the County's office at 14310 Frederick Street, Moreno Valley, California, and may be obtained upon payment to the County of \$60 per set, received at the County's office and \$75 per set if mailed by U.S. mail (mailing cost does not apply when using recipient's mailing account number). No refund will be made.

A digital copy of the Contract Documents and Project Drawings in PDF format will be available on the Department's website <http://www.rcwaste.org>. The Project Drawings will also be available in digital Microstation (.dgn) format on Department's website. This digital data is to be used at the Contractor's own discretion. The County is not responsible for the manner in which the Contractor chooses to use the digital data. The County is not responsible for how this digital data might be converted by the Contractor to another format. The Contractor is solely responsible for its use of this digital data.

Each Bid Proposal must be accompanied by a Bid Security, in the form of cash, a certified check, cashier's check or Bid Bond, equal to ten percent (10%) of the amount Bid, payable to the County of Riverside as a guarantee that the Contractor will, if awarded the Contract, execute a satisfactory Contract and furnish the required bonds and provide the required certificates of insurance.

Bid Proposals must be placed in a sealed envelope clearly marked "Bid Proposal". Bid Proposals must be in accordance with the instructions and other Contract Documents and filed with the County by **11:00 AM on Wednesday, November 16, 2022** at 14310 Frederick Street, Moreno Valley, CA 92553 which time and place are fixed for the public opening of bids. A **non-mandatory** pre-bid site review will be conducted at the Blythe Sanitary Landfill on **Wednesday, October 19, 2022, at 10:30 AM**. The Blythe Sanitary Landfill site address is 1000 Midland Road, Blythe, CA 92225. All questions and requests for clarification or interpretation of the Contract Documents must be submitted in writing by **5:00 PM on Friday, October 28, 2022** to Jeff Gow via e-mail to "jgow@rivco.org" or fax no. (951) 486-3250.

Pursuant to Labor Code Section 1771.1, any Contractor bidding and subcontractors to be listed on a Bid Proposal are subject to Public Contract Code Section 4104 and shall not be eligible to bid unless currently registered with the Department of Industrial Relations and qualified to

perform public works pursuant to Labor Code section 1725.5. No Contractor or subcontractor may be awarded a public works project or enter into a Contract without proof of current registration to perform public works.

General prevailing rate of per diem wages and general prevailing rate of per diem wages for holiday and overtime work, including employer payments for health and welfare, pension, vacation, apprentices and similar purposes for each craft, classification or type of workman needed for execution of Contracts under the jurisdiction of the County have been obtained by the County from the Director of Industrial Relations of the State of California for the area where the Work is to be done. These are on file at the County's office, and will be made available to any interested person upon request. THIS PROJECT IS SUBJECT TO COMPLIANCE MONITORING AND ENFORCEMENT BY THE DEPARTMENT OF INDUSTRIAL RELATIONS. The awarded prime Contractor shall post job site notices, including a copy of the prevailing rate of per diem wages determinations made by the Director for the Department of Industrial Relations and other notices prescribed by regulations and comply with the provisions of the California Labor Code, including, without limitation, Sections 1771.4, 1773.1, 1773.2, 1774, 1775, 1776, and 1777.5.

Contractor shall furnish the records specified in Labor Code Section 1776, including but limited to the certified payroll records, directly to the Labor Commissioner for the Department of Industrial Relations.

Substitution of securities for any moneys withheld by County shall be permitted as provided for by Section 22300 of the California Public Contract Code.

Contractors submitting Bid Proposals for this Project shall have an active and in good standing **Class C57 Well Drilling** Contractor's license from the State of California and be registered as well driller with the Riverside County Department of Environmental Health in order to be considered eligible for the Contract award. The license(s) shall remain active and in good standing throughout the entire duration of the Project.

BIDDER QUALIFICATIONS:

A Bidder must satisfy the following requirements to bid on this Project:

1. Within the last five (5) years, the Contractor shall have successfully completed at least ten (10) well installation projects.

Bidders shall provide all the reference information requested on the Project Reference Form for the Bidder and for any and all subcontractor(s) listed to perform any work that requires the above qualifications.

SUBMITTAL REQUIREMENTS:

With the submittal of the Bid Proposal, the Contractor shall submit for approval by the County documented evidence of satisfaction of all of the Bidder Qualifications listed above, including the name and experience of the superintendent and lead personnel that will be responsible for each category of Work listed under the preceding paragraph "Bidder Qualifications". As part of this submittal, Project Reference Forms shall be completed indicating at a minimum, the name, address, and phone number of the project owner and owner's representative, the location of the project, the amount of material installed, and completion date.

Dated: 7/18/2022

RIVERSIDE COUNTY
DEPARTMENT OF WASTE RESOURCES

Hans Kernkamp Digitally signed by Hans Kernkamp
Date: 2022.07.18 16:12:35 -07'00'

Hans W. Kernkamp, General Manager - Chief Engineer

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - GENERAL CONDITIONS

1.1 DEFINITIONS

Capitalized terms used on the Contract Documents shall have the meanings assigned to them in the Construction Agreement, Bonds, other Forms, General Provisions, and Technical Specifications that are included in the Contract Documents. Capitalized terms not so defined shall have the meanings assigned to them in, or if none is assigned as reasonably interpreted according to the context of, the portion of the Contract Documents where such terms are used.

1.2 QUANTITIES

The amount of work to be done or materials to be furnished by the Contractor as stated in the Bid Proposal (except for lump sum items) are only estimates and are not to be taken as an expressed or implied statement that the actual amount of work or materials will correspond to the estimate. The County reserves the right to increase or decrease or to entirely eliminate certain items from the work or materials if found desirable or expedient. The Contractor will be allowed no claims for anticipated profits, loss of profits or for any damages of any sort because of any difference between the estimated and the actual amounts of work done, or materials furnished or used in the completed project.

1.3 AGREEMENT OF FIGURES

If the unit prices and the total amounts named by the Bidder in the Bid Proposal do not agree, the unit prices alone will be considered as representing the Bidder's intention.

1.4 “OR EQUAL”

Pursuant to Division 2, Chapter 3, Article 5, commencing at Section 3400 of the Public Contract Code, all specifications shall be deemed to include the words “or equal,” provided, however, that permissible exceptions or other requirements shall be specifically noted in the specifications. Any “equal” proposed by the Contractor must be described in the Contractor’s Proposal.

1.5 INSPECTION OF SITE AND UNDERSTANDING OF CONTRACT PROVISIONS

Prior to submission of a Bid, Bidders must have examined the site and fully acquainted themselves with all conditions affecting the Work. Information derived from maps, plans or specifications, or from the County, will not relieve the successful Bidder from properly carrying out all the terms of the written Contract. By the submittal of a Bid Proposal, the Bidder will be held to have personally examined the site and the drawings, to have carefully read all of the specifications and other Contract Documents, and to have satisfied itself as to its ability to meet all the difficulties attending

the execution of the Work. The Bidder agrees that if it is awarded the Contract it will make no claim against the County based on ignorance or misunderstanding of the Contract provisions; and that the Bidder fully understands the payment method for the Work.

1.6 QUALIFICATIONS OF BIDDERS

No Bid Proposal will be accepted from a Contractor who is not licensed under laws of California, as evidenced by the submittal of the Statement of Licensure by Contractor with the Bid Proposal. No award will be made to any Bidder who cannot give satisfactory assurance to the County as to its ability to carry out the Contract, both from its financial standing and by reason of its previous experience as a Contractor on work of the nature contemplated in the Contract. If a Bidder is a corporation, limited partnership or limited liability company, such entity shall be 1) duly incorporated, formed, or organized; 2) authorized to transact and do business in the State of California; and 3) is current, active and in good standing under the laws of the State of California.

1.7 VENDOR REGISTRATION

In order to receive purchase orders and payments, the awarded Contractor must register all of its current information including W-9 and Evidence of Insurance with the County, or update its information if already registered. It is suggested that all bidders register in the County database so their information will be available for future consideration and so they are notified directly of future bids. To register, access the RivcoPRO Registration and User Guide at <https://www.purchasing.co.riverside.ca.us>.

Information needed in order to register:

1. User name (This person will be responsible for original registration and any future change.)
2. User Password
3. Company information including:
 - a. Completed W-9 and Evidence of Insurance
 - b. All Addresses (Corporate, Remit to, Sales, etc.)
 - c. Company type (Corporation, partnership, sole proprietorship, etc.)
 - d. Tax Identification Number (or social security number for individuals)
 - e. Banking Information for future electronic payment processes
4. Contact Information including:
 - a. Names
 - b. Titles/Positions
 - c. Contact Numbers (Phone, Fax, Cell phone, etc.)
 - d. E-Mail address for future correspondences
5. List of items/services you wish to provide to the County.

1.8 BALANCE BID

The Contractor is cautioned against unbalancing of its Bid by including its overhead and profit into one or two items only when there are a number of items on the schedule. The overhead and indirect charges should be prorated on all items in the schedule.

1.9 ANTI-DISCRIMINATION

It is the policy of the County that, in connection with all work performed under this Contract, there be no discrimination against any prospective or active employee engaged in the Work because of race, color, ancestry, national origin, religious creed, sex, age, marital status, or sexual preference. The Contractor agrees to comply with applicable Federal and California laws including, but not limited to, the California Fair Employment Practice Act, beginning with Labor Code Section 1410, and Labor Code Section 1735. In addition, the Contractor agrees to require like compliance by any subcontractors employed on the Work.

1.10 REQUIRED SUBMITTALS

There are a number of forms and other documents required as submittals by the Bidder during the various stages of the Project. Table 1 provides a checklist of submittals required by the Bidder as requested in the Administrative and General Provisions. Bidders shall be made aware that the documents listed in the following table do not guarantee a complete submittal package.

Table 1: Required Submittal Checklist

	BID DOCUMENT	SUBMITTAL TIMEFRAME	CONTRACT DOCUMENT REFERENCE
<input type="checkbox"/>	Contractor's Proposal	with Bid Proposal	Administrative Provisions
<input type="checkbox"/>	List of Subcontractors	with Bid Proposal	Administrative Provisions: Instructions to Bidders, Article 2, Section 2.8
<input type="checkbox"/>	Contractor's Statement of Licensure	with Bid Proposal	Administrative Provisions: Instructions to Bidders, Article 1, Section 1.6
<input type="checkbox"/>	Non-Collusion Declaration	with Bid Proposal	Administrative Provisions, under Section "Bid Proposal"
<input type="checkbox"/>	Iran Contracting Act Certification	with Bid Proposal	Administrative Provisions, under Section "Bid Proposal"
<input type="checkbox"/>	Economic Sanctions in Response to Russia's Actions in Ukraine	with Bid Proposal	Administrative Provisions, under Section "Bid Proposal"
<input type="checkbox"/>	Bid Bond (10% of Contract Price)	with Bid Proposal	Administrative Provisions: Instructions to Bidders, Article 2, Section 2.7
<input type="checkbox"/>	Project Reference Form(s) (Minimum of 5 References) Must provide all the information described on the Project Reference Form.	with Bid Proposal	Administrative Provisions: Notice Inviting Bids to Contractors, Submittal Requirements
<input type="checkbox"/>	Contractor's Statement of Qualifications Form(s)	with Bid Proposal	Administrative Provisions: Required Submittal Checklist (Table 1) and Article 3
<input type="checkbox"/>	Construction Agreement	within 5 days of Notice of Intent to Award	Administrative Provisions
<input type="checkbox"/>	Performance Bond (100% of Contract Price)	within 5 days of Notice of Intent to Award	Administrative Provisions: Instructions to Bidders, Article 4, Section 4.2
<input type="checkbox"/>	Payment Bond (100% of Contract Price)	within 5 days of Notice of Intent to Award	Administrative Provisions: Instructions to Bidders, Article 4, Section 4.2
<input type="checkbox"/>	Workers' Compensation Contractor Certificate	within 5 days of Notice of Intent to Award	Administrative Provisions, under Section "Construction Agreement, Bonds, and Other Forms"
<input type="checkbox"/>	Declaration of Sufficiency of Funds	within 5 days of Notice of Intent to Award	Administrative Provisions, under Section "Construction Agreement, Bonds, and Other Forms"
<input type="checkbox"/>	Evidence of Insurance <u>and</u> Endorsements	within 5 days of Notice of Intent to Award	Administrative Provisions: Article 4, Section 4.1.1
<input type="checkbox"/>	Construction Schedule	within 14 days of Notice of Intent to Award	Administrative Provisions: Article 4, Section 4.1.2
<input type="checkbox"/>	Schedule of Values	within 14 days of Notice of Intent to Award	Administrative Provisions: Article 4, Section 4.1.2
<input type="checkbox"/>	Affirmative Action Compliance Program (for Contractors with 50+ Employees)	within 30 days of Award of Contract	General Provisions: Section 5, Subsection 5.1.1

ARTICLE 2 - BIDDING PROCEDURES

2.1 PUBLIC OPENING OF BID PROPOSALS

Bid Proposals will be opened and read publicly at the time and place indicated in the Notice Inviting Bids to Contractors. Bidders or their authorized agents are invited to be present. Without limitation to the County's right to reject all bids received, if two or more responsive bids from bidders determined to be responsible are the same and the lowest bid received, then the successful bidder may be chosen by the County.

2.2 BID PROPOSAL FORMS

Attention of all Bidders is called to all Bid Proposal forms attached hereto and Bidders are cautioned that all Bid Proposals submitted must be accompanied by the proper declaration, properly executed and proof of acknowledgement. Bid Proposals must be made on the forms furnished by the County.

2.3 SUBMISSION OF BID PROPOSALS

All copies of the Contractor's Proposal, Bid Security, and other Bid Proposal Submittals shall be enclosed by the Bidder in a sealed opaque envelope. Said envelope, as well as any other, outer envelope or packaging in which said envelope may have been placed by Bidder or the carrier for delivery, shall be addressed and delivered as provided in the Notice Inviting Bids to Contractors.

2.4 TIMELY RECEIPT

The Bidder assumes full and sole responsibility for timely receipt of its Bid Proposal, including its Bid Security and all other Bid Submittals, at the location designated in the Notice Inviting Bids to Contractors.

2.5 DELIVERY METHOD

Submittal of Bid Proposals shall be by hand delivery or mail, only. Oral, telephonic, telegraphic, facsimile or other electronic transmission is not permitted.

2.6 INVALID BID PROPOSALS

Bid Proposals submitted by fax or e-mail and those which fail to reach the place fixed for opening of Bid Proposals prior to the date and hour set for opening same will not be considered.

2.7 BID SECURITY: BIDDER'S CASH, CHECK OR BOND

Each Bid Proposal must be accompanied by a Bid Security, in the form of cash, certified check, cashier's check, or by a Bid Bond only on the form supplied by the County, drawn in favor of the

County in an amount not less than ten percent (10%) of the Total Bid. This Bid Security shall be given as a guarantee that the Bidder, if identified on the Notice of Intent to Award, will execute and deliver the Agreement, the required Payment and Performance Bonds, and the required certificates of insurance in accordance with the Bid Proposal accepted by the County. In default of execution of the Agreement and/or delivery of said Payment and Performance Bonds and certificates of insurance, such Bid Security, the cash, Bid Bond or check, shall be held subject to payment to the County for the difference in money between the amount of the Contract with another party to perform the Work, together with the cost to the County of redrafting, redrawing and publishing documents and papers necessary to obtain new bids on said Work. The Bid Security, the cash, check or bond, shall, in addition, be held subject to all other actual damages suffered by the County. The Bid Security will be returned upon the close of the period mentioned in these instructions below and to the successful Bidder upon execution of the Agreement. NO BONDS WILL BE ACCEPTED UNLESS SUBMITTED ON THE FORM SUPPLIED BY THE COUNTY.

2.8 SUBLETTING AND SUBCONTRACTING

Bidders are required, pursuant to the Subletting and Subcontracting Fair Practices Act (commencing with Section 4100 of the Public Contract Code), to list in their Bid Proposal the name and location of place of business of each subcontractor who will perform work or labor or render services in or about the construction of the Work or improvement or a subcontractor who specially fabricates and installs a portion of the Work or improvement, in excess of one-half (½) of one percent (1%) of the prime Contractor's Total Bid. Failure to list a subcontractor for a portion of the Work means that the prime Contractor will do that portion of the Work.

2.9 DISCREPANCIES AND OMISSIONS

Discrepancies, omissions, ambiguities, or requirements likely to cause disputes shall be immediately brought to the attention of the County. When appropriate, Addenda will be issued by the County. No communication by anyone except by an Addendum affects the meaning or requirements of the Contract Documents. If at any time (before or after submittal of its Bid Proposal) the Contractor is of the opinion that there is or may be a discrepancy or inconsistency in the plans, drawings, specifications or other Contract Documents, it shall immediately report this in writing to the County and shall not proceed with any related work until ordered so to do.

2.10 ADDENDA

Interpretations, corrections, clarifications and changes to the Contract Documents will be made by Addenda. County reserves the right to issue Addenda to the Contract Documents at any time prior to the time set to open bids. Addenda will be transmitted by County to all prospective Bidders who (1) attended and signed in at the Pre-Bid Site Review meeting (if any) or (2) have submitted a written request to County for notice of Addenda to the Riverside County Department of Waste Resources at 14310 Frederick St. Moreno Valley, CA 92553, including in such request the Bidder's name and address for mailing. Each potential Bidder shall leave with the County its

name, address, and fax number for the purpose of receiving Addenda. To be considered, a Contractor's Proposal must list and take into account all issued Addenda. Failure of the Bidder to receive any Addendum shall not relieve the Bidder from any of its obligations under its Contractor's Proposal. The costs of performance by Bidder of all items of Work and other obligations contained in all Addenda issued by the County shall be deemed included in the amount of the Contractor's Proposal. The Bidder shall identify and list in its Contractor's Proposal all Addenda received and included by the County as a basis for determining its Bid Proposal non-responsive.

2.11 POSTPONEMENT

The County reserves the right to postpone the time and date for the public opening of bids as specified in the Notice Inviting Bids to Contractors by issuance of an Addendum to the Contract Documents at any time prior to the specified time and date for public opening of bids.

2.12 REJECTION OF BID PROPOSALS CONTAINING ALTERATIONS, ERASURES OR IRREGULARITIES

Bid Proposals may be rejected if they show any alterations of form, additions not called for, conditional Bid Proposals, incomplete Bid Proposals, erasures, or irregularities of any kind. Erasures or interlineations in the Bid Proposal must be explained or noted over the signature of the Bidder. The County may determine as unresponsive any Bid Proposal in which any statement or representation made or incorporated by reference in the Contractor's Proposal, including any Bid submittal comprising the Bid Proposal, is false, incorrect or materially incomplete and misleading.

2.13 DISQUALIFICATION OF BIDDERS

More than one Bid Proposal from an individual, a firm or partnership, a corporation or an association under the same or different names will not be considered. Reasonable ground for believing that any Bidder is interested in more than one Bid Proposal for the Work contemplated will cause the rejection of all Bid Proposals in which such Bidder is interested. If there is any reason for believing that collusion exists among the Bidders, none of the participants in such collusion will be considered in awarding the Contract. Bid Proposals in which the prices appear to be unbalanced may be rejected.

2.14 WITHDRAWAL OF BID PROPOSALS

Any Bid Proposal may be withdrawn at any time prior to the hour fixed in the Notice Inviting Bids to Contractors for the opening of Bid Proposals, provided that a request in writing, executed by the Bidder or its duly authorized representative, for the withdrawal of such Bid Proposal, is filed with the County. The withdrawal of a Bid Proposal shall not prejudice the right of a Bidder to file a new Bid Proposal.

ARTICLE 3 - CONSIDERATION OF BIDS

3.1 BASIS OF AWARD

It is the intent of the County to award the Contract, if it be awarded, to the lowest, responsible and qualified Bidder submitting a Bid in accordance with the requirements of the bidding documents based upon all Bid items.

A responsible Bidder is a bidder who has demonstrated the attributes of trustworthiness, as well as quality, fitness, capacity and experience of the bidder to satisfactorily perform the proposed work and satisfy the requirements of the contract. The County may determine a Bidder to be non-responsible for purposes of this proposed work, if the Board of Supervisors for the County, in its discretion, finds that the Bidder has done any such acts or omissions, including without limitation, that: (1) violated a term of a contract for any public works project, including one with the County; (2) reflects negatively on the Bidder's quality, fitness or capacity to perform a contract with the County or any public entity; (3) made any false statements or claims against the County or any public entity; (4) demonstrates or indicates a lack of business integrity or honesty including such acts or omissions that would demonstrate a pattern or practice of such negative business practices; or (5) has violated any law or regulation required of a contractor in the submission of bids to or performance under any contracts with any public entity.

3.2 NOTICE OF INTENT TO AWARD

Within five (5) to thirty (30) days following public opening and reading of Bids, the County will issue a Notice of Intent to Award identifying the name of the Bidder to whom the County intends to Award the Construction Contract. Such notice will be mailed to all Bidders submitting a Bid Proposal. The County may, in its sole and absolute discretion, elect to extend the time for its issuance of its Notice of Intent to Award.

3.3 BID PROTESTS

Any Bidder submitting a Bid Proposal to the County may file a protest of the County's proposed Award of the Construction Contract provided that each and all of the following are complied with:

1. The bid protest is in writing.
2. The bid protest is both filed with and received by Hans W. Kernkamp, General Manager – Chief Engineer at the following address, 14310 Frederick Street, Moreno Valley, CA 92553, not more than five (5) business days following the date of issuance of the Notice of Intent to Award. Failure to timely file and serve the bid protest as aforestated shall constitute grounds for the County's denial of the bid protest without consideration of the grounds stated therein.

3. The written bid protest sets forth, in detail, all grounds for the bid protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the bid protest. Any grounds not set forth in the bid protest shall be deemed waived. All factual contentions must be supported by competent, admissible and credible evidence. Any bid protest not conforming to the foregoing shall be rejected as invalid.
4. Provided that a bid protest is filed in conformity with the foregoing, the General Manager – Chief Engineer, or such individual(s) as may be designated by the General Manager – Chief Engineer in his/her discretion, shall review and evaluate the basis of the bid protest, and shall provide a written decision to the Bidder submitting the bid protest, either concurring with or denying the bid protest. The written decision of the General Manager -Chief Engineer or his/her designee shall be final, unless overturned by the Board of Supervisors.

3.4 AWARD OF CONTRACT

The County reserves the right to reject any and all Bid Proposals or to waive any irregularities. Prior to award of the Contract, and if requested by County, the Contractor agrees to meet with the County to review the details and calculations of the Contractor's Proposal and the Contractor's understanding of any aspect of the Work.

3.5 RETURN OF BID SECURITY

Upon an award of the Contract, the County will return the Bid Security accompanying those Bid Proposals that are not considered in making the award within a reasonable period of time, but not to exceed beyond 60 days from the time the award of the Contract is made by the County. All other Bid Securities will be held until the Contract has been fully executed and the required bonds and certificates of insurance have been provided by the successful Bidder, after which such Bid Securities will be returned to the respective Bidders whose Bid Proposal they accompany.

ARTICLE 4 - POST NOTICE OF INTENT TO AWARD

4.1 POST-NOTICE OF INTENT TO AWARD SUBMITTALS

Within the time periods set forth below, the successful Bidder identified in the Notice of Intent to Award as the successful Bidder shall submit the following additional Post-Notice of Intent to Award submittals, completed and signed in the manner required by the Contract Documents, to the County at 14310 Frederick Street, Moreno Valley, CA 92553:

4.1.1 Within **five (5) days** after issuance by County to Bidder of the Notice of Intent to Award and prior to contract award, such Bidder shall submit to the County the following:

- (1) Construction Agreement duly executed by the authorized delegate of the contractor;
- (2) Performance Bond and Payment Bond (issued by Surety), as set forth in Section 4.2 below;
- (3) Evidence of Insurance and Endorsements, as specified in Section 8.3 of the Contract Documents;
- (4) Workers' Compensation Certificate and Waiver of Subrogation Endorsement, in the form specified by the Contract Documents; and
- (5) Declaration of Sufficiency of Funds (required only if the Bidder has not entered into a collective bargaining agreement covering the workers to be employed for performance of the Work), in the form specified by the Contract Documents.

4.1.2 Within **fourteen (14) days** after issuance by County to Bidder of the Notice of Intent to Award and prior to commencement of the Work, such Bidder shall submit to the County the following:

- (1) Construction Schedule, prepared by Bidder in the manner required by the Technical Specifications; and
- (2) Schedule of Values, prepared by Bidder in the manner required by the Technical Specifications.

4.2 CONTRACT SECURITY - PERFORMANCE AND PAYMENT BONDS

The Contractor shall furnish two (2) surety bonds in duplicate, one as a security for the faithful performance of the Contract in the amount equal to one hundred percent (100%) of the Contract price, and one as security for the payment of all persons performing labor and furnishing materials in connection with the Contract in an amount equal to one hundred percent (100%) of the Contract

price. Both the Performance Bond and Payment Bond shall be issued by an admitted surety. The surety on the Performance Bond shall have an A.M. Best's Insurance Rating of A:VIII (A:8) or better. All bonds must be submitted on forms provided by the County. Notary acknowledgements of the signatures of the Contractor and Surety(ies) is required. The attorney-in-fact who executes the required Performance Bond and Payment Bond on behalf of the Surety shall affix thereto a certified and current copy of the power of attorney authorizing such attorney-in-fact to execute same on behalf of such Surety. Bonds submitted in any other form will not be accepted. Should any surety on the Payment Bond or Performance Bond be deemed unsatisfactory by the County, Contractor shall upon notice promptly substitute new bonds satisfactory to the County. All bonds must be issued by sureties which are licensed by the State of California to issue such bonds.

4.3 FORFEITURE FOR FAILURE TO POST SECURITY AND EXECUTE AGREEMENT

In the event the Bidder, to whom an award is made, fails or refuses to post the required bonds and provide the required certificates of insurance and fails to return executed copies of the Agreement within five (5) calendar days after the prescribed forms are presented to it for signature, the County may declare the Bidder's Bid deposit or bond forfeited as damages caused by the failure of the Bidder to post such security and execute such copies of the Agreement and may award the Work to the next lowest responsible Bidder, or may call for new bids.

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BID PROPOSAL

(This page left intentionally blank.)

CONTRACTOR'S PROPOSAL

TO THE BOARD OF SUPERVISORS OF THE COUNTY OF RIVERSIDE:

The undersigned hereby declares:

- (a) That the only persons or parties interested in this Bid Proposal as principals are the following:

(If the Contractor is a corporation, give the name of the corporation and the name of its president, secretary, treasurer, and manager. If a co-partnership, give the name under which the copartnership does business, and the names and addresses of all copartners. If an individual, state the name and address under which the Contract is to be drawn.)

- (b) That this Bid Proposal is made without collusion with any other person, firm or corporation.
- (c) That the Contractor has carefully examined the location of the proposed Work, and has familiarized itself with all of the physical, climatic or other conditions related to the Work.
- (d) That the Contractor has carefully examined all of the specifications, plans, and other Contract Documents, and makes this Bid Proposal in accordance therewith.
- (e) That, if this Bid Proposal is accepted, the Contractor will enter into a written Contract with the County of Riverside.
- (f) That the Contractor proposes to enter into such Contract and to accept in full payment for the Work actually done the prices shown in the attached schedule. It is understood that the quantities listed (except for those shown as "Final" or "Lump Sum (L.S.)") are but estimates only and final payment will be based on actual quantities whatever they may be, subject to such adjustments and alterations as elsewhere provided for in the Contract Documents.

As Bid Security, accompanying this Bid Proposal is cash, a certified check, cashier's check or Bid Bond payable to the order of the County of Riverside in the sum of:

_____ Dollars (\$_____).
[Write Out in Words Total Amount of Bid Security] [Numerical Value in Figures]

THE REQUIRED REFERENCES AND OTHER REQUIRED DOCUMENTS MUST BE
ATTACHED TO THIS BID PROPOSAL

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Contractor bids as follows for **Construction of Groundwater Wells** at the Blythe Sanitary Landfill located at 1000 Midland Road, Blythe, CA 92225 in Riverside County, California:

ITEM NO.	ITEM OF WORK	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization (Max. 5% of Contract Price)	LS	1		
2	Modify Existing Groundwater Production Wellhead	LS	1		
3	Drill and Develop Groundwater Monitoring Well	LS	1		
4	Drill, Develop, and Test Groundwater Production Well	LS	1		
5	Furnish and Install New Submersible Vertical Turbine Pump System	LS	1		
6	Furnish and Install New 12,000- Gallon Portable Water Tower with Automatic Fill	LS	1		
7	Authorized Time & Materials (T&M)	LS	1	\$25,000.00	\$25,000.00
8	Demobilization (Min. ½% of Contract Price)	LS	1		

For the Total Bid Proposal of: **TOTAL COST (State in Figures)** \$ _____

(Write out Total Bid Amount in Words), subject to additions and deductions as provided for in the Contract Documents.

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Contractor Acknowledges Receipt of Addenda No(s): _____

Name of Contractor: _____

Address: _____

Telephone: _____

Contractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

Signature: _____

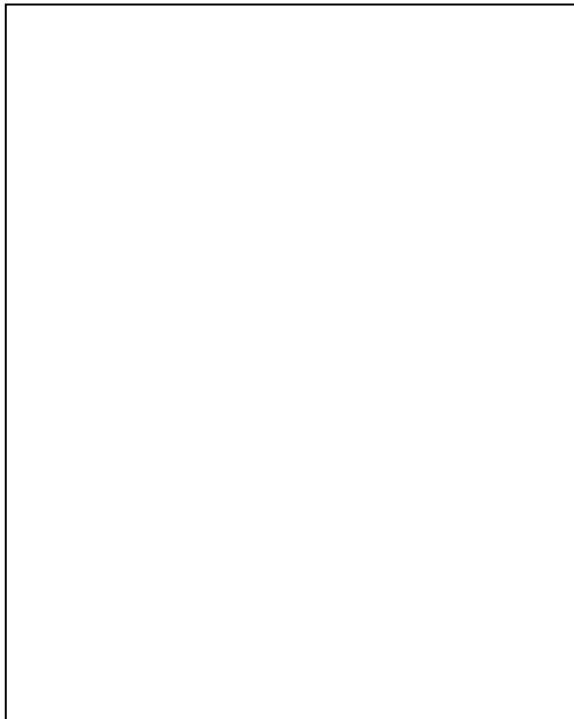
Name: _____

Title: _____

Dated: _____

If Bidder is a corporation, corporate seal and attestation shall be provided.

Space for Corporate Seal and Attestation:



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LIST OF SUBCONTRACTORS

The name and the location of the place of business of each subcontractor who will perform work or labor or render service to the Prime Contractor in or about the construction of the Work or improvement, or a subcontractor who specially fabricates and installs a portion of the Work or improvement, in an amount in excess of one-half ($\frac{1}{2}$) of one percent (1%) of the Prime Contractor's Total Bid and the portion of the Work by indicating the Item No. of the Work which will be done by each such subcontractor is as follows:

Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

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Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

Item No. (s): _____

Name of Subcontractor: _____

Phone and Fax Numbers: _____

Address: _____

Subcontractor's License No. and Classification: _____

Department of Industrial Relations (DIR) Registration Number: _____

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PROJECT REFERENCE FORM

Project Reference No. _____	
Project Name:	
Project Location:	
Scheduled Completion Date:	
Actual Completion Date:	
Contracted Project Cost: Final Project Cost: Reason for Difference:	
Did change orders exceed 10% of original contract sum? If yes, explain.	
Were any liquidated damages assessed against the Bidder on this project? If yes, explain.	
Project Owner:	
Owner's Mailing Address:	
Name of Owner's Representative:	
Representative's Email Address:	
Representative's Telephone Number:	
Name of Contractor's Superintendent/Lead:	
Brief Description of Work Performed (Describe how the Scope of Work met the Experience Criteria):	

Bidder shall provide all the project reference information requested on the Project Reference Form for the Bidder and also for any and all subcontractor(s) listed to perform any work that requires the qualifications described for this project in the Bidders Qualifications Section on page III of the Notice Inviting Bids to Contractors.

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CONTRACTOR'S STATEMENT OF QUALIFICATIONS FORM

Bidder shall complete the entire Statement of Qualifications Form and submit it with its Bid Proposal for the Project in accordance with the Instructions to Bidders. Failure to complete this Form would be grounds for immediate disqualification for this proposed work. Any explanation requested by a Bidder regarding the meaning or interpretation of this Statement of Qualification must be requested in writing and with sufficient time allowed for a written reply to reach Bidder before the submission of its Bid Proposal. Oral explanations or instructions will not be provided. Any information provided to any prospective Bidder concerning this Statement of Qualification will be furnished to all prospective Bidders as an Addendum to the Bidding Documents.

1	Has Bidder's Contractor's License been revoked or suspended by any governmental agency at any time in the last five (5) years?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
2	In the last five (5) years has the Bidder been denied an award of a public works contract based on a finding by a public agency that your company was not a responsible bidder? If YES, attach description of each instance including details and owner's name and phone number.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
3	Has the Bidder defaulted on a contract or been terminated for cause by any public agency on any project in California within the past five (5) years?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
4	In the last five (5) years has the Bidder, or any firm with which any of your company's owners, officers or partners was associated, been debarred, disqualified, removed or otherwise prevented from bidding on, or completing, any government agency or public works project for any reason? If YES, attach description of each instance including details and owner's name and phone number.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
5	Has the Bidder been assessed and paid liquidated damages pursuant to a contract for a project with a public owner within the past five (5) years? If YES, explain and indicate on a separate signed sheet(s) the project name(s), damage(s), and date(s).	<input type="checkbox"/> YES	<input type="checkbox"/> NO
6	Has a Surety completed a contract for Bidder on a public works project with any public agency within the last five (5) years?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
7	Has any insurer had to pay amounts to third parties that were in any way related to construction activities of the Bidder on a public works project for any public agency within the past five (5) years? If YES, explain and indicate on a separate signed sheet(s) the project name(s), damage(s), and date(s).	<input type="checkbox"/> YES	<input type="checkbox"/> NO
8	Has Bidder had any claims, litigation, or disputes ending in judgments, settlement, mediation or arbitration, or termination for cause associated with any project in the past five (5) years? If yes, attach description of each instance including details of total claim amount, settlement amount, and owner's name and phone number.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
9	Has Bidder been cited, fined, penalized or otherwise found to have violated any prevailing wage or labor code provision within the past five (5) years? If YES, attach description of each occurrence.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
10	In the past five (5) years, Has the Bidder or any of its owners or officers been charged and convicted of a crime under federal, state, or local law involving: <div style="margin-left: 20px;"> (1) Bidding for awarding of, or performance of a contract with a public entity; (2) Making a false claim(s) to any public entity or government agency; or (3) Fraud, theft, or other acts of dishonesty to any contracting party within the past ten (10) years? </div>	<input type="checkbox"/> YES	<input type="checkbox"/> NO

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CONTRACTOR'S STATEMENT OF LICENSURE

The undersigned does certify under oath that the information provided herein is true and sufficiently complete as not to be misleading

1. Full Legal Name of Bidder: _____
2. Legal Capacity: ☐ Corporation ☐ Partnership ☐ Individual ☐ Joint Venture ☐ Other _____
3. Address of Bidder: _____
4. How many years has the Bidder been in business as a contractor? _____
5. How many years has the Bidder been in business under its present name? _____
6. Under what other or former name have you operated? _____
7. Bidder certifies that the pocket license/certificate of licensure presented to the County as of this date is my/its own license, being State of California Contractors License No. _____; said Contractors License is current and valid; and is of a classification appropriate to the Work to be undertaken for the County, a Class _____ license.
8. List other contractors license classifications in which the Bidder holds in California _____

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated: _____

Signature: _____

Name: _____

Title: _____

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**NON-COLLUSION DECLARATION
TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID
(Public Contract Code Section 7106)**

The undersigned declares:

I am the _____ (Title) of _____ (Company),
the party making the foregoing Bid.

The Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The Bid is genuine and not collusive or sham. The Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham Bid. The Bidder has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham Bid, or to refrain from bidding. The Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the Bid price, or of that of any other Bidder. All statements contained in the Bid are true. The Bidder has not, directly or indirectly, submitted his or her Bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, Bid depository, or to any member or agent thereof, to effectuate a collusive or sham Bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a Bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the Bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on

_____ [Date], at _____ [City], _____ [State].

Signature of Declarant: _____

Printed/Typed Name of Declarant: _____

Name of Bidder: (Company): _____

Note: Notarization of signature is required
___ Check here if attachment is included

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IRAN CONTRACTING ACT CERTIFICATION

(Public Contract Code sections 2200-2208)

In accordance with Public Contract Code Section 2204(a), prior to bidding on, submitting a Bid Proposal or executing a Contract or renewal for a County of Riverside Contract for goods or services of \$1,000,000 or more, a CONTRACTOR must either:

a) Certification:

Certify it is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b) and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person, for 45 calendar days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS;

OR

b) Exemption:

Demonstrate it has been exempted from the certification requirement for that solicitation or Contract pursuant to Public Contract Code section 2203(c) or (d).

To comply with this requirement, please insert your Contractor or financial institution name and Federal ID Number (if available) and complete one of the options below. Please note: California law establishes penalties for providing false certifications, including civil penalties equal to the greater of \$250,000 or twice the amount of the Contract for which the false certification was made; Contract termination; and three-year ineligibility to bid on Contracts. (Public Contract Code section 2205.)

Option #1 – Certification

I, the official named below, certify I am duly authorized to execute this certification on behalf of the Contractor/financial institution identified below, and the Contractor/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person/vendor, for 45 calendar days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

<i>Contractor Name/Financial Institution (Printed)</i>		<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>		
<i>Printed Name and Title of Person Signing</i>		
<i>Date Executed</i>	<i>Executed in</i>	

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Option #2 – Exemption

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a Contractor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a Bid Proposal for, or enters into or renews, a Contract for goods and services.

If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

<i>Contractor Name/Financial Institution (Printed)</i>		<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>		
<i>Printed Name and Title of Person Signing</i>		
<i>Date Executed</i>	<i>Executed in</i>	

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ECONOMIC SANCTIONS IN RESPONSE TO RUSSIA'S ACTIONS IN UKRAINE

The Contractor must certify that it is not a target of economic sanctions imposed in response to Russia's actions in Ukraine imposed by the United States government or the State of California. The Contractor is required to comply with the economic sanctions imposed in response to Russia's actions in Ukraine, including with respect to, but not limited to, the federal executive orders identified in California Executive Order N-6-22, located at <https://www.gov.ca.gov/wp-content/uploads/2022/03/3.4.22-Russia-Ukraine-Executive-Order.pdf> and the sanctions identified on the United States Department of the Treasury website at (<https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information/ukraine-russia-related-sanctions>).

The Contractor is required to comply with all applicable reporting requirements regarding compliance with the economic sanctions, including, but not limited to, those reporting requirements set forth in California Executive Order N-6-22 for all parties with one or more agreements with the State of California, the County of Riverside, or any other local agency, with a value of Five Million Dollars (\$5,000,000) or more. Notwithstanding any other provision in these documents, failure to comply with the economic sanctions and all applicable reporting requirements may result in disqualification or termination of the Construction Agreement, if awarded. For contractors with an agreement value of Five Million Dollars (\$5,000,000) or more with the State of California, the County of Riverside, or any other local agency, reporting requirements include, but are not limited to, information related to steps taken in response to Russia's actions in Ukraine, including but not limited to:

1. Desisting from making any new investments or engaging in financial transactions with Russian institutions or companies that are headquartered or have their principal place of business in Russia;
2. Not transferring technology to Russia or companies that are headquartered or have their principal place of business in Russia; and
3. Direct support to the government and people of Ukraine.

To comply with this requirement, please insert your Contractor name and Federal ID Number (if available) on the Certification Form on Page XXVIII, execute by a duly authorized representative for the contractor and return with the bid proposal.

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**COMPLIANCE WITH ECONOMIC SANCTIONS IN RESPONSE TO RUSSIA'S
ACTIONS IN UKRAINE
(BIDDERS)**

Prior to bidding on, submitting a proposal, or executing a contract, a contractor must certify: 1) it is not a target of economic sanctions and 2) in compliance with economic sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any requirements related to the Russian sanctions imposed by the California Governor's Executive Order N-6-22 issued on March 4, 2022 and under state law, if any.

To comply with this requirement, please insert the Contractor name and Federal ID Number (if available), complete the information described below and execute by an authorized representative of the contractor.

CERTIFICATION

I, the authorized representative for contractor named below, certify I am duly authorized to execute this certification on behalf of the contractor below, and the contractor identified below has conducted a good faith review of existing contracts. I attest that the contractor is not a target of economic sanctions, and that contractor is in compliance with the economic sanctions imposed by the U.S. government in response to Russia's actions in Ukraine, as well as any requirements related to the Russian sanctions imposed by the California Governor's Executive Order N-6-22 issued on March 4, 2022 and under state law, if any.

<i>Contractor Name (Printed)</i>		<i>Federal ID Number (or n/a)</i>	
<i>By (Authorized Signature)</i>			
<i>Printed Name and Title of Person Signing</i>			
<i>Date</i>			

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BID BOND
(Public Work – Public Contract Code Section 20129(a))

Recitals:

1. _____ (Contractor) has submitted its Contractor's Proposal to the County of Riverside, by and for the Department of Waste Resources, for the construction of the public work known as **Construction of Groundwater Wells** at the Blythe Sanitary Landfill , in accordance with a Notice Inviting Bids to Contractors dated _____.

2. _____ a _____ corporation, hereafter called Surety, is the surety, an Admitted surety insurer pursuant to Code of Civil Procedure Section 995.120, on this Bond. The Contractor is obligated as a condition of submittal of a Bid Proposal shall submit a Bid Security pursuant to Public Contract Code §20129 in the amount of ten percent (10%) of the Bid amount, which security may be in the form of a Bid Bond issued by an Admitted surety insurer pursuant to Code of Civil Procedure Section 995.120.

Agreement: We, Contractor as principal and Surety as surety, jointly and severally agree and state as follows:

1. The amount of the obligation of this Bond is 10% of the amount of the Contractor's Proposal and inures to the benefit of County.
2. This Bond is exonerated by (1) County rejecting said Bid Proposal or, in the alternate, (2) if said Bid Proposal is accepted, Contractor executes the Agreement and furnishes the Bonds and certificates of insurance as agreed to in its Bid Proposal, otherwise it remains in full force and effect for the recovery of loss, damage and expense of County resulting from failure of Contractor to act as agreed to in its Bid Proposal.
3. Surety, for value received, stipulates and agrees that its obligations hereunder shall in no way be impaired or affected by any extension of time within which County may accept the Bid Proposal and waives notice of any such extension.
4. This Bond is binding on our heirs, executors, administrators, successors and assigns.

Dated: _____

By: _____

By: _____

Title: _____
(Surety)

Title: _____
(Contractor)

NOTE: This Bond must be executed by both parties with corporate seal affixed. All signatures must be acknowledged by a notary (attach acknowledgments).

A power of attorney for the attorney-in-fact of the Surety must be attached.

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CONSTRUCTION AGREEMENT, BONDS, AND OTHER FORMS

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CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT ("Agreement") is made as of _____ and is by and between the COUNTY OF RIVERSIDE, on behalf of its Department of Waste Resources, a political subdivision of the State of California, (County) and _____, (Contractor).

IT IS AGREED BY THE PARTIES AS FOLLOWS:

1. The Work. Contractor shall furnish all tools, equipment, apparatus, facilities, labor, supervision, services, transportation, materials and other required items necessary to perform the Work for the project, **Construction of Groundwater Wells** at the Blythe Sanitary Landfill, and Contractor shall do all things necessary to accomplish and complete the Work described in and in exact conformity with the Contract Documents, subject to such inspection as County deems appropriate.
2. Contract Documents. The Contract Documents for the project are:
 - (a) Notice Inviting Bids to Contractors;
 - (b) Instructions to Bidders;
 - (c) Contractor's Proposal, including List of Subcontractors, Contractor's Statement of Licensure, Contractor's Statement of Qualifications, Non-Collusion Declaration, Iran Contracting Act Certification;
 - (d) Bid Bond;
 - (e) Construction Agreement, including Exhibit A, Workers' Compensation Contractor Certificate, Declaration of Sufficiency of Funds, and Evidence of Insurance;
 - (f) Performance Bond;
 - (g) Payment Bond;
 - (h) General Provisions;
 - (i) Technical Specifications for the **Construction of Groundwater Wells** at the Blythe Sanitary Landfill;
 - (j) Appendix A – Landfill Site Rules;
 - (k) Appendix B – Fugitive Dust Control Requirements;
 - (l) Appendix C – Project Drawings for the **Construction of Groundwater Wells**;
 - (m) Appendix D – Existing Site Groundwater Data;
 - (n) Standard Specifications for Public Works Construction, Latest Edition, with Amendments;
 - (o) Any other documents included in or incorporated into the Contract Documents;
 - (p) Addenda Nos. _____;
 - (q) Orders, instructions, drawings and plans issued by County during the course of the Work in accordance with the provisions of the Contract Documents.

Each of the above-mentioned documents presently in existence are by this reference incorporated into this Agreement and each of these documents not now in existence are incorporated herein as of the time of their issuance.

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3. Contract Time for Completion – The Work shall be commenced on a date to be specified in a written “Notice To Proceed” to be issued by the County and shall be completed within the duration specified in the Technical Specifications. It is expressly agreed that except for extensions of time duly granted in the manner and for the reasons specified in the General Provisions, time shall be of the essence.
4. Contract Price –
 - (a) Compensation to be paid to Contractor – The County agrees to pay and the Contractor agrees to accept in full consideration for the performance of the Agreement, the sum of:

(\$ _____), subject to additions and deductions as provided for in this Agreement.
 - (b) Payment. Exhibit A is attached to and incorporated into this Agreement and states the basis for full payment to Contractor. Contractor represents that it fully understands the payment method for the Work.

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RIVERSIDE COUNTY DEPARTMENT OF
WASTE RESOURCES
14310 Frederick Street
Moreno Valley, CA 92553

By: _____
Hans W. Kernkamp
General Manager – Chief Engineer

Date: _____

COUNTY OF RIVERSIDE

By: _____
Chair, Board of Supervisors

Date: _____

ATTEST:

By: _____
Kecia Harper, Clerk of the Board

By: _____
Deputy

Date: _____

(Seal)

CONTRACTOR

By: _____

Date: _____

Name: _____

Title: _____

(If corporation, attach corporate seal)

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EXHIBIT A

(Construction Agreement for the Riverside County Department of Waste Resources, **Construction of Groundwater Wells** at the Blythe Sanitary Landfill, located in Riverside County, California.)

It is understood that the quantities listed (except for those shown as “Final” or “Lump Sum (L.S.)”) are but estimates only and final payment will be based on actual quantities whatever they may be, subject to such adjustments and alterations as elsewhere provided for in the Contract Documents.

ITEM NO.	ITEM OF WORK	UNIT	QUANTITY	UNIT COST	TOTAL COST
1	Mobilization (Max. 5% of Contract Price)	LS	1		
2	Modify Existing Groundwater Production Wellhead	LS	1		
3	Drill and Develop Groundwater Monitoring Well	LS	1		
4	Drill, Develop, and Test Groundwater Production Well	LS	1		
5	Furnish and Install New Submersible Vertical Turbine Pump System	LS	1		
6	Furnish and Install New 12,000- Gallon Portable Water Tower with Automatic Fill	LS	1		
7	Authorized Time & Materials (T&M)	LS	1	\$25,000.00	\$25,000.00
8	Demobilization (Min. ½% of Contract Price)	LS	1		

For the Total Bid Proposal of:

TOTAL COST (State in Figures) \$ _____

(Write out Total Bid Amount in Words), subject to additions and deductions as provided for in this Agreement.

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PERFORMANCE BOND

(Public Work – Public Contract Code Section 20129 (b))

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the Board of Supervisors (“Board”) for the County of Riverside, (“County”) and _____, (“Contractor”) have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

Construction of Groundwater Wells at the Blythe Sanitary Landfill

(“Contract”) which Contract dated as of the date of the last signature on the signature page and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof;

AND, WHEREAS, said Contractor, as Principal on this Bond, is required by the Contract and/or by California Public Contract Code, Section 20129 (b) to furnish a performance bond for the faithful performance of the Contract;

NOW THEREFORE, we, the Contractor and _____ (“Surety”), an admitted surety insurer pursuant to Code of Civil Procedure, Section 995.120, are held and firmly bound unto County in the penal sum of _____

Dollars (\$ _____), this amount being not less than one hundred percent (100%) of the total sum payable by County under the Contract at the time the Contract is awarded by County to the Contractor, lawful money of the United States of America, for the payment of which sum well and truly to be made, we, Contractor and Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents, to:

1. Perform all the work required to complete the Project; and
2. Pay to the County all damages the County incurs as a result of the Contractor’s failure to perform all the Work required to complete the Project.

THE CONDITION OF THIS OBLIGATION IS SUCH that if Contractor, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by and well and truly keep and perform all the undertakings, terms, covenants, conditions and agreements in the Contract, including, without limitation, all obligations during the original term and any extensions thereof as may be granted by County, with or without notice to Surety thereof (including, without limitation, the obligation for Contractor to pay liquidated damages), all obligations during the period of any warranties and guarantees of materials and workmanship

ADMINISTRATIVE PROVISIONS

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required under the Contract and all other obligations otherwise arising under the terms of the Contract (such as, but not limited to, obligations of indemnification), all within the time and in the manner therein designated in all respects according to their true intent and meaning, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period equal to the warranty and/or guarantee period of the Contract, during which time Surety's obligation shall continue if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the County from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the County's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Contractor shall be, and is declared by County to be, in default under the Contract, the Surety shall promptly either remedy the default, or, if the Contract is terminated by County or the Contractor's performance of the Work is discontinued, Surety shall promptly complete the Contract through its agents or independent contractors, subject to acceptance of such agents or independent contractors by County as hereinafter set forth, in accordance with its terms and conditions and to pay and perform all obligations of Contractor under the Contract (including without limitation, all obligations with respect to payment of liquidated damages) less the "Balance of the Contract Price" (as hereinafter defined); subject to the penal amount of this bond as set forth above. The term "Balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Contractor by County under the Contract and any modifications thereto, less the amount previously paid by County to the Contractor and less amounts that County is authorized to withhold under the terms of the Contract.

If County determines that completion of the Contract by Surety or its agents or independent contractors must be performed by a lowest responsible bidder selected pursuant to a competitive bidding process, then Surety shall comply with such processes in accordance with the requirements of County and applicable laws. Unless otherwise approved by District, in the exercise of its sole and absolute discretion, Surety shall not utilize Contractor in completing performance of the Work.

No right of action shall accrue on this bond to or for the use of any person or entity other than County or its successors or assigns.

In the event any legal proceeding or arbitration is brought upon this bond by County and judgment or award is entered in favor of County as the prevailing party, Surety shall pay all costs and attorney's fees incurred by the County.

Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

(This page left intentionally blank.)

Surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, shall in any way impair or affect Surety's obligation under this bond, and Surety does hereby waive notice of any such changes, extensions of time, alterations or additions.

Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the Contract, and suit may be brought against Surety and such other sureties, joint and severally, or against any one or more of them or against less than all of them, without impairing County's rights against the others.

Signature provisions on following page:

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Affix Seal if Corporation

(Firm Name – Contractor)

(Business Address)

By _____

(Original Signature)

(Title)

(Corporation Name – Surety)

Affix Corporate Seal

(Business Address)

By _____

(Signature – Attached Notary's Acknowledgment)

ATTORNEY-IN-FACT

(Title-Attach Power of Attorney)

Note: Notary acknowledgment of signatures of Bidder and Surety, and Surety's Power of Attorney, must be included or attached

(This page left intentionally blank.)

PAYMENT BOND

(Public Work - Civil Code Sections 9550 et seq.)

KNOW ALL PERSONS BY THESE PRESENTS:

WHEREAS, the Board of Supervisors ("Board") for the County of Riverside, ("County") and _____, ("Contractor") have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to perform the following project:

Construction of Groundwater Wells at the Blythe Sanitary Landfill

("Contract") which Contract dated as of the date of the last signature on the signature page and all of the Contract Documents attached to or forming a part of the Contract, are hereby referred to and made a part hereof; and

WHEREAS, pursuant to law and the Contract, said Contractor is required by the Contract and/or by Division 3, Part IV, Title XV, Chapter 7 (commencing at Section 9550 et seq.) of the California Civil Code to furnish a payment bond in connection with the Contract;

NOW THEREFORE, we, the Contractor and _____ ("Surety"), an admitted surety insurer pursuant to Code of Civil Procedure, Section 995.120, are held and firmly bound unto County in the penal sum of _____

Dollars (\$ _____), this amount being not less than one hundred percent (100%) of the total sum payable by County under the Contract at the time the Contract is awarded by County to the Contractor, lawful money of the United States of America, for the payment of which sum well and truly to be made, we, Contractor and Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if Contractor, its heirs, executors, administrators, successors, or assigns approved by County, or its subcontractors, of any contracting tier, shall fail to pay any person or persons named in California Civil Code, Section 9554, then Surety will pay for the same, in or to an amount not exceeding the penal amount hereinabove set forth, and also will pay to the prevailing party if suit is brought upon this bond, reasonable attorney's fees as provided in California Civil Code, Section 9564.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under section 9100 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

(This page left intentionally blank.)

Surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the Work to be performed thereunder, nor any rescission or attempted rescission of the Contract or this bond, nor any conditions precedent or subsequent in the bond or Contract attempting to limit the right of recovery of any claimant otherwise entitled to recover under the Contract or this bond shall in any way impair or affect Surety's obligation under this bond, and Surety does hereby waive notice of any such changes, extensions of time, alterations or additions.

Surety is not released from liability to those for whose benefit this bond has been given, by reason of any breach of the Contract by County or Contractor

Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the Contract, and suit may be brought against Surety and such other sureties, joint and severally, or against any one or more of them or against less than all of them, without impairing County's rights against the others.

Signature provisions on following page:

(This page left intentionally blank.)

Affix Seal if Corporation

(Firm Name – Contractor)

(Business Address)

By

(Original Signature)

(Title)

(Corporation Name – Surety)

Affix Corporate Seal

(Business Address)

By

(Signature – Attached Notary's Acknowledgment)

ATTORNEY-IN-FACT

(Title-Attach Power of Attorney)

Note: Notary acknowledgment of signatures of Bidder and Surety, and Surety's Power of Attorney, must be included or attached

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WORKERS' COMPENSATION CONTRACTOR CERTIFICATE

(Labor Code Sections 1860, 1861 & 3700)

In accordance with the provisions of Section 3700 of the Labor Code, every Contractor shall secure compensation in one or more of the following ways:

- (a) By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state.
- (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or as one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees.
- (c) I For any county, city, city and county, municipal corporation, public district, public agency, or any political subdivision of the state, including each member of a pooling arrangement under a joint exercise of powers agreement (but not the state itself), by securing from the Director of Industrial Relations a certificate of consent to self-insure against workers' compensation claims, which certificate may be given upon furnishing proof satisfactory to the director of ability to administer workers' compensation claims properly, and to pay workers' compensation claims that may become due to its employees. On or before March 31, 1979, a political subdivision of the state which, on December 31, 1978, was uninsured for its liability to pay compensation, shall file a properly completed and executed application for a certificate of consent to self-insure against workers' compensation claims. The certificate shall be issued and be subject to the provisions of Section 3702.

Labor Code Section 1861 requires each Contractor to whom a public works Contract is awarded shall sign and file with the County the following certification prior to performing the Work of the public works construction Contract:

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

By signing this certification, the Contractor understands the requirements of and agrees to comply with the aforementioned requirements.

Name of Contractor: _____

By: _____

Title: _____

(This page left intentionally blank.)

DECLARATION OF SUFFICIENCY OF FUNDS
(California Labor Code Section 2810)

I, the undersigned, an authorized representative of _____ (“Bidder”) with authority to make the statements contained in this Declaration on behalf of Bidder, hereby declare the following:

1. The Bidder’s employer identification number for state tax purposes is:

_____.

2. The Bidder’s workers’ compensation insurance policy number is:

_____.

and the name, address, and telephone number of the insurance carrier providing said insurance is:

_____.

_____.

3. The following information is provided concerning any and all vehicles that are owned by the Bidder and that will be used for transportation in connection with any service provided for the performance of the Work that is the subject of the Bidder’s Bid [Insert information requested. Attach additional sheets, if needed.]:

<i>Vehicle</i>	<i>Vehicle ID #</i>	<i>Vehicle. Liability Insurance Policy Number (of policy covering vehicle)</i>	<i>Name, Address and Telephone Number of Vehicle Liability Insurance Carrier (issuing policy covering vehicle)</i>

4. The following is the address of any real property that will be used to house workers in connection with the performance of the Work that is the subject of the Bidder’s Bid [If no such housing will be provided, enter “none”]:

_____.

_____.

(This page left intentionally blank.)

5. The actual or estimated number of workers that will be employed to perform the Work that is the subject of the Bidder's Bid, the total amount of wages to be paid to said workers, and the dates on which said wages will be paid are as follows [Attach additional sheets, if needed.]:

<i>Total Number of Workers</i>	<i>Total Amount of Wages</i>	<i>Date(s) for Payment of Wages</i>

6. Check only one of the following boxes, as applicable:

- ☐ The statement of number of workers declared in Paragraph 5, above, is a statement of the actual number of workers that will be employed.
- ☐ The actual number of workers requested in Paragraph 5, above, is unknown and therefore the statement of number of workers declared therein is based on the Bidder's best estimate available at the time of submitting its Bid, rather than the actual number of workers that will be employed and if and when the actual number of workers and the other information requested above is available, it will be reported to the County of Riverside by Bidder in writing.

7. The actual or estimated total number of persons who will be utilized as independent Contractors to perform the Work of the Project that is the subject of the Bidder's Bid (together with their known, current local, state, and federal Contractor license identification numbers that each is required to have under local, state or federal laws or regulations) are as follows [Attach additional sheets, if needed.]:

<i>List of Independent Contractors</i>	<i>Current Local, State and Federal Contractor License Identification Number</i>

(This page left intentionally blank.)

8. Check only one of the following boxes, as applicable:

- ☐ The statement of number of independent Contractors declared in Paragraph 7, above, is a statement of the actual number of independent Contractors that will be utilized.
- ☐ The actual number of independent Contractors requested in Paragraph 7, above, is unknown and therefore the statement of number of independent Contractors declared therein is based on the Bidder's best estimate available at the time of submitting its Bid, rather than the actual number of independent Contractors that will be utilized, and if and when the actual number of independent Contractors and the other information requested above is available, it will be reported to the County of Riverside by Bidder in writing.

I, the undersigned, declare under penalty of perjury that the foregoing statements are within my personal knowledge and are true and correct. Executed on this _____ day of _____, in the year 20__ at _____, California.

(Signature)

Type Name of Signer:

Type Name of Bidder:

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GENERAL PROVISIONS

FOR THE

CONSTRUCTION OF GROUNDWATER WELLS

AT THE

BLYTHE SANITARY LANDFILL

JULY 2022

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SECTION 1 - DEFINITION OF TERMS

1.1. TERMS

Whenever in these specifications, or in any documents or instruments where these specifications govern, the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

- a) **AGENCY:** Whenever used in the Standard Specifications shall refer to County.
- b) **BOARD OF SUPERVISORS:** The Board of Supervisors of the County, also sometimes referred to as the Board.
- c) **CONTRACT DOCUMENTS.** The Contract Documents shall mean to contain and include all the documents listed in the Construction Agreement entered into between the County and the Contractor.
- d) **DEPARTMENT, COUNTY, OR OWNER:** The County of Riverside, by and for the Department Of Waste Resources.
- e) **ENGINEER:** The General Manager - Chief Engineer of the Riverside County Department of Waste Resources, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.
- f) **LABORATORY:** The laboratories authorized by the County to test materials and work involved in the contract.
- g) **BIDDER:** Any individual, firm or corporation submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.
- h) **CONTRACTOR:** The person or persons, co-partnership or corporation, private or municipal, who have entered into the Agreement with the County, or his or their legal representatives.
- i) **SUPERINTENDENT:** The executive representative of the Contractor, present on the work at all times during progress, authorized to receive and execute instruction from the County.
- j) **PLANS or PROJECT DRAWINGS:** The official plans, profiles, typical cross sections, general cross sections, working drawings, and supplemental drawings, or exact reproductions thereof, approved by the County, which show the location, character, dimension and details of the work to be done, and which are to be considered a part of the Contract Documents.
- k) **SPECIFICATIONS:** The directions, provisions, and requirements contained in the Contract Documents as to the method and manner of performing the work or to the quantities and qualities of materials to be furnished under the contract.
- l) **CONTRACT:** The written Agreement covering the work.

- m) **CONTRACT PRICE:** Shall mean either the lump sum, unit price, or unit prices named in the Agreement, or the total of all payments under the contract at the lump sum, unit price, or unit prices, as the case may be.
- n) **SURETY OR SURETIES:** The bondsmen or party or parties, approved by the County, who may guarantee the fulfillment of the contract by bond, and whose signatures are attached to said bond.
- o) **RIGHT OF WAY:** The whole right of way which is reserved for and secured for use in constructing the improvement.
- p) **THE WORK:** All the work specified in the Contract Documents.

1.2. SIMILARITY OF WORDS

Wherever in the specifications or upon the plans the words directed, required, permitted, ordered, designated, prescribed, or words of like import are used, it will be understood that the direction, requirements, permission, order, designation, or prescription of the County is intended, and similarly the words approved, acceptable, satisfactory, or words of like import, shall mean approved by, or acceptable to, or satisfactory to, the County, unless otherwise expressly stated.

SECTION 2 - SCOPE OF WORK

2.1. WORK TO BE DONE

The Contractor shall provide all labor, power, light, water, materials, equipment, tools, scaffolding, machinery, transportation, insurance, permits, bonds, temporary protection, watchmen, and superintendence necessary to construct and complete all work, and to furnish all materials included in the contract, except those furnished by the County as specifically stated in the Contract Documents. The Contract Documents are complementary, and the work called for by any one shall be as binding as if called for by all.

2.2. CONSTRUCTION SCHEDULE

The Contractor shall submit to the County at least monthly, or at such times as may be requested by the County, a schedule which shall show the order and dates in which the Contractor proposes to carry on the various parts of the work, including estimated completion dates. The County's receipt of such schedule(s) shall not indicate any concurrence by the County in the items or dates described in the schedule(s).

2.3. DRAWINGS AND SPECIFICATIONS ON THE WORK

The Contractor shall keep one copy of all drawings and specifications on the work, in good order, available to the County and its representatives.

2.4. ESTIMATE OF QUANTITIES

It is understood that the quantities listed (except for those shown as "Final" or "Lump Sum") are but estimates only and final payment will be based on actual quantities for the work whatever they may be, subject to such adjustments and alterations as elsewhere provided for in the Contract Documents. The County is not to be held responsible for the accuracy of the estimate of quantities. The Contractor shall judge for himself, after considering all circumstances and conditions, the costs and quantities of materials involved in the work.

The Contractor shall not at any time assert that there was any misunderstanding in regard to the nature of the work or the kind or amount of materials to be furnished for the work. The Contractor shall not ask, demand, sue for, or seek to recover compensation in excess of the costs or charges for the work as stated in the Agreement.

2.5. PROTESTS

If the Contractor considers any work demanded of it to be outside of the requirements of the contract, the Contractor shall immediately and before the start of such work state this in writing to the County. In such writing, the Contractor shall clearly and in detail state the basis of its protest. Except for such protests as are made of record in the manner herein specified, the records, rulings, instruction, or decisions of the County shall be final and conclusive. Written protest by the Contractor shall not in any way relieve the Contractor from proceeding with the work as directed by the County.

2.6. ALTERATIONS

The Contractor agrees that reasonable alterations and modifications may be made by the County and that this may be done without notice to the sureties on the Contractor's bonds. If such changes result in increased or decreased quantities under the items specified in the Agreement, the Contractor will be paid on the basis of actual quantities as measured by the County; and such changes shall not affect the unit prices bid by the Contractor.

2.7. EXTRA WORK

2.7.1. General

The County reserves and shall have the right to revise the details of the contemplated work, or to add work of a different character or function, and have the Contractor perform such revised or added work as "Extra Work", when such extra work is considered by the County to be appurtenant to the satisfactory completion of the project. "Extra Work" is defined as added work of a different character or function and for which no basis for payment is prescribed; or that work which is indeterminate at the time of advertising and is specifically designated as extra work. The signing of the contract by the Contractor will be deemed to be an agreement on his part to perform extra work, as and when ordered by the County. If required extra work results in delay to the work, the Contractor will be given an appropriate extension of time.

The General Manager – Chief Engineer shall have the authority to approve changes or additions in the work in accordance with Public Contract Code 20142 without Board of Supervisors approval.

2.7.2. Procedure for Extra Work

Extra work may not be done by the Contractor without prior request and proper written approval by the County. Upon decision of the County to have extra work performed, the County will so inform the Contractor, acquainting it with the details of the new work. The Contractor shall thereupon present in writing a price for said work to the County, whose written approval shall be secured before work is started; except that the County may order the Contractor to proceed with extra work in advance of the submission of such prices provided that preliminary estimates show that the cost will not exceed \$1,000.

Prices for extra work shall be prepared by the Contractor on one or both of the following methods, as requested by the County, and submitted to the County for approval:

For a stated unit price or lump sum amount based upon current prevailing fair prices for materials, labor, plant, overhead and profit.

On a cost plus 15 percent basis (force account by the Contractor). The cost of all work done by the Contractor on a cost plus 15 percent basis will be computed in the manner described in Section 7, and the compensation thus provided shall be full payment to the Contractor related to the extra work.

Upon receipt of the Contractor's price, the County will make an analysis thereof and in its discretion adopt one of the following procedures:

Accept the Contractor's price for lump sum or unit price amount in the original or amended form and direct it to proceed with the work; or direct it to perform the work on a cost plus 15 percent basis.

Have the work performed by County's forces or by separate contract.

Direct the Contractor to proceed with the work and accept payment therefore in the amount as adjudicated later in a court of law.

The price agreed to by the Contractor for the extra work shall be full compensation to the Contractor for all labor, materials, equipment or other costs related to the extra work.

2.8. PAYMENT FOR EXTRA WORK

At the end of each month the Contractor shall make and deliver to the County a statement of the cost of the extra work completed during the current month, itemized and in a form satisfactory to the County. Payment for extra work shall be added to the monthly partial payment made in accordance with Section 7.5 of the General Provisions.

2.9. RIGHTS OF WAY

The County shall provide the rights of way as specifically described in the Contract Documents upon which the work under this contract is to be done, except that the Contractor shall provide land required for the erection of temporary construction facilities and storage of his material, together with right of access to same.

2.10. CLEANING UP

The Contractor shall, as directed by the County, remove from the County's right of way and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations.

SECTION 3 - CONTROL OF THE WORK

3.1. AUTHORITY OF THE COUNTY

The County shall have general supervision of the contract under authority of the Board of Supervisors. The County has the authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the contract. The County shall decide all questions which may arise as to the quality or acceptability of materials furnished, work performed, and rate or progress of the work; all questions which may arise as to the interpretation of the plans and specifications; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions as to compensation. The County's determination and decision thereon shall be final and conclusive.

3.2. DETAIL DRAWINGS

The approved plans shall be supplemented by such working drawings as are necessary to control the work adequately. All authorized alterations affecting the requirement and information given on the approved plans shall be in writing. No changes shall be made to any plan or drawing after the same has been approved by the County, except by its written direction.

Approval by the County of the Contractor's working drawings (or other documents) does not relieve the Contractor of responsibility for accuracy of dimensions, details or other requirements of the Contract Documents. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of his working drawings with the approved plans and specifications. Full compensation for furnishing all working drawings shall be considered as included in the prices paid for the various contract items of work, and no additional allowance will be made therefore.

3.3. CONFORMITY WITH PLANS AND ALL ALLOWABLE DEVIATIONS

Except as otherwise specifically stated in the Contract Documents, finished surfaces in all cases shall conform exactly to the elevations, lines, grades, cross-sections, and dimensions shown or described in the Contract Documents. Any deviations must be authorized in advance in writing by the County.

3.4. INTERPRETATION OF PLANS AND SPECIFICATIONS

Should it appear that the work to be done is not sufficiently detailed or explained in the Contract Documents, the Contractor must bring this to the County's attention in writing prior to submittal of the Contractor's Proposal.

In the event of any discrepancy between any drawings and the figures written thereon, the figures shall be taken as correct. The Contractor will not be allowed to take advantage of errors and omissions in the drawings and specifications. When errors or omissions are found, they shall immediately be brought to the attention of the other party in writing.

3.5. SUPERINTENDENCE

The Contractor shall keep on his work, continually during its progress, a competent Superintendent responsible for the construction of the work, as well as any necessary assistants. All such persons

shall be acceptable to the County continuously throughout the duration of the project. The Superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the Contractor.

3.6. LINES AND GRADES

The Contractor shall provide opportunities and facilities for setting points and making measurements as requested by the County or otherwise as reasonably required. The Contractor shall not proceed until it has made timely demand upon the County for, and has received from the County, such lines and grades as may be necessary as the work progresses. The work shall be done in strict conformity with such lines and grades.

The Contractor shall carefully preserve benchmarks, reference points and stakes, and in case of willful or careless destruction, the Contractor shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their loss or disturbance.

3.7. INSPECTION OF WORK

The County and its representatives shall at all times have access to the work and shall be furnished with every reasonable opportunity for ascertaining that the materials and workmanship are in accordance with the requirements of the Contract Documents. All work done and all materials furnished shall be subject to the County's inspection and approval.

The inspection of the work by any County representatives shall not relieve the Contractor of any of its obligations to fulfill the requirements of the Contract Documents. Defective work or unsuitable materials may be rejected, notwithstanding that such work or materials may have been previously overlooked by County representatives, accepted, or estimated for payment.

3.8. REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK

All work which has 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 or replacement. Any work done beyond the lines and grades as described by the Contract Documents, or any extra work done without proper written authority, will be considered as unauthorized and will not be paid for. Work so done may be ordered removed at the Contractor's expense. Upon failure on the part of the Contractor to comply, the County shall have authority to cause defective or unauthorized work to be remedied, or removed and replaced, and to deduct the costs for this work from any monies due or to become due the Contractor.

3.9. EQUIPMENT AND PLANT

Equipment not suitable to produce the quality of work required will not be permitted to operate on the project. Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient material to carry the work to completion within the time limit. The Contractor shall provide adequate and suitable equipment and plant to meet these requirements and, when ordered by the County, shall immediately remove unsuitable equipment from the work and discontinue the operation of unsatisfactory plants. No worn or obsolete equipment shall be used, and in no case shall the maker's rating of the capacity for any equipment be exceeded. All vehicles used to haul materials over existing highways shall be equipped with pneumatic tires.

3.10. FINAL INSPECTION

The County will not make the final inspection until all the work provided for and contemplated by the contract has been fully completed and the final clean up has been performed.

SECTION 4 - CONTROL OF MATERIAL

4.1. COUNTY FURNISHED MATERIALS

The Contractor shall furnish all materials required to complete the work, except those specified in the Contract Documents to be furnished by the County. Any materials furnished by the County will be delivered to the Contractor at the points specified in the Contract Documents. The Contractor will be held responsible for all materials so delivered to him, and deductions will be made from any monies due Contractor to make good any shortages and deficiencies, from any cause whatsoever, which may occur after such delivery, or for any demurrage charges due to delinquency in unloading.

4.2. SOURCE OF SUPPLY AND QUALITY OF MATERIALS

At the option of the County the source of supply of any materials shall be approved by the County before the delivery is started. Only materials conforming to the exact requirements of the Contract Documents and approved by the County shall be used in the work. All materials proposed for use may be inspected or tested by the County at any time during their preparation and use. If it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources. No material which, after approval, subsequently becomes unfit for use shall be used in the work.

Wherever the name, or brand, or manufacturer of an item is specified, it is used as a measure of quality and utility or a standard. Except in those instances where the product is designated to match others presently in use, or as otherwise stated in the Contract Documents, specifications calling for a designated material, product, thing or service by specific brand or trade name shall be deemed to be followed by the words "or equal" so that the Contractor may propose in the Contractor's bid any equal material, product, thing or service. If the Contractor desires to use any other brand or manufacturer of equal quality or utility to that specified, he shall list definite particulars of that which it considers equivalent to the specified item in its bid. The County will then determine whether or not the proposed name brand or article is equal in quality and utility to that specified, and the County's determination in that regard shall be final and binding upon the Contractor.

4.3. SAMPLES AND TESTS

All tests of materials furnished by the Contractor shall be made by the County in accordance with commonly recognized standards of national organizations for this type of landfill project, and such special methods and tests as are in use at the County's approved laboratory or otherwise determined by the County to be needed. The County shall determine what testing is needed.

Field tests of materials will be made by the County or its representative when deemed necessary as determined by the County; and these tests shall be made in accordance with standard practices of the County or as otherwise needed.

The Contractor shall furnish samples of all materials as requested by the County without charge. No material shall be used until it has been approved by the County. Samples will be secured and tested whenever necessary as determined by the County to determine the quality of the material.

Promptly after the approval of the contract, the Contractor shall notify the County of the proposed sources of supply of all materials to be furnished by it, using a form which will be supplied by the County upon request.

Whenever reference is made to standard tests or requirements of the County, the American Society for Testing Materials, the American Railway Engineering Association or the American Association of State Highway Officials, the reference shall be construed to mean the standards that are in effect at the date the Agreement is signed with subsequent amendments, changes, or additions as thereafter adopted and published by the organization referred to.

None of the provisions stated in this section shall relieve the Contractor of its obligations as stated elsewhere in the Contract Documents.

4.4. DIGGING TRENCHES OR OTHER EXCAVATIONS

Any Work that involves digging trenches or other excavations extending deeper than four feet below the surface, then the following terms shall apply:

1. Contractor shall promptly, and before the following conditions are disturbed, notify the County, in writing, of any:
 - a) 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.
 - b) Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids.
 - c) 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.
2. The County 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 in the Contract.
3. In the event that a dispute arises between the County 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 by the contract, but shall proceed with all work to be performed under the contract. 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 contracting parties.

4. Contractor shall submit to County, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. Prior to any excavation is commenced, County shall accept said plan. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer.
5. Nothing in this section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders.
6. Nothing in this section shall be construed to impose tort liability on the awarding body or any of its employees.

4.5. STORAGE OF MATERIALS

Materials shall be so stored as to ensure the preservation of their quality and fitness for the work. When considered necessary by the County, they shall be placed on wooden platforms or other hard, clean surfaces and not on the ground. They shall be placed under cover when so directed by the County. Stored materials shall be so located as to facilitate prompt inspection.

4.6. DEFECTIVE MATERIALS

All materials not conforming to the exact requirements of the Contract Documents shall be considered as defective; and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the work. No rejected materials, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the County. Upon failure on the part of the Contractor to comply forthwith with any order of the County made under the provisions of this article, the County shall have authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

4.7. ASSIGNMENT OF CLAIMS

In submitting a bid on this public works project, or any subcontractor agreeing to supply goods, services, or materials, and entering a contract pursuant thereto, the Contractor and/or subcontractors do offer and agree to assign to the County 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. Section 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

SECTION 5 - LEGAL RELATIONS AND RESPONSIBILITY

5.1. LAWS TO BE OBSERVED

5.1.1. Compliance with Applicable Law

Reference to and/or incorporation into the Contract Documents of a particular law, statute, ordinance, rule or regulation is not, nor is it intended to be, a definitive statement of the law applicable to the Contract Documents and the accomplishment of the work. Contractor must keep informed as to all such applicable laws - Federal, State, County, Municipal - as they affect the conduct of the work and comply with such law, including, but not limited to, having requisite licenses, obtaining necessary permits, paying necessary fees and taxes, posting notices and installing, operating and maintaining safety precautions and facilities. It is likewise Contractor's responsibility to see to it that its subcontractors also fully comply with such applicable laws. Contractor shall protect and defend County, its officers, agents, employees and contractors against any claim or liability arising from or based upon any alleged violation of such applicable law.

5.1.2. Labor Code

The Contractor shall comply with all applicable requirements of the California Labor Code including but not limited to Labor Code, Chapter 2, Subchapter 1, Article 10, Required Apprentices on Public Works Contracts. Reference is made to Chapter 1, Part 7, Division 2 of the California Labor Code (commencing with Section 1720). By this reference said Chapter 1 is incorporated herein with like effect as if it were here set forth in full. The parties recognize that said Chapter 1 deals with, among other things, discrimination, penalties and forfeitures, their disposition and enforcement, wages, working hours and securing workers' compensation insurance and directly affect the method of prosecution of the work by Contractor and subject it under certain conditions to penalties and forfeitures. Execution of the Agreement by the parties constitutes their agreement to abide by said Chapter 1. Their stipulation as to all matters which they are required to stipulate to by the provisions of said Chapter 1, constitutes Contractor's certification that he is aware of the provisions of said Chapter 1 and will comply with them and further constitutes Contractor's certification as follows: "I am aware of the provisions of Section 3700 of the California Labor Code which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this contract." Contractor and his subcontractors shall comply with the provisions of the Labor Code regarding apprentices. Contractor shall post at each job site during the course of the work a copy of County's "Determination of Prevailing Wage Rate". Copies of this Determination are available from County and at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>.

5.1.3. Equal Employment Opportunity

The Contractor shall comply with all applicable non-discrimination and equal employment laws. The Contractor shall not discriminate in his recruiting, hiring, promotion, demotion or termination practices on the basis of race, religious creed, color, national origin, ancestry, sex, age or physical handicap in the performance of this contract and shall comply

with the provisions of the California Fair Employment Practice Act (commencing with S1410 of the Labor Code), the Federal Civil Rights Act of 1964 (P.L. 88-352) and all amendments thereto, Executive Order No. 11246 (30 Federal Register 12319), as amended, and all administrative rules and regulations issued pursuant to said Acts and Order. See particularly 41 Code of Federal Regulation (CFR) Chapter 60.

Contractor shall require each of its subcontractors to comply with the preceding paragraph and shall include in each subcontract language similar to the preceding paragraph.

Contractor shall permit access to its records of employment, employment advertisement, application forms and other pertinent data and records (including but not limited to certified payroll information) by County and any state or federal agency having jurisdiction for the purpose of investigation to ascertain compliance with this Section.

County may assign an affirmative action representative to monitor Contractor and his subcontractor(s) conduct required by this section, including the right of entry to the construction site for the purpose of obtaining information from persons performing work on the project providing such inspection does not interfere with the progress of the work.

Elsewhere in the Contract Documents more specific requirements may be contained covering the same subject matter of this Section. If so, such more specific requirements prevail over this section in case of conflict.

Transactions of \$10,000 or under - Contracts and subcontracts not exceeding \$10,000 are exempt from the requirements of this section. No Contractor or subcontractor shall procure supplies and/or services in less than usual quantities to avoid applicability of this section. With respect to contract and subcontracts for indefinite quantities, this section applies unless the amount required in any one year under such contract will reasonably be expected not to exceed \$10,000.

Transactions in Excess of \$10,000, but less than \$50,000 - At County's request, Contractor shall certify that he has in effect an affirmative action plan and agrees to comply with all state and federal laws and regulations regarding Fair Employment Practices. Contractor shall maintain a written copy of his affirmative action plan and furnish County a copy of the Plan upon request. County may require Contractor to complete an Affirmative Action Compliance Report, on a form furnished by County, setting forth definite goals during the term of this contract.

Transactions of \$50,000 or more - If Contractor has 50 or more employees and a contract for \$50,000 or more, he shall develop and submit to County within 30 days after award, a written affirmative action compliance program providing in detail specific steps to guarantee equal employment opportunity. Contractor shall include in his affirmative action program a table of job classifications, which table shall include but need not be limited to job titles, duties and rates of pay.

Contractor shall in each subcontract let to do a portion of the work covered hereunder, where the subcontractor involved has 50 or more employees and the subcontract is for \$50,000 or more, impose in the subcontract the above requirements.

For the purpose of determining the number of employees, the average of the Contractor's or his subcontractor's employees from the 12 month period immediately prior to award, or the total number of employees contractor or its subcontractor will have when performing this contract, whichever is higher, shall be used.

Federally Assisted Construction - If this project is a federally assisted construction project, then the contract provisions contained 41 CFR S60-1.4(b) are incorporated herein and Contractor shall likewise incorporate said provisions in each subcontract entered into by Contractor to perform the work. Federally assisted construction is identified as such in the Notice Inviting Bids.

5.1.4. Registration of Contractors

In order to be considered, a prospective bidder must be licensed in accordance with Division 3, Chapter 9 (commencing with Section 7000) of the Business and Professions Code.

5.1.5. Accident Prevention

Particular attention shall be given to relevant Division of Industrial Safety Construction and Electrical Safety Orders. Said Orders are contained in Title 8 of the California Code of Regulations, Chapter 4, Subchapters 4 and 5. Specific attention shall be taken of the California Occupational Safety and Health Act of 1973 (commencing with Section 6300 of the Labor Code) and the Federal Occupational Safety and Health Act of 1970 (P.L. 91-596) and rules and regulations issued pursuant to said Acts. Specific reference is made to Article 6 of said Construction Safety Orders. Contractor shall submit to County, in advance of excavation a detailed plan showing the design of shoring, bracing, sloping of the sides of trenches, or other provisions to be made for protection of personnel during earthwork operations. In event the Contractor's plan does not conform to the shoring system requirement of Article 6, the contractor's proposed shoring design shall be prepared and signed by a civil or structural engineer registered in the State of California. The Contractor shall also impose these requirements on all subcontractors involved and enforce compliance therewith. The duties here set forth are nondelegable by Contractor.

5.2. CONTRACTOR'S RESPONSIBILITY

Contractor is under the absolute duty in fulfilling his contractual obligations hereunder to proceed, and cause his subcontractors to proceed, in a safe, workmanlike manner, with adequate safeguards for the protection of the public, the workmen and persons from time to time inspecting the work. If at any time Contractor finds any of his subcontractors are allowing work to proceed in an unsafe manner or contrary to the terms of the Contract Documents, Contractor shall immediately cause such action to stop and immediately take all action necessary to protect workmen, inspectors and the general public and cause the work to proceed in a safe manner or in accordance with the terms of the Contract Documents.

5.3. CONTRACTOR'S RESPONSIBILITY FOR WORK

Until the formal final acceptance of the completed work by the County, the Contractor shall have the charge and care of the work and shall bear the risk of injury or damage to any part of the work by the action of the weather or from any other cause, whether or not arising from the execution of

the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work.

5.4. PROPERTY RIGHTS IN MATERIALS

Nothing in the contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or the soil. All such materials shall become the property of the County upon being so attached or affixed.

5.5. PERMITS AND LICENSES

The Contractor shall procure all permits and licenses (including but not limited to: National Pollution Discharge Elimination System (NPDES) and Air Quality Management District (AQMD) permit requirements), pay all charges and fees, and give all notices necessary and incident to prosecution of the work.

5.6. ROYALTIES AND PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the County and its duly authorized representatives, from all suits at law, or actions of every nature for, or on account of, the use of any patented materials, equipment, devices, or processes.

5.7. SANITARY PROVISIONS

Necessary conveniences, properly secluded from public observation, shall be provided by the Contractor where needed for the use of laborers on the work. Their location, construction and maintenance shall be subject to the approval of the County. The Contractor shall obey and enforce such sanitary regulations as may be prescribed by the State Department of Health or other authorities having jurisdiction.

5.8. PUBLIC SAFETY

The Contractor at its own expense shall furnish, erect, and maintain such fences, barriers, lights, and signs as are necessary to give adequate warning to the public at all times that the work is under construction; and the Contractor shall erect such warning and directional signs and employ such flagmen as are required and shall maintain same throughout the construction period. Full compensation for the work involved in carrying out the precautionary measures above specified shall be considered as included in the prices paid for the various contract items of work and no additional payment will be made therefore.

5.9. USE OF EXPLOSIVES

When the use of explosives is necessary for the prosecution of the work, the Contractor shall use the utmost care not to endanger life or property. All explosives shall be stored in accordance with the provisions of Division II Part I, Chapter 3, of the Health and Safety Code of the State of California and other applicable laws or regulations.

5.10. PROVISIONS FOR EMERGENCIES

Unusual conditions may arise on the work which will require that immediate and unusual provisions be made to protect the public from danger or loss or damage to life or property, and it is part of the service required of the Contractor to make such provisions and to furnish such protection.

The Contractor shall use such foresight and shall take such steps and precautions as its operations make necessary to protect the public from danger or damage, or loss of life or property.

Whenever work is undertaken pursuant to this Section, Contractor shall promptly file with County a verified report setting forth the nature of the emergency and the action taken by the Contractor by reason of the emergency.

Whenever, in the opinion of the County, an emergency exists against which the Contractor has not taken sufficient precaution for the safety of the public or the protection of utilities or of adjacent structures or property which may be injured or damaged because of the Contractor's work; and, in the opinion of the County, immediate action shall be considered necessary in order to protect public or private, personal or real property interests, or prevent likely loss of human life or damage; then the County may provide suitable protection to said interests by causing such work to be done and material to be furnished as, in the opinion of the County, may seem reasonable and necessary. The cost and expense of all such emergency work shall be borne by the Contractor, and if he shall not pay said cost and expense upon presentation of the bills therefore, duly certified by the County, then said cost and expense will be paid by the County and shall thereafter be deducted from any amounts due or which may become due said Contractor. Failure of the County, however, to take such precautionary measures, shall not relieve the Contractor of its full responsibility for public safety.

5.11. UNFORESEEN DIFFICULTIES

The risk of all loss or damage, except as noted in Section 8.4, arising out of the work, or from any unforeseen obstructions or difficulties which may be encountered during the progress of the work, or from the action of the weather, or from encumbrances in the line of work, shall be the responsibility of the Contractor.

5.12. ACCESS TO THE WORK

Unless provided for in the Special Provisions, access to the work from existing roads shall be provided by the Contractor at its expense and maintained in a manner so as not to create a public nuisance. The County assumes no responsibility for the condition or maintenance of any existing road or structure thereon that may be used by the Contractor for performing the work or for traveling to and from the site of the work. No additional payment will be made to the Contractor for constructing any temporary road used for construction operations or for improving, repairing, or maintaining any existing road or structure thereon that may be used by the Contractor for performance of the work under these specifications. The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of construction work.

5.13. GUARANTEE OF WORK

All work shall be guaranteed by Contractor for a period of two (2) years from the recordation of the Notice of Completion against any defects, including but not limited to those resulting from the use of inferior materials, equipment, or workmanship. Upon notice from County, Contractor shall promptly remedy such defects at its expense, including payment to County of its expenses in connection with such defects; otherwise County shall proceed to remedy such defects and Contractor shall reimburse County for its expenses.

This guarantee is in addition to any specific guarantee(s) provided for elsewhere in the Contract Documents or provided by manufacturers or suppliers.

5.14. SURETY OF GUARANTEE

The performance of guarantee and conditions specified in Section 5.13., shall be secured by a surety bond which shall be delivered by the Contractor to the County prior to the date on which final payment is made to the Contractor. Said bond shall be in an approved form and executed by a surety company or companies satisfactory to the County, in the amount of 10 percent of the final contract price. Said bond shall remain in force for the duration of the guarantee period specified in Section 5.13. Instead of providing such a bond as described above, the Contractor may, at its option, provide for the performance bond furnished under the contract to remain in force for said amount until the expiration of said guarantee period; and the amount of said performance bond may be reduced to 10 percent of the final contract price beginning at the time of recordation of the Notice of Completion.

5.15. DAMAGES BY ACT OF GOD

If the construction of the project herein is damaged, which damage is determined to have been proximately caused by an act of God, in excess of 5% of the contract amount, provided that the work damaged is built in accordance with applicable building standards and the plans and specifications, then the County may, without prejudice to any other right or remedy, terminate the contract.

SECTION 6 - PROSECUTION AND PROGRESS

6.1. PROGRESS OF THE WORK

The Contractor shall begin the work within ten (10) calendar days after the date of receipt by Contractor of notice to proceed from the County and shall diligently and continuously prosecute the same to completion within the time limit provided in the Special Provisions.

6.2. OVERTIME WORK AND WORK AT NIGHT

The Contractor shall conduct the work on a five (5) day, forty (40) hour work week with no work on legal holidays (as further described in the Special Provisions). If the Contractor feels it is necessary to work more than the normal 40 hour work week, he will make a written request for permission from the County, outlining the reasons for such request. The decision of granting permission for overtime work shall be in the sole discretion of the County; and the decision of the County shall be final. If granted, a condition will be imposed requiring the Contractor to pay the County the cost incurred at overtime rates for additional inspection and engineering time required in connection with the overtime work.

When any work is performed at night, only such classes of work shall be done as can be properly inspected. Adequate light must be provided for the safety of the workers and for proper inspection.

6.3. SUBCONTRACTING

Reference is made to the Subletting and Subcontracting Fair Practice Act contained in the California Public Contract Code (commencing with Section 4100). By this reference, said Act is incorporated herein with like effect as if it were here set forth in full and the parties shall abide by its terms and substitution shall be only as allowed by that Act. County reserves the right to approve all subcontractors whether or not they are required to be listed in the Contractor's Proposal.

Contractor shall be responsible for the acts and omissions of its subcontractors and shall make certain that at all times its subcontractors comply with the terms of the Contract Documents and applicable law. Where a portion of the work which has been subcontracted by the Contractor is not being prosecuted in a manner satisfactory to the County, the subcontractor shall be removed immediately on the request of the County and shall not again be employed on the work.

The Contractor shall give its personal attention to the fulfillment of the contract and shall keep the work under its control. The Contractor shall perform with its own organization work of a value amounting to not less than 50 percent of the remainder obtained by subtracting from the total original contract value the sum of any item designated herein or in the Special Provisions as Specialty Items. The furnishing and placing of reinforcing steel, when placing is performed by the supplier, will be considered as a Specialty Item for this purpose; however, he shall be designated in the list of subcontractors. The value of the work subcontracted will be based on the contract item bid price, if any subdivision of a contract unit is subcontracted, the entire unit shall be considered as subcontracted.

6.4. CHARACTER OF WORKMEN

If any subcontractor or person employed by the Contractor shall fail or refuse to carry out the directions of the County or shall appear to the County to be incompetent or to act in a disorderly or improper manner, he/she shall be discharged immediately upon the request of the County and such person shall not again be employed on this work.

6.5. TEMPORARY SUSPENSION OF THE WORK

The County shall have the authority to suspend the work wholly or in part, for such period as the County may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as the County may deem necessary due to the failure on the part of the Contractor to properly perform the work. The Contractor shall immediately comply with the order of the County to suspend the work wholly or in part. The work shall be resumed when conditions are favorable or methods are corrected, as ordered or approved by the County.

6.6. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

The Contractor shall complete the work called for under the contract in all parts and requirements within the number of working days specified in the Special Provisions. Liquidated damages shall apply as stated in the Special Provisions.

A working day is hereby defined as any day (except Saturdays, Sundays, legal holidays, and days on which the Contractor is specifically required by the Special Provisions to suspend construction operations) on which the Contractor is not prevented by inclement weather or resulting conditions from proceeding with at least 60 percent of the normal labor and equipment force engaged in the controlling operation or operations for at least five hours.

The County will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days specified for completion of the contract, and the number of working days remaining to complete the contract. The Contractor will be allowed one week in which to file a written protest setting forth in what respects the weekly statement is incorrect, otherwise the statement shall be deemed to have been accepted by the Contractor as correct.

The following holidays will be considered as legal holidays: New Year's Day; Martin Luther King Jr. Birthday, Lincoln's Birthday; Washington's Birthday (observed); Memorial Day; Independence Day; Labor Day; Columbus Day; Veteran's Day; Thanksgiving Day; Christmas; and such other days as are declared County holidays by ordinance passed by the Board of Supervisors. Please refer to specific holiday dates listed in the Detailed Provision Section 01 1400 – Work Restrictions.

Contractor acknowledges that failure to perform in strict accordance with the Contract Documents and within the time limits specified in the Special Provisions will cause County to suffer special damages in addition to cost of completion of the work in accordance with the provisions of the Contract Documents. Such special damage could include, but is not limited to, lease and rental cost, additional salaries and overhead, interest during construction, attorney expense, additional engineering, inspection expense, cost of maintaining or constructing alternate facilities, and injury to the property of the County or others. Such special damage could also include penalties assessed

against the County by other governmental agencies for failure to have the project completed in a timely manner or as required by law. The County may withhold from any money due or that may become due the Contractor under the contract such amount as the County may elect to offset the damages incurred. Any withholding or failure to withhold shall not in any way limit recovery for damages actually incurred.

It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the time specified, the County (in its sole discretion) shall have the right to extend the time for completion or not. If the County decides to extend the time limit for the completion of the contract, the County shall further have the right to charge to the Contractor and to deduct from the Contractor's payment all or any part of the actual cost of engineering, inspection, superintendence, and other related expenses caused by the Contractor's failure to complete the project as required. Liquidated damages shall apply as stated in the Special Provisions.

6.7. DELAYS AND EXTENSION OF TIME

If delays are caused by unforeseen causes beyond the control of either the Contractor or the County, such as war, strikes, fire, floods, or other action of the elements that are unreasonable under the circumstances involved and not within the contemplation of the parties, such delays will entitle the Contractor to an equivalent extension of time for the completion of the contract but not damages or additional payments over the contract price. Furthermore, if the Contractor suffers any delay caused by the failure of the County to furnish the necessary right of way or materials agreed to be furnished by it, or by failure to supply necessary plans or instructions concerning the work to be done after written request therefore has been made, the Contractor shall be entitled to an extension of time equivalent to the time lost for any of the above-mentioned reasons herein this Section 6.7 but shall not be entitled to any damages for such delay.

6.8. ASSIGNMENT

The contract may be assigned only upon prior written consent of the County. Such written consent to sublet, assign or otherwise dispose of any portion of the contract, shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the contract.

6.9. TERMINATION OF CONTRACT

If the Contractor fails to begin delivery of material and equipment or to commence work within the time specified herein, or to maintain the rates of delivery of materials, or to execute the work in the proper manner, written notice by the County may be served upon the Contractor demanding compliance with the contract. If the Contractor refuses or neglects to comply with such notice within five (5) working days after receipt of the notice, then the County may take possession of the work, together with all material and equipment thereon, and may complete the work itself in the manner the County determines to be appropriate. The cost of the completion of the work shall be charged against the Contractor and its surety and may be deducted from any money due to the Contractor; and if the sums due under the contract are insufficient, the Contractor and/or its surety shall pay to the County within five (5) working days after the completion of the work all of such cost in excess of the contract price.

SECTION 7 - PAYMENT

7.1. SCOPE OF PAYMENTS

The compensation described in the Agreement shall be complete and full payment to the Contractor for furnishing all materials, labor, tools, equipment and related items necessary to complete the work; and for all obligations imposed upon the Contractor pursuant to the Contract Documents. 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.

7.1.1. Measurement and Computation of Quantities

Unless otherwise stated, all items of the work to be paid for at a contract price per unit of measurement will be measured by the County in accordance with United States Standard Measures. A ton shall mean 2,000 pounds, avoirdupois. Except as otherwise expressly provided in the specifications, the methods of measurement and computation of quantities will be determined by the County.

The weights of metalwork, and other metal parts to be paid for by weight will be determined by the County on the basis of handbook weights, scale weights, or manufacturer's catalog weights, or in the absence of any of the foregoing, on the basis of estimated weights; provided, that weights of nonmetallic coatings will be excluded.

7.1.2. Payment at Contract Prices

The contract price for an item of the work shall include full compensation for all costs of that item, including the costs of any work, materials and equipment incidental to the item but not specifically shown or described in the Contract Documents.

The contract prices shall include full compensation for all costs of any work, materials, and equipment required by the Contract Documents, but not covered by a contract price or otherwise expressly made the subject of direct payment.

7.2. PAYMENT AND COMPENSATION FOR ALTERED QUANTITIES

When alterations in plans or quantities of work are ordered and performed, the Contractor agrees to accept payment in full at the contract unit price for the actual quantities of work done; and no additional payment will be made for anticipated profits.

7.3. FORCE ACCOUNT PAYMENT

When extra work is to be paid for on a force account basis, compensation will be determined as follows:

7.3.1. Work Performed by Contractor

The Contractor will be paid for labor, materials, and equipment rental as hereinafter provided, except where agreement has been reached to pay in accordance with Section 7.3.2. Only materials incorporated in the work will be paid for.

To the total computed as provided in Section 7.3.1.1, 7.3.1.2 and 7.3.1.3 will be added the following percentages:

Labor -- 24 percent
Materials -- 15 percent
Equipment Rental -- 15 percent

It is understood labor, materials, and equipment may be furnished by the Contractor or by the subcontractor or by others on behalf of the Contractor.

When extra work paid for on a force account basis is performed by forces other than the Contractor's organization, the Contractor shall reach agreement with such other forces as to the distribution of the payment made by the County for such work and no additional payment therefore will be made by the County.

7.3.1.1. Labor

The Contractor will be paid the cost of labor for the workmen (including foremen when authorized by the County), used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor, subcontractor, or other forces, will be the sum of the following:

7.3.1.1.1. Actual Wages

The actual wages paid shall include any employer payments to or on behalf of the workmen for health and welfare, pension, vacation, and similar purposes.

7.3.1.1.2. Labor Surcharge

To the actual wages as defined in Section 7.3.1.1.1., will be added a labor surcharge set forth in the Special Provisions, which labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workmen, other than actual wages as defined in Section 7.3.1.1.1 and subsistence and travel allowance as specified in Section 7.3.1.1.3.

7.3.1.1.3. Subsistence and Travel Allowance

Subsistence and travel allowance paid to such workmen as required by collective bargaining agreements.

7.3.1.2. Materials

The cost of materials incorporated in the work will be the cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier thereof, except as the following are applicable:

- (a) If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the County notwithstanding the fact that such discount may not have been taken.
- (b) If the materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to such purchaser, the cost of such materials shall be deemed to be the price paid to the actual supplier as determined by the County. No markup except for actual costs incurred in the handling of such materials will be permitted.
- (c) If the materials are obtained from a supply or source owned wholly or in part by the purchaser, payment therefore will not exceed the price paid by the purchaser for similar materials furnished from said source on contract items or on the current wholesale price for such materials delivered to the job site whichever price is lower.
- (d) If the cost of such materials is, in the opinion of the County, excessive, then the cost of such materials shall be deemed to be the lowest current wholesale price at which such materials are available in the quantities concerned delivered to the job site, less any discounts as provided in Section 7.3.1.2(a).
- (e) If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof, the cost shall then be determined in accordance with Section 7.3.1.2(d).

The County reserves the right to furnish such materials as it deems advisable, and the Contractor shall have no claims for costs and profit on such materials.

7.3.1.3. Equipment Rental

The Contractor will be paid for the use of equipment at the rental rates listed for such equipment in the Special Provisions regardless of ownership and any rental or other agreement, if such may exist, for the use of such equipment entered into by the Contractor. If it is deemed necessary by the County to use equipment not listed in the Special Provisions, a suitable rental rate for such equipment will be established by the County. The Contractor may furnish any cost data which might assist the County in the establishment of such rental rate.

The rental rates paid as above provided shall include the cost of fuel, oil, lubrication, supplies, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Operators of rented equipment will be paid for as provided under Section 7.3.1.1. All equipment shall, in the opinion of the County, be in good working condition and suitable for the purpose for which the equipment is to be used.

Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable

rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

Individual pieces of equipment or tools having a replacement value of \$25.00 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore.

Rental time will not be allowed while equipment is inoperative due to breakdowns. In computing the rental time of equipment, less than 30 minutes shall be considered ½ hour.

7.3.1.3.1. Equipment on the Work

The rental time to be paid for equipment on the work shall be the time the equipment is in operation on the extra work being performed, and in addition, shall include the time required to move the equipment to location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location, except that moving time will not be paid for if the equipment is used at the site of the extra work on other than such extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made if the equipment is used at the site of the extra work on other than such extra work.

7.3.1.3.2. Equipment not on the Work

For the use of equipment moved in on the work and used exclusively for extra work paid for on a force account basis, the Contractor will be paid the rental rates listed in the Special Provisions or as agreed to as provided in Section 7.3.1.3 and for the cost of transporting the equipment to the location of the work and its return to its original locations, all in accordance with the following provisions:

- (i) The original location of the equipment to be hauled to the location of the work shall be agreed to by the County in advance.
- (ii) The County will pay the costs of loading and unloading such equipment.
- (iii) The cost of transporting equipment on low bed trailers shall not exceed the hourly rates charged by established haulers.
- (iv) The cost of transporting equipment shall not exceed the applicable minimum established rates of the Public Utilities Commission.

- (v) The rental period shall begin at the time the equipment is unloaded at the site of the extra work, shall include each day that the equipment is at the site of the extra work, excluding Saturdays, Sundays, and legal holidays unless the extra work is performed on such days, and shall terminate at the end of the day on which the County directs the Contractor to discontinue the use of such equipment. The rental time to be paid per day will be in accordance with the following:

Hours In	Hours to be Paid
0	4
0.5	4.25
1	4.5
1.5	4.75
2	5
2.5	5.25
3	5.5
3.5	5.75
4	6
4.5	6.25
5	6.5
5.5	6.75
6	7
6.5	7.25
7	7.75
8	8
Over 8	Hours in operation

When hourly rates are listed, less than 30 minutes of operation shall be considered to be ½ hour of operation.

When daily rates are listed, payment for ½ day will be made if the equipment is not used. If the equipment is used, payment will be made for one day.

The minimum rental time to be paid for the entire rental period on an hourly basis shall not be less than 8 hours or if on a daily basis shall not be less than one day.

- (vi) Should the Contractor desire the return of the equipment to a location other than its original location, the County will pay the cost of transportation in accordance with the above provisions, provided such payment shall not exceed the cost of moving the equipment to the work.
- (vii) Payment for transporting, loading and unloading equipment, as above provided, will not be made if the equipment is used on the work in any other way than upon extra work paid for on a force account basis.

7.3.2. Work Performed by Special Forces or Other Special Services

When the County and the Contractor, by advance agreement, determine that a special service or an item of extra work cannot be performed by the forces of the Contractor or those of any of his subcontractors, such service or extra work item may be performed by a specialist. Invoices for such service or item of extra work on the basis of the current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide such complete itemization. In those instances wherein a Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the job site, the charges for that portion of the extra work performed in such facility may, by agreement, be accepted as a specialist billing.

To the specialist invoice price, less a credit to the County for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent in lieu of the percentages provided in Section 7.3.1.

7.3.3. Records

The Contractor shall maintain his records in such manner as to provide a clear distinction between the direct costs of extra work paid for on a force account basis and the costs of other operations.

The Contractor shall furnish the County (on a form provided by the County) report sheets in duplicate of each day's extra work paid for on a force account basis no later than the working day following the performance of said work. The daily report sheets shall itemize the materials used, and shall cover the direct costs of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor, or other forces, except for charges described in Section 7.3.2. The daily report sheets shall provide names or identifications and classifications of workmen, the hourly rate of pay and hours worked, and also the size, type and identification number of equipment, and hours operated.

Materials charges shall be substantiated by valid copies of vendor's invoices. Such invoices shall be submitted with the daily report sheets, or if not available, they shall be submitted with subsequent daily report sheets. Should said vendor's invoices not be submitted within 15 days after acceptance of the work, the County reserves the right to establish the cost of such materials at the lowest current wholesale prices at which said materials are available in the quantities concerned delivered to the location or the work, less any discounts provided in Section 7.3.1.2 (a).

Daily report sheets shall be signed by the Contractor or its authorized agent.

The County will compare its records with the daily report sheets furnished by the Contractor, make any necessary adjustments, and compile the costs of work paid for on a force account basis on daily extra work report forms furnished by the County. When these daily extra work reports are agreed upon and signed by both parties, they shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on a later audit.

The Contractor's cost records pertaining to work paid for on a force account basis shall be open to inspection or audit by representatives of the County, during the life of the contract and for a period of not less than 18 months after the date of acceptance thereof, and the Contractor shall retain such records for that period. Where payment for materials or labor is based on the cost thereof to forces other than the Contractor, the Contractor expressly guarantees that the cost records of such other forces shall be open to inspection and audit by representatives of the County on the same terms and conditions as the cost records of the Contractor. If an audit is to be commenced more than 60 days after the acceptance date of the contract, the Contractor will be given a reasonable notice of the time when such audit is to begin.

7.3.4. Payment

Payment as provided above in Sections 7.3.1 and 7.3.2 shall constitute full compensation to the Contractor for performance of work paid for on a force account basis and no additional compensation will be allowed therefore.

7.4. ACCEPTANCE

The work shall be inspected for final acceptance by the County promptly upon receipt of notice in writing from the Contractor that the completed work is ready for such inspection.

7.5. PARTIAL PAYMENTS

On or about the last day of each month, the County shall make an estimate in writing of the total amount of work done by the Contractor to the time of such estimate and the value thereof. The County shall retain 5 percent (5%) of such estimated value of the work or partial payment for the fulfillment of the contract by the Contractor.

After deducting all previous payments and all sums to be kept or retained under the provisions of the contract or applicable law, the County shall make monthly progress payments to the Contractor. No such estimate or payment shall be required to be made when, in the judgment of the County, the work is not proceeding properly. No payment shall be required to be made by the County unless and until all required submittals have been delivered to the County, including but not limited to the following: certified payroll information (at a frequency specified in the Special Provisions, if project is a prevailing wage contract), construction schedule updates as listed in Section 2.2, and National Pollution Discharge and Elimination System permit requirements and frequencies as stated in Special Provisions.

In accordance with Public Contract Code Section 22300 and other applicable law, the Contractor may substitute securities for any monies withheld to ensure performance under the contract. Such substitution shall be made only upon a separate agreement between the County Board of Supervisors and the Contractor which contains terms and conditions in compliance with all laws applicable to monies withheld under the contract.

7.6. DELAYED PAYMENTS

All the monies due the Contractor under the contract will be paid by the Treasurer of the County of Riverside, prepared and approved as required by law; and it is understood that any delay in the preparation, approval and payment of these demands will not constitute a breach of the County's obligations.

7.7. FINAL PAYMENT

The County, after completion of the work, and submittal of any final documents or reports required by the Special Provisions, shall make a final estimate in writing to the County Board of Supervisors of the amount of work done and the value of such work; and pursuant to order of the Board of Supervisors the County shall pay the sum found to be due after deducting therefrom all previous payments and all amounts to be kept and retained under the provisions of the contract or applicable law. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. The withheld retention funds shall not be due and payable to the Contractor until the expiration of thirty-five (35) days after the date of approval by the Board of Supervisors and recordation of the notice of completion.

The Contractor agrees that no certificate given or payments made under the contract except the final payment and approval by the Board of Supervisors shall be conclusive evidence of the performance of the contract. No payment shall be construed to be an acceptance of any defective work or improper materials.

The Contractor agrees that payment of the final amount due under the contract will be withheld until the guarantee of work as required in Section 5.13 herein is accepted by the County in approved form.

The Contractor's agreement to the final payment shall release the County, including its officers, employees, agents and contractors, from any and all claims from the Contractor for further or additional compensation related to the work.

7.8. CLAIMS RESOLUTION – CLAIMS UP TO \$375,000

In accordance with Public Contract Code Section 20104 - 20104.8 and other applicable law, public works claims of \$375,000 or less which arise between the Contractor and the County shall be resolved following the statutory procedure.

7.8.1. Submission of Claims

All claims shall be submitted in writing and accompanied by substantiating documentation. Claims must be filed before processing of the final payment unless other notice requirements are provided in the contract. "Claim" means a separate demand by the claimant for (1) a time extension, (2) payment of money or damages arising from work done by or on behalf of the claimant and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled, or (3) an amount the payment of which is disputed by the County.

7.8.1.1. Claims under \$50,000.00

The County shall respond in writing to the claim within 45 days of receipt of the claim, or, the County may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the County may have against the claimant. If additional information is needed thereafter, it shall be requested and provided upon mutual agreement of the County and the claimant. The County's written response shall be submitted 15 days after receiving the additional documentation, or within the same period of time taken by the claimant to produce the additional information, whichever is greater.

7.8.1.2. Claims over \$50,000.00 but less than or equal to \$375,000.00

The County shall respond in writing within 60 days of receipt, or, may request in writing within 30 days of receipt of the claim, any additional documents supporting the claim or relating to defenses or claims the County may have against the claimant. If additional information is needed thereafter, it shall be requested and provided pursuant to mutual agreement between the County and the claimant. The County's response shall be submitted within 30 days after receipt of the further documents, or within the same period of time taken by the claimant to produce the additional information or documents, whichever is greater.

7.8.2. Meet and Confer

If the claimant disputes the County's response, or if the County fails to respond within the statutory time period, the claimant may so notify the County within 15 days of the receipt of the County's response or within fifteen (15) days of the County's failure to respond within the time prescribed, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon such demand, the County shall schedule a meet and confer conference within 30 days for settlement of the dispute.

7.8.3. Filing of Claims

If following the meet and confer conference, the claim or any portion thereof remains in dispute, the claimant may file a claim pursuant to Government Code 900 et seq. and Government Code 910 et seq. For purposes of those provisions, the time within which a claim must be filed shall be tolled from the time the claimant submits the written claim until the time the claim is denied as a result of the meet and confer process, including any time utilized for the meet and confer conference.

7.8.4. Mediation and Judicial Arbitration

If a civil action is filed to resolve any claim, the provisions of Public Contract Code 20104.4 shall be followed providing for nonbinding mediation and judicial arbitration.

7.8.5. Location for Filing of Claims, Jurisdiction

Any legal action related to the performance of the work or the terms of the Contract Documents shall be filed only in the Superior Court of the State of California located in Riverside, California.

7.9. CLAIMS RESOLUTION – ALL CLAIMS (PUBLIC CONTRACT CODE SECTION 9204)

This section is intended to help resolve disputes between the parties related to this project. Such disputes shall be brought to the attention of the County at the earliest possible time, so that such disputes may be promptly resolved, if possible, or other appropriate action or investigation may be promptly undertaken. Claims must be filed on or before the date of final payment as required in Public Contract Code Section 20104.2. Public works claims which arise between the Contractor and the County shall be resolved using the following procedure:

7.9.1. Claim

A “claim” means a separate demand by the Contractor sent by registered mail or certified mail return receipt requested for one or more of the following: (a) a time extension including, without limitation, for relief from damages or penalties for delay assessed by the County; (b) payment by the County of money or damages arising from work done by or on behalf of the Contractor and payment for which is not otherwise expressly provided or to which the Contractor is not otherwise entitled; (c) payment of an amount that is disputed by the County. The Contractor shall furnish reasonable documentation to support the claim.

7.9.2. Form and Contents of Claim(s)

The Contractor shall furnish reasonable documentation to support the Claim, which shall be sent by registered mail or certified mail with return receipt requested to the Department at the address provided herein this Section 7.10. The Contractor’s written Claim must include, but not limited to, the following:

- 1) A statement to identify that it is a Claim under this Section 7.10, on a company letterhead, and a request for a decision on the Claim;
- 2) A detailed description or narrative of pertinent events, act, error, omission, unforeseen condition, event or other circumstance giving rise to the Claim;
- 3) Citation to contract provisions;
- 4) Theory of entitlement that provides a detailed justification for any remedy or relief sought by the Claim. This includes, but not limited to: a detailed cost breakdown, invoices, material tickets, staff logged time, summary of quantities, other cost records and total cost calculations;
- 5) Complete pricing of all cost impacts;
- 6) A time impact analysis of all time delays that shows actual time impact on the critical path; and
- 7) Documentation, Department letters, notifications, related drawings and photos supporting items (1) through (6).

The Claim must be verified under penalty of perjury by Contractor’s project superintendent as to the Claim’s accuracy, and shall be priced like a Change Order, and must be updated at regular intervals as to cost and entitlement if a continuing Claim. Routine contract materials, for example, correspondence, RFI, Change Order requests, or payment requests

shall not constitute a Claim. Contractor shall bear all costs incurred in the preparation and submission of a Claim.

Claims and support documentation related must be sent to:

Hans W. Kernkamp, General Manager – Chief Engineer
14310 Frederick St., Moreno Valley, CA 92553

7.9.3. Claims Procedure

- 1) Upon receipt of a Claim and the supporting documentation, the Department shall conduct a reasonable review of the Claim and within forty-five (45) days, or an extended period as may be set by mutual agreement of the Department and Contractor, provide the Contractor with a written statement identifying what portion of the Claim is still disputed and what portion is undisputed.
- 2) Notwithstanding the time period set forth in C. 1) above, if the Department needs approval from the Board of Supervisors to provide the Contractor with a written statement identifying the disputed portion and the undisputed portion of the Claim, and the Board of Supervisors does not meet within the forty-five (45) days or within the mutually agreed to extension of time following receipt of the Claim, the Department shall have up to three (3) days following the next duly publicly noticed meeting of the Board of Supervisors after the forty-five (45) day period, or extension, expires to provide Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim.
- 3) Any payment due on the undisputed portion of the Claim under this section shall be processed and made within sixty (60) days after the Department issues its written statement. Amounts not paid in a timely manner as required by this Section 7.10 shall bear interest at 7 percent per annum. If the Department fails to issue a written statement, the Claim shall be deemed rejected in its entirety. Failure by the Department to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A Claim that is denied by reason of the Department's failure to have responded to the Claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.
- 4) If the Contractor disputes the Department's written response, or if the Department fails to respond within the time prescribed, the Contractor may demand in writing, sent by registered mail or certified mail return receipt requested, an informal meet and confer conference for settlement of the portion of the Claim in dispute. Upon receipt of the demand, the Department shall schedule a meet and confer conference within thirty (30) days.

- 5) Within ten (10) business days following the conclusion of the meet and confer conference, if the Claim or any portion thereof remains in dispute, the Department shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion shall be processed and made within sixty (60) days after the Department issues its written statement. Any disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the Department and Contractor sharing the associated costs equally. The Department and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator.
- 6) For purposes of this section, mediation includes any nonbinding process, including but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute with resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section. Unless otherwise agreed to by the Department and the Contractor in writing, the mediation conducted pursuant to this Section 7.10 shall excuse any further obligation under Section 20104.4 of the Public Contract Code to mediate after litigation has been commenced.
- 7) If mediation is unsuccessful to resolve all issues, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside of this section and the requirements of Public Contract Code § 9204. The Claim resolution procedures in this Section do not preclude the Department from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article does not resolve the parties' dispute.
- 8) Following the procedures set forth in this Section 7.10, including the mediation, if the Claim or any portion of it remains in dispute, the Contractor may file a Claim as provided in Chapter 1 (commencing with § 900) and Chapter 2 (commencing with § 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.
- 9) If the Government Code claim is denied, Contractor may file an action in court. If a civil action is filed to resolve any claim, such action shall be subject to the provisions of Public Contract Code Sections 9204 or 20104.4 and shall be followed, providing for non-binding mediation and judicial arbitration. This Section applies only to claims subject to Public Contract Code Sections 9204 or 20104. If a claim is not subject to Public Contract Code Sections 9204 or 20104, the Contractor's right to file a civil action shall be as otherwise provided by law.

7.9.4. Subcontractor Claim(s)

If a subcontractor or a lower tier subcontractor has a Claim, the Contractor may present to the Department a Claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the Contractor present a Claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the Claim be presented to the Department shall furnish reasonable documentation as set forth in Section 7.10 to support the Claim. Within forty-five (45) days of receipt of this written request, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the Department, and if the Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so

7.9.5. Venue

Any legal action related to the performance of the work or the terms of the Contract Documents shall be filed only in the Superior Court of the State of California located in Riverside, California.

7.9.6. Consistency with Public Contract Code Sections 9204 and 20104

If any Claim(s) arising under this Contract is subject to the provisions of Public Contract Code Sections 9204 or 20104 et seq. (Div. 2, Part 3, Chapter 1, Article 1.5), and if provisions of those statutory sections require a procedure or procedural element different from that established in this Contract, then the provisions of those statutory sections shall apply in place of the conflicting procedure or procedural element established herein.

SECTION 8 - GENERAL

8.1. COOPERATION BETWEEN CONTRACTORS

The Contractor shall fully cooperate and coordinate its work with all utility and public agency representatives engaged in construction, relocation, altering or otherwise rearranging any facilities interfering with the progress of the work, and with any other contractors working at or near the project site. Full compensation for any delay or inconvenience to the Contractor's operation due to such operations shall be considered included in the prices for the other items of work and no additional allowance will be made therefore.

8.2. HOLD HARMLESS / INDEMNIFICATION

CONTRACTOR shall indemnify and hold harmless the County of Riverside, its Agencies, Districts, Special Districts and Departments, their respective directors, officers, Board of Supervisors, elected and appointed officials, employees, agents and representatives from any liability claim, action, or damages whatsoever, based or asserted upon any services of CONTRACTOR, its officers, employees, subcontractors, agents or representatives arising out of or in any way relating to this Agreement, including but not limited to property damage, bodily injury, or death or any other element of any kind or nature whatsoever arising from the performance of CONTRACTOR, its officers, agents, employees, subcontractors, agents or representatives relating to this Agreement. CONTRACTOR shall defend, at its sole expense and pay all costs and fees including, but not limited to attorney fees cost of investigation, defense and settlements or awards, the County of Riverside, its Agencies, Districts, Special Districts and Departments, their respective directors, officers, Board of Supervisors, elected and appointed officials, employees, agents and representatives in any claim or action to which this indemnification and hold harmless obligation applies.

With respect to any action or claim subject to indemnification herein by CONTRACTOR, CONTRACTOR shall, at their sole cost, have the right to use counsel of their own choice and shall have the right to adjust, settle, or compromise any such action or claim without the prior consent of COUNTY; provided, however, that any such adjustment, settlement or compromise in no manner whatsoever limits or circumscribes CONTRACTOR'S indemnification to COUNTY as set forth herein.

CONTRACTOR'S obligation hereunder shall be satisfied when CONTRACTOR has provided to COUNTY the appropriate form of dismissal relieving COUNTY from any liability for the action or claim involved.

The specified insurance limits required in this Agreement shall in no way limit or circumscribe CONTRACTOR'S obligations to indemnify and hold harmless the COUNTY herein from third party claims.

In the event there is conflict between this clause and California Civil Code Section 2782, this clause shall be interpreted to comply with Civil Code 2782. Such interpretation shall not relieve the CONTRACTOR from indemnifying the COUNTY to the fullest extent allowed by law.

8.3. INSURANCE

Without limiting or diminishing the CONTRACTOR'S obligation to indemnify or hold the COUNTY harmless, CONTRACTOR shall procure and maintain or cause to be maintained, at its sole cost and expense, the following insurance coverage's during the term of this Agreement.

8.3.1. Workers' Compensation:

If the CONTRACTOR has employees as defined by the State of California, the CONTRACTOR shall maintain statutory Workers' Compensation Insurance (Coverage A) as prescribed by the laws of the State of California. Policy shall include Employers' Liability (Coverage B) including Occupational Disease with limits not less than \$1,000,000 per person per accident. The policy shall be endorsed to waive subrogation in favor of The County of Riverside.

8.3.2. Commercial General Liability:

Commercial General Liability insurance coverage, including but not limited to, premises liability, contractual liability, products and completed operations liability, personal and advertising injury, cross liability coverage and employment practices liability, covering claims which may arise from or out of CONTRACTOR'S performance of its obligations hereunder. Policy shall name the County of Riverside, its Agencies, Districts, Special Districts, and Departments, their respective directors, officers, Board of Supervisors, employees, elected or appointed officials, agents or representatives as Additional Insureds. Policy's limit of liability shall not be less than \$1,000,000 per occurrence combined single limit and \$2,000,000 annual aggregate. If such insurance contains a general aggregate limit, it shall apply separately to this agreement or be no less than two (2) times the occurrence limit.

8.3.3. Vehicle Liability:

If CONTRACTOR'S vehicles or mobile equipment are used in the performance of the obligations under this Agreement, then CONTRACTOR shall maintain liability insurance for all owned, non-owned or hired vehicles so used in an amount not less than \$1,000,000 per occurrence combined single limit. If such insurance contains a general aggregate limit, it shall apply separately to this agreement or be no less than two (2) times the occurrence limit. Policy shall name the County of Riverside, its Agencies, Districts, Special Districts, and Departments, their respective directors, officers, Board of Supervisors, employees, elected or appointed officials, agents or representatives as Additional Insureds.

8.3.4. Environmental Impairment Insurance:

Contractor shall maintain Environmental Impairment Insurance providing coverage for the Contractor's performance of work included within this Agreement, with a limit of liability of not less than \$1,000,000 per occurrence and \$1,000,000 annual aggregate.

8.3.5. General Insurance Provisions - All lines:

Any insurance carrier providing insurance coverage hereunder shall be admitted to the State of California and have an A M BEST rating of not less than A: VIII (A:8) unless such requirements are waived, in writing, by the County Risk Manager. If the County's Risk Manager waives a requirement for a particular insurer such waiver is only valid for that specific insurer and only for one policy term.

The CONTRACTOR'S insurance carrier(s) must declare its insurance deductibles or self-insured retentions. If such deductibles or self-insured retentions exceed \$500,000 per occurrence such deductibles and/or retentions shall have the prior written consent of the County Risk Manager before the commencement of operations under this Agreement. Upon notification of deductibles or self-insured retention's unacceptable to the COUNTY, and at the election of the County's Risk Manager, CONTRACTOR'S carriers shall either; 1) reduce or eliminate such deductibles or self-insured retention's as respects this Agreement with the COUNTY, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.

CONTRACTOR shall cause CONTRACTOR'S insurance carrier(s) to furnish the County of Riverside with either 1) a properly executed original Certificate(s) of Insurance and certified original copies of Endorsements effecting coverage as required herein, and 2) if requested to do so orally or in writing by the County Risk Manager, provide original Certified copies of policies including all Endorsements and all attachments thereto, showing such insurance is in full force and effect. Further, said Certificate(s) and policies of insurance shall contain the covenant of the insurance carrier(s) that thirty (30) days written notice shall be given to the County of Riverside prior to any material modification, cancellation, expiration or reduction in coverage of such insurance. In the event of a material modification, cancellation, expiration, or reduction in coverage, this Agreement shall terminate forthwith, unless the County of Riverside receives, prior to such effective date, another properly executed original Certificate of Insurance and original copies of endorsements or certified original policies, including all endorsements and attachments thereto evidencing coverage's set forth herein and the insurance required herein is in full force and effect. ***CONTRACTOR shall not commence operations until the COUNTY has been furnished original Certificate (s) of Insurance and certified original copies of endorsements and if requested, certified original policies of insurance including all endorsements and any and all other attachments as required in this Section. An individual authorized by the insurance carrier to do so on its behalf shall sign the original endorsements for each policy and the Certificate of Insurance.***

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 insurance, and the COUNTY'S insurance and/or deductibles and/or self-insured retention's or self-insured programs shall not be construed as contributory.

The COUNTY'S Reserved Rights--Insurance. If, during the term of this Agreement or any extension thereof, there is a material change in the scope of services; or, there is a material change in the equipment to be used in the performance of the scope of work which will add to additional exposures (such as the use of aircraft, watercraft, cranes, etc.); or, the term of this Agreement including any extensions thereof exceeds five (5) years the COUNTY reserves the right to adjust the types of insurance required under this Agreement and the monetary limits of liability for the insurance coverage's currently required herein, if; in the County Risk Manager's reasonable judgment, the amount or type of insurance carried by the CONTRACTOR has become inadequate.

CONTRACTOR shall pass down the insurance obligations contained herein to all tiers of subcontractors working under this Agreement.

The insurance requirements contained in this Agreement may be met with a program(s) of self-insurance acceptable to the COUNTY.

CONTRACTOR agrees to notify COUNTY of any claim by a third party or any incident or event that may give rise to a claim arising from the performance of this Agreement.

8.4. PUBLIC UTILITIES

The locations of all pipelines, power lines, communication lines and other utility components known to County to exist within the limits of the work, are indicated on the drawings and may be the subject of a specific section in the Special Provisions. Size, location and characteristics of such utilities are based upon information made available to County, generally from the owner of the utility in question. The exactness of such information is not guaranteed but may be assumed to have been accomplished with reasonable accuracy.

In addition to the drawings and any such provision regarding utilities, Contractor is under a duty to take into account the location of service laterals or other appurtenances which can be inferred from the presence of facilities such as buildings, meter, junction boxes or similar items in or about the limits of the work.

Unless otherwise directed by the Contract Documents, all existing utilities, whether shown or described or not, shall be left in place and Contractor must conduct its operations so that such utilities are protected from damage at all times during the course of the work; and the work must be accomplished so as to give such utilities proper protection and support upon completion of the work by Contractor.

If during the course of the work, Contractor discovers underground utility components not indicated in the drawings or elsewhere in the Contract Documents, Contractor must immediately notify, in writing, the County and the utility company (public or private) involved, stating with exactness the condition found.

If Contractor encounters a utility not shown or described in the Contract Documents, Contractor shall cease all work which would disturb such utility and its support until given specific instructions as to how to proceed regarding such utility by County.

All work needed to protect existing utilities shown or described in the Contract Documents, or which can be reasonably inferred from the presence of other visible facilities, is to be done at Contractor's expense.

Contractor's cost of locating and repairing damage not due to the failure of Contractor to exercise reasonable care, and removing or relocating utility components and facilities not indicated in the drawings or elsewhere in the Contract Documents, and for equipment on the project necessarily idled during such work shall be paid Contractor as Extra Work.

County may direct the Contractor to do such repair or relocation work as required. When such repair or relocation work is not elsewhere provided for in these Contract Documents, or reasonably inferred therefrom, Contractor shall be compensated for such work as Extra Work.

8.5. PROTECTION OF EXISTING STREET FACILITIES

The Contractor shall be responsible for the protection of existing signs, fences, concrete curbs, gutters and other facilities or structures. The Contractor shall be responsible to repair or replace any such items which are damaged.

Excavation within the street right of way shall be conducted in a manner to cause the least interruption to traffic. Where traffic must cross open trenches, the Contractor shall provide suitable bridges at street intersections and driveways. Hydrants under pressure, valve pipe covers, valve boxes, curb stop boxes, fire or police call boxes, or other utility controls shall be left unobstructed and accessible during construction.

8.6. DIVERSION AND CONTROL OF WATER

Unless otherwise provided in the Agreement, no separate or additional payment will be made for diversion or control of surface or groundwater. All costs incidental to maintaining dry working areas shall be the responsibility of the Contractor and shall be included in the unit prices paid for other items of work.

8.7. DUST ABATEMENT

During the performance of all work, the Contractor shall take the necessary precautions to avoid any loss or damage resulting from its operations that raise or produce dust. The Contractor will be required to have a positive and continuous method of dust control which is satisfactory to the County. The methods to be used for controlling dust in the construction area and along haul roads shall be approved by the County prior to starting any of the work. All costs incidental to dust control shall be included in the unit prices paid for other items of work.

8.8. PROJECT SIGNS

The Contractor shall erect a maximum of two project signs at the locations designated by the County. The signs will be furnished by the County. The signs shall be erected as soon as possible and within 15 days after date of Notice to Proceed. The signs are 4 feet by 8 feet in size, with two 4" x 4" x 12' posts. The sign posts shall be set 5.0 feet in good solid ground and the backfill carefully tamped into place.

8.9. EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK

The Contractor shall examine fully and carefully the site(s) of the work, the plans, the specifications, and any other Contract Documents prior to submitting its bid. The submission of a bid shall be conclusive evidence that the Contractor has investigated the site(s) and is satisfied as to the conditions and requirements of the work to be performed.

Where the County has made investigations of subsurface conditions in areas where work is to be performed, or in other areas, such investigations are made only for the purpose of study and design. Where such investigations have been made, bidders may, upon request, inspect the records of the

County as to such investigations. The records of such investigations are not a part of the contract and are solely for the convenience of the bidders. It is expressly understood and agreed that the County assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof; or of the interpretations set forth therein or made by the County in its use thereof and there is no warranty or guarantee, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that unlooked-for developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered. No information derived from inspection of such records will in any way relieve the Contractor from its obligations under the Contract Documents.

SECTION 9 - WATERING

9.1. DESCRIPTION

This work shall include providing a water supply for all water required for the work. The application of the water shall be subject to the approval of the County at all times and shall be applied in the necessary amounts and at the necessary locations subject to the approval of the County.

At least one mobile unit of at least 1,000-gallon capacity for applying water shall be available on the project at all times.

Water for compacting embankment material and for dust control shall be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses with nozzles that will ensure a uniform application of water.

SECTION 10 - PUBLIC CONVENIENCE, TRAFFIC CONTROL AND DETOURS

10.1. GENERAL

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.

Unless otherwise provided in the Special Provisions, all public traffic shall be permitted to pass through or near the work with as little inconvenience and delay as possible.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately at the Contractor's expense.

Construction operations shall be conducted in such a manner as to cause as little inconvenience and annoyance as possible to abutting and nearby property owners.

Convenient access to driveways, houses and buildings along or near the work shall be maintained and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition.

10.2. SIGNS

It shall be the responsibility of the Contractor to provide and maintain all traffic control, lights, barricades and signs, both on and off the site of work, subject to approval of the County; and all such devices shall be of a type approved by the County.

If, in any case, the County finds it necessary to replace, add to or erect said barricades, signs, or lights when the Contractor fails to do so, the Contractor shall be billed for all costs thereof.

10.3. MATERIALS STORAGE

Storing or stockpiling of excavated material, imported backfill material or construction materials on any street or highway will not be permitted except as approved in advance in writing by the County.

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SPECIAL PROVISIONS

FOR THE

CONSTRUCTION OF GROUNDWATER WELLS

AT THE

BLYTHE SANITARY LANDFILL

JULY 2022

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SECTION 1 - GENERAL

1.1 INTRODUCTION

- A. These Special Provisions are for the Construction of Groundwater Wells (Project) at the Blythe Sanitary Landfill in Riverside County, California. The Project is located at 1000 Midland Road, Blythe, CA 92225. The site location and vicinity map are included in the Project Drawings.
- B. The Work shall consist of constructing a groundwater monitoring well, a nonpotable water production well, and a portable water tower. The major features of the Work to be performed are summarized in Detailed Provisions Section 01 1100 – Summary of Work.

All Work to be implemented under this Contract shall consist of furnishing equipment, superintendence, labor, skills, materials, and all other items necessary for the execution of the Project and shall conform to the Contract Documents for this Project.

- C. Full cooperation of the Contractor and its forces is required to assure safe working conditions. Therefore, it is necessary to emphasize that the County will have full authority to eject any of the Contractor's employees or Subcontractors who do not immediately abide by the landfill site rules (See Appendix A – Landfill Site Safety Rules) or the directions of the County.

1.2 INTENT AND INTERPRETATION OF THE CONTRACT DOCUMENTS

- A. The Contract Documents constitute the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.
- B. The Contract Documents shall not be construed to create a contractual relationship between any parties other than the County and the Contractor. No contract between the County and a third party shall be construed to create any duty on the part of the County or such third party to the Contractor. The Contractor is not an intended or incidental beneficiary of any promises made in the County's contract with a third party, if any.
- C. The Contract Documents are intended to be complementary. What is required by one part of the Contract shall be as binding as if required by all. Should any conflict or inconsistency be found in the Contract Documents, the County shall resolve any such conflict or inconsistency in accordance with Section 1.3 - Order of Precedence of Contract Documents of these Special Provisions.
- D. Where the words "similar", "typical" (or their equivalents) are used in the Contract, they shall mean nearly corresponding or having a likeness. Such words shall not be construed to mean that all parts of the Work referred to are identical or substantially identical, or that such elements of the Work are

connected identically or substantially identically to the rest of the Work. The Contractor has the responsibility to determine all details of the Work in relation to their location and connection to other parts of the Work. Words importing the singular number may also be applied to the plural of persons and things; words importing the plural may be applied to the singular; and words importing the male gender may be extended to females also.

- E. The organization of the specifications into divisions and provisions and the organization of the Project Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.3 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

- A. Precedence of Contract Documents requirements are set forth under Detail Provisions Section 01 4300 – Quality Assurance and Control incorporated herein as if set forth in full.

1.4 CLARIFICATION OF DRAWINGS AND DETAIL DRAWINGS

- A. Where on any drawing a portion of the Work is drawn out and the remainder is indicated in outline, the drawn out parts shall apply also to other similar portions of the Work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses of parts in which it occurs and shall apply to all other similar parts of the Work, unless otherwise indicated.
- B. With regard to drawings the following shall apply:
 - 1. Written dimensions shall be followed; drawings may not be to scale.
 - 2. Figure dimensions on drawings shall govern over scale dimensions; and detail drawings shall govern over general drawings.

SECTION 2 - COUNTY

2.1 AUTHORITY

- A. Unless the County, in writing, indicates otherwise, the authority to (1) commit to or bind the County to any Change Orders or change in Contract Work, Contract Price and/or Contract Time; or (2) sign the Contract or Change Orders rests solely with the County Board of Supervisors or their designee.
- B. The County Board of Supervisors or their designee shall assign a Project Manager who shall have the authority to administer the Contract including, but not limited to:
 - 1. Receiving all correspondence and information from the Contractor;
 - 2. Issuing Field Directives;
 - 3. Issuing request for Change Proposals;
 - 4. Responding to Requests for Information;
 - 5. Reviewing the schedule of values, project schedules, submittals, testing and inspection reports, substitution requests, and other documentation submitted by the Contractor;
 - 6. Negotiating Change Proposals and Change Orders;
 - 7. Recommending Change Orders for approval by the County Board of Supervisors or their designee;
 - 8. Issuing decisions with respect to Requests for Change Orders and Claims;
 - 9. Processing payment requests submitted by the Contractor, and recommending payment;
 - 10. Monitoring the quality of the Work, rejecting noncompliant work, and recommending acceptance of the Work;
 - 11. Transmitting executed Change Orders, amendments, and other Contract correspondence to the Contractor, and
 - 12. Performing all other contract administrative functions.
- C. All correspondence, questions, and/or documentation shall be submitted to the Project Manager.
- D. The Project Manager may designate technical representatives to perform functions under the Contract, such as review and/or inspection and acceptance of supplies, services, including construction, and other functions of a technical or administrative nature.

2.2 INFORMATION SUPPLIED BY COUNTY

- A. Unless otherwise specifically provided in the Contract, surveys and site information provided by the County are intended to describe the general physical characteristics of the Project Site. The County does not represent that

this information is complete or sufficient for the Contractor's performance of the Work.

- B. At the Pre-Construction Meeting, the County shall furnish the Contractor with two (2)) complete copies of the Contract Documents (including half-size and full-size sets of the Project Drawings). The cost of additional requested copies shall be deducted from payment to the Contractor.
- C. All drawings, models, and specifications furnished by the County are solely for use on this Contract and are not to be used by the Contractor on any other work or project.

2.3 WORK BY COUNTY OR SEPARATE CONTRACTORS

- A. The County reserves the right to perform Work not included in the Contract or to let other contracts in connection with this Project.

2.4 SUSPENSION AND RESUMPTION OF OPERATIONS

- A. The Contractor shall suspend construction operations when, in the County's opinion, the conditions for such operations are unsatisfactory due to rain, wind, or any other reason. The Contractor shall not be compensated monetarily for any such delays caused by the suspension of operations. Working days shall be charged as appropriate in accordance with the Contract Documents.
- B. Whenever operations have been suspended, the effect of rain, wind, or other adverse conditions shall be assessed by the County before approval to resume construction is given. Equipment will not be allowed to travel on the landfill site until the ground has dried sufficiently to prevent excessive rutting and to allow the equipment to be operated satisfactorily. If rutting occurs, the Contractor shall re-level, scarify, and re-compact the materials to whatever depth is required to repair the damage to pre-existing conditions as directed by the County at the Contractor's expense. If temporary access and internal haul roads need repair, the Contractor shall repair them as required at the Contractor's expense.

2.5 TESTS AND INSPECTIONS

- A. General:
 - 1. The Contractor shall comply with requests by the County and Testing/Inspection Provider staff to alter the Work sequence or uncover materials to facilitate testing, inspection, or observation, or for the collection of samples or data. The Contractor shall provide the County and Testing/Inspection Provider staff with safe and suitable access to the Work area for testing, inspection, or observation.

2. It is understood that observation and testing of a material at the time of its incorporation into the Work shall in no way be considered as a guarantee of continued acceptance of material presumed to be similar to that upon which observations and tests have been made, and that observation and testing performed by the County and Testing/Inspection Provider staff shall not relieve the Contractor or its Suppliers of the responsibility for quality control or to fully comply with the requirements of the Contract Documents.

B. Earthwork Testing:

1. Earthwork testing shall be performed by the County and/or Testing/Inspection Provider in accordance with the Contract Documents. If testing indicates that any area of a completed layer does not meet the specifications, the Contractor shall perform corrective action; followed by re-testing of the same area by County, and/or Testing/Inspection Provider in accordance with the Contract Documents. The Contractor shall remove, re-work, and bring into compliance any area that the County considers to be unsatisfactory. The area shall be restored to the complete satisfaction of the County. The Contractor shall be solely responsible for any and all costs, including re-testing, and all delays associated with and resulting from any required re-working of a soil layer due to non-compliance.

C. Materials and Installation:

1. Materials and installation procedures to be used in the Work shall be subject to observation (including special inspections) and testing by the County, Testing/Inspection Provider or by an agency or laboratory approved by the County. The Contractor shall furnish without charge, any samples that may be requested or required for testing. Manufacturer's warranties, guarantees, instruction sheets, and parts lists that are furnished with materials used in construction shall be submitted to the County for review and approval/acceptance before the respective items are incorporated into the Work. See Detailed Provisions Section 01 3300 – Submittal Procedures.

SECTION 3 - CONTRACTOR

3.1 CONTRACTOR REPRESENTATIONS

The Contractor makes the following representations to the County:

A. Before submission of its Bid, the Contractor has:

1. Carefully reviewed the Contract Documents, and visited and examined the Project Site. If deemed “mandatory” as indicated in the “Notice Inviting Bids to Contractors”; attended pre-bid site review meeting conducted by the County;
2. Become familiar with the general and local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of Contract Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and reasonably ascertainable subsurface conditions and other matters that may be encountered at the Project Site or affect performance of the Contract Work or the cost or difficulty thereof;
3. Become familiar with and satisfied itself as to the conditions bearing upon transportation, disposal, handling, and storage of materials; and
4. Become familiar with and satisfied itself as to the availability of labor, water, electric power, and roads; and uncertainties of traffic, weather, or similar physical conditions at the Project Site. Any failure of the Contractor to take the action described in this provision or elsewhere in the Contract Documents will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work or for proceeding to successfully perform the Work without additional expense to the County;

B. The Contract Price is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work as represented by the Contract, site visit, and the general conditions (including, but not limited to: weather, site, soil) known or reasonably anticipated for the Project Site. All cost for complying with the Work or other requirements of the Contract Documents are included in the Bid, no additional compensation shall be paid by the County;

C. The Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform the Contractor’s obligations required by the Contract; and

D. The Contractor is able to furnish plant, tools, material, supplies, equipment, and labor required to complete the Work and perform the obligations required by the Contract and has sufficient experience and competence to do so.

3.2 CONTRACTOR'S QUALIFICATIONS

- A. In addition to the Bidder's Qualifications that are listed under the "Notice Inviting Bids to Contractors" of these Contract Documents, the Contractor shall have, or be able to obtain, all the personnel, equipment, and materials necessary to perform the Work specified in the Scope of Work and be able to keep the needed equipment at the job site for the duration of the Work. The bidder may meet these requirements by using Subcontractors, or forming a partnership, joint venture, or other legal arrangement. If the qualifications are met by the formation of a partnership, joint venture or other legal arrangement; then each separate legal entity shall be required to sign the Contract and accept joint and several liabilities. The Contractor, or the Contractor's personnel shall hold appropriate certificates, licenses, and permits necessary to perform the Work described in the Scope of Work.
- B. The Contractor shall present all licenses held, the certificate numbers, and in whose name the license is issued in their Bid Response. In the Contractor's Proposal, the Contractor shall present specific projects, dates, locations, clients, project costs, a project summary description, and the Contractor's role in each project. The Contractor shall present a reference list of clients that includes a contact person and phone number. The Contractor shall also possess a **Class C57 Well Drilling** Contractor's License and be registered as well driller with the Riverside County Department of Environmental Health.
- C. The Contractor shall demonstrate that his project manager, equipment operators, and other responsible individuals performing work on site have appropriate experience and capability. The Contractor shall present personal resumes that document education, training, work experience, and licenses and certificates held in the Bid Response.

3.3 SPECIALTY ITEMS

Pursuant to Section 6.3 "Subcontracting" of the General Provisions of these Contract Documents, the Contractor shall perform at the Site, and with its own forces, work of a value amounting to not less than fifty percent (50%) of the remainder obtained by subtracting from the original Contract Price the sum of any items designated herein as "Specialty Items". Where an entire item is subcontracted, the value of work subcontracted will be based on the contract unit price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the contract unit price. This will be determined from information submitted by the Contractor, such as Schedule of Values for partial subcontracted items, and will be subject to acceptance and approval by the County. For this Project, no items of work have been designated as "Specialty Items".

3.4 GENERAL DUTIES

- A. The Contractor shall give sufficient supervision to the Work, using its best skill and attention. The Contractor is hereby given notice that the County will be relying on the accuracy, competence and completeness of the Contractor's Work. The Contractor shall supervise and be solely responsible for the proper performance of the Work in accordance with the Contract, including the construction means, methods, techniques, sequences, procedures, and for coordination of all portions of the Work.
- B. Unless specified elsewhere in the Contract, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction machinery, utilities, transportation, and other facilities and services (including federal and state tax, industrial insurance, social security liability and all other applicable taxes) necessary for the proper execution and completion of the Work.
- C. The Contractor shall also provide sufficient staffing and supervision to process Requests for Information, Change Proposals, Submittals, Change Orders, close-out documentation, and to perform all other requirements of the Contract and all Work.
- D. The Contractor shall lay out its Work from baselines and benchmarks indicated in the Contract Documents and shall be responsible for the accuracy of all field measurements used in the lay out.

3.5 DUTY TO INSPECT CONTRACT DOCUMENTS

- A. The Contractor shall carefully examine the Contract Documents and check the conditions, dimensions, and instructions that may affect the execution of the Work. These conditions include, but are not limited to, the following:
 - 1. Applicable health and safety regulations;
 - 2. Traffic control, transportation and access conditions;
 - 3. Availability of utilities;
 - 4. Surface and subsurface conditions;
 - 5. Location, availability, and condition of construction materials;
 - 6. Climate;
 - 7. On-site soil characteristics of soil to be used in construction, including but not limited to size and type variation, location of excavation and stockpile areas, etc.;
 - 8. General construction conditions at the Project Site;
 - 9. Work trade coordination: Contractor shall coordinate the work trades and construction items to be supplied, delivered, set in place, and constructed. Such portions of Contractor and Subcontractor's Work as all or in part embedded, built-in, attached to, or supported by the Work shall be performed in a manner that shall not hinder construction and work progress.

- B. The Contractor shall immediately notify in writing the County of any:
 - 1. Error, inconsistency, or omission in the Contract Documents that a reasonable contractor knew of through the exercise of reasonable diligence should have discovered under the same and similar circumstances;
 - 2. Requirements in the Contract Documents that conflict with any local, state, and federal laws, regulations and/or permits, licenses, and easement conditions that a reasonable contractor knew or through the exercise of reasonable diligence should have discovered under the same and similar circumstances.
- C. The Contractor should not proceed with the Work in question until the Contractor receives written direction from the County.
- D. If the Contractor proceeds with the Work in question without written direction from the County, the Contractor shall be responsible for any costs or damages associated with:
 - 1. Fines or penalties;
 - 2. Demolition, tear out, removal, cleanup, remediation, or fixing the Work in question; and
 - 3. Delay, disruption, and loss of productivity.
- E. The Contractor's failure to timely discover and immediately report such reasonably ascertainable errors, inconsistencies, or omissions and conflicts in regulatory requirements, permits, licenses or easements to the County shall preclude the Contractor's recovery of costs and time resulting from the Contractor's failure to timely discover and/or immediately notify the County of such errors, inconsistencies, or omissions.

3.6 DEVIATION FROM CONTRACT

- A. The Contractor shall not make an alteration, variation, addition, deviation, or omission from the requirements of the Contract without the written consent of the County.
- B. Any such alteration, variation, addition, deviation, or omission by the Contractor shall not result in any extra compensation or extension of time.
- C. The County shall have the right to treat any alteration, variation, addition, deviation, or omission from the requirements of the Contract as a contract breach if prior written consent is not obtained from the County, which may be justification for the County to withhold payment, stop work, or terminate the Contract for default.

3.7 COMMUNICATIONS

- A. The Contractor must designate, in writing, its Contractor's Representative who is responsible for administering the Contract and has the authority to bind and obligate the Contractor in the performance of the Work.
- B. Communication with the Contractor shall be through the Contractor's Representative.
- C. The Contractor must designate, in writing, the name(s) of the Contractor's supervisory staff (project manager, superintendent, safety officer, etc.) that shall have the authority to conduct and supervise construction operations for this Project, including, but not limited to: supervision, maintenance, traffic control, survey, health and safety, dust control, materials storage, and storm water compliance.
- D. The Contractor shall notify the County immediately if the Contractor's Representative and/or Contractor's supervisory staff change and identify the name(s) of the new staff and effective date of the change.

3.8 INSURANCE REQUIREMENTS

- A. Contractor and their Subcontractors shall procure and maintain Workers Compensation, Commercial General Liability, Vehicle Liability, and Environmental Impairment insurance in accordance with Section 8.3 "Insurance" of the General Provisions. In addition, the following shall apply to this Project:
 - 1. Builder's Risk, Flood and Earthquake Insurance – The Contractor and their Subcontractors shall maintain or cause to be maintained until the Work of the Contract is approved for Final Acceptance by the County, builder's risk "All Risk" completed value insurance, to include, at the option of the County, loss or damage caused by fire, earthquake, and flood, insuring completed work, work in progress, material, supplies and equipment of the Project Site, in storage or in transit, in an amount equal to the full replacement cost thereof. Such insurance shall include the interests of the County, Contractor, all tiers of Subcontractors, Suppliers and materialmen, with deductible amounts, if any, for the sole account of and payable by Contractor. Loss under such insurance shall be adjusted with and payable to the County for the interest of all parties. The amount of property insurance shall be sufficient to protect against such loss or damage in full until the Work is accepted by the County. COUNTY must be named as "loss payee" on the certificate for Builder's Risk policy.
 - a. Builder's "All Risk" insurance policy shall contain a deductible not higher than \$1,000 unless otherwise approved by the County.

- b. Earthquake insurance policy shall contain a deductible not higher than ten percent (10%) of the total insurable value unless otherwise approved by the County.
- c. Flood Insurance policy shall contain a deductible not higher than \$100,000 unless otherwise approved by the County.
- 2. Professional Liability Insurance – Contractor’s design consultant(s) shall procure and maintain the following required insurance policies at their sole cost and expense at all times during the duration of the Contract:
 - a. Workers’ Compensation – Statutory
 - b. General Liability - \$1,000,000
 - c. Professional Liability - \$1,000,000
 - d. Vehicle Liability - \$1,000,000

3.9 CONTRACTOR’S SUPERVISION AND EMPLOYEES

- A. Contractor has an obligation to provide qualified and competent people to administer the Contract and perform all the Work.
- B. During the performance of the Work the Contractor shall have supervisory staff on-site and available to administer, manage and coordinate the Work. The County shall not be responsible for the acts or omissions of the supervisory staff or their assistants.
- C. The Contractor shall at all time enforce good order among all persons furnishing labor or materials on-site and shall only employ workers skilled in the work assigned. If requested by the County, Contractor shall provide the County with copies of licenses, registrations, and certifications.
 - 1. The County shall have the right to require the Contractor to remove staff from the Project Site who (1) do not have the appropriate qualifications and experience to meet or uphold the requirements of the Contract or (2) do not comply with the Contractor’s Health and Safety Plan and/or the safety rules for the Project Site. The County shall also have the right to order the Contractor to replace staff who demonstrate unprofessional behavior.
 - 2. Failure by the County to require removal of any Contractor staff shall not be deemed an admission that any such staff are satisfactory, nor shall such failure relieve the Contractor from any contractual responsibility.

3.10 CONTRACTOR’S DUTY WHEN COUNTY PERFORMS WORK ON PROJECT

- A. The Contractor shall coordinate its Work with the County and other County contractors and, at the County’s request, participate in meetings for the purpose of coordinating the Contractor’s construction schedule with those of other contractors at no additional cost to the County. To the extent a direct conflict exists regarding access to the Project Site, and the Contractors cannot work out

a resolution that has no impact on Contract Price and Contract Time, the County shall issue written direction to resolve the conflict.

- B. The Contractor shall not cut, excavate, alter, impair, or otherwise engage in any work activity that inhibits the work of any other contractor's without the prior written consent of the County.
- C. If any part of the Contractor's Work depends, for proper execution or results, upon the prior work of the County or any other contractor, the Contractor shall, before performing the affected Work, inspect and give prompt written Notice of any apparent discrepancies of defects in the prior work that renders it unsuitable for the reception of Contractor's Work. Contractor's failure to inspect and to give such prompt notice shall constitute acceptance of the prior work as fit for reception of its Work, except as to defects not then reasonably discovered.

3.11 MATERIALS AND EQUIPMENT FURNISHED BY COUNTY

- A. Unless otherwise specifically provided in the Contract Documents, if the Contract requires that the Contractor install materials and equipment provided by the County, in the absence of a reasonably apparent defect, such materials and equipment shall be considered compliant with the Contract Documents.
 - 1. If the Contractor discovers defects in the County-furnished material or equipment the Contractor shall immediately notify the County in writing.
 - 2. After such discovery, the Contractor shall not proceed with Work involving such County materials and equipment unless otherwise authorized in writing by the County.
 - 3. Contractor's failure to provide immediate written notice of any defects in material or equipment shall constitute acceptance of such materials and equipment as fit for incorporation into the Work.
 - 4. Contractor shall be responsible for any damages or delays resulting from Contractor's failure to provide timely written notice or Contractor's improper incorporation of such defective materials or equipment into the Work.

3.12 PROJECT RECORD DOCUMENTS

- A. The Contractor shall keep a copy of the Contract Documents at the Project Site.
- B. The Contractor shall keep at the Project Site an accurate, readable, and orderly set of drawings and specifications, updated as the job progresses to show all approved changes, addenda, options, submittals, correspondence, directives, alternates, and all actual deviations from the original Contract Documents.

- C. Project Record Documents shall be maintained by Contractor in hard copy and electronic format meeting the requirements specified in Detailed Provisions Section 01 7700 – Closeout Procedures.
- D. In addition to all approved changes, submittals, options, alternates, and all actual deviations from the original Contract Documents, the Project Record Documents shall be marked as follows:
 - 1. Record all materials used where options, alternates and/or change orders where indicated, specified and/or authorized.
 - 2. Accurate measurements referenced to two (2) permanent structures shall be recorded to show the exact location and changes in direction of all underground services and utilities, as well as their approximate depth below finished grade;
 - 3. Update the Project Record Documents with information about each item of capital equipment of other fixed asset installed, including type of equipment, make, model, serial number, and acquisition cost;
 - 4. Update the Project Record Documents identifying each item of capital equipment or other fixed asset removed from the Project, including type of equipment or fixed asset, make, model, serial number and description of location from which it was removed.
 - 5. Record all other requirements as specified in the Detailed Provisions.
- E. The Project Record Documents shall be kept up-to-date and be available for review by the County at all times, including but not limited to at each Weekly Progress Meeting. Failure to have records up-to-date shall be sufficient reason for the County to withhold payments to the Contractor, until all such information is recorded.

3.13 PROTECTION OF ADJACENT LANDFILL OPERATIONS, STRUCTURES, UTILITIES, AND IMPROVEMENTS

- A. The Blythe Sanitary Landfill is an active facility, thus, all construction work relating to this Project shall not impede or interrupt daily landfill business operations.
- B. Contractor shall protect from damage all existing structures, equipment, improvements, utilities, trees and vegetation not shown in the Contract Documents to be removed or modified at or near the Project Site. Contractor shall repair, at no cost to the County, any such damage resulting from failure to comply with the requirements of the Contract or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, the County may have the necessary work performed and deduct or charge the cost to Contractor or exercise its rights under the Performance and Payment Bond. In the event there are insufficient funds remaining, excluding retention, the Contractor shall pay the County for the costs associated with protection and repairing the damages.

- C. At a minimum, the Contractor shall furnish, install, and maintain temporary construction/safety fencing along the limits of the Project working area or portions thereof as directed by the County. Fencing shall limit access to the construction zone and prevent debris, rocks, and equipment from interfering with the access roads and landfill operations adjacent to the Project working area. See Detailed Provisions Section 01 5000 – Temporary Facilities and Controls for fencing requirements.

3.14 PERMITS, LAWS AND REGULATIONS

- A. Except those permits, easements, and variances specified in the Contract as having been previously obtained by the County, all permits, licenses, easements and variances necessary for the execution of the Work shall be secured and paid for by the Contractor. The Contractor shall identify and apply for such permits and licenses at the earliest possible time so as to avoid any delay to the Contract Work arising from the permitting and/or licensing process. No actions taken by the County to aid the Contractor in securing any permit or license shall relieve the Contractor of any obligations to secure any such permit or license.
- B. The Contractor shall maintain all stamped permit sets of documents at the Project Site during construction, in good condition and as required by local ordinances.
- C. Required permits and compliance requirements may include, but are not limited to:
 - 1. Compliance with Mojave Desert Air Quality Management District (MDAQMD) Rule 403 Fugitive Dust Regulations and any other applicable regulation. The Contractor is responsible for implementing the necessary mitigation measures to ensure compliance with regulatory thresholds relating to air quality including, but not limited to MDAQMD Rule 403 Fugitive Dust Control Regulations. The County shall have the authority to immediately suspend all construction operations if, in the County's opinion, the Contractor fails to adequately provide for dust control. Control of dust shall include, but not limited to: sprinkling of water, use of approved dust suppressants, modifications of operations or any other means acceptable to the County, the California Regional Water Quality Control Board (CRWQCB), the MDAQMD, and any agency having jurisdiction over the Site. See Detailed Provisions Section 01 5600 – Project Environmental Controls.
 - 2. State Water Resources Control Board's (SWRCB) National Pollution Discharge and Elimination System (NPDES) Permit: The County complies with the SWRCB General Industrial Activities NPDES permit through regular inspections, monitoring and implementation of Best Management Practices (BMPs) as described in the Blythe Landfill Storm Water Pollution Prevention Plan (Blythe SWPPP). Contractor shall be responsible for compliance with the Blythe SWPPP for the Project working area.

- D. The Contractor shall perform all work hereunder in full compliance with local, state and federal laws, ordinances, resolutions and regulations, and with permit, license, easement, and variance conditions pertaining to the conduct of the Work. The Contractor shall defend, indemnify, and hold the County harmless from any assessment of fines, penalties, or damages arising from violations of the same by the Contractor or Subcontractors. The Contractor shall pay and provide proof of payment for any assessments of fines, penalties or damages. The Contractor shall cooperate with all governmental entities regarding inspection of the Work and compliance with such requirements.
- E. Taxes. The Contractor is required to pay all applicable taxes. No adjustment will be made in the amount to be paid by the County under the Contract because of any change in law or regulations covering any applicable taxes, or because of any misunderstanding by the Contractor as to its liability for or the amount of any taxes.

3.15 CONTRACTOR'S OVERALL RESPONSIBILITY FOR PROTECTION OF WORK, PROPERTY AND PERSONS

- A. The Contractor shall be responsible for conditions of the Project Site, including safety of all persons and property, during performance of the Work. The Contractor shall maintain the Project Site and perform the Work in a manner which meets all statutory and common law requirements or other specific contractual requirements for the provision of a safe place to work and which adequately protects the safety of all persons and property on or near the Project Site. This obligation shall apply continuously and shall not be limited to normal working hours. The County's inspection of the Work or presence at the Project Site does not and shall not be construed to include review of the adequacy of the Contractor's safety measures in, on or near the site of the Work.
- B. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including adequate safety training, in connection with the Work. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.
- C. Unless otherwise required in the Contract Documents the Contractor shall protect and be responsible for any damage of loss to the Work or to the materials and equipment associated with the Work until the date of Substantial Completion. The Contractor remains responsible for any damage or loss caused directly or indirectly by the acts or omissions of the Contractor, Subcontractors, Suppliers, or third parties authorized or allowed on the Project Site by the Contractor until Final Acceptance.
- D. The Contractor shall also be solely and completely responsible for damages arising from the Work that affect areas adjacent to the Project Site.

- E. The Contractor shall repair or replace without cost to the County any damage or loss that may occur, except damages or loss caused by the acts or omissions of the County.
- F. The Contractor shall erect and maintain adequate signs, fencing, barricades, lights or other measures and persons to protect the Work until Final Acceptance.

3.16 PROTECTION OF PERSONS

- A. The Contractor shall take all reasonable precautions for the safety of all employees working on this Contract and all other persons who may be affected by such Work. The Contractor shall designate a responsible member of its organization at the Project Site whose duty shall be to manage and coordinate the safety programs and to prevent accidents of the Contractor and Subcontractors.
- B. Except as otherwise stated in the Contract, if the Contractor encounters, on the Project Site, material reasonably believed to be Hazardous Material, including, but not limited to: asbestos, lead, or polychlorinated biphenyl (PCB), that Contractor shall immediately stop work in the area affected and give notice of the condition to the County. Work in the affected area shall not be resumed without written direction by the County.
- C. The Contractor shall maintain in a reasonable number of conspicuous and accessible places at the Project Site all materials necessary for giving first aid to the injured. The Contractor shall establish, publish and make known to all employees procedures for ensuring immediate removal to a hospital or a doctor's care, of persons who may have been injured on the Project Site. Employees shall not be permitted to work on the Project Site before the Contractor has: (1) provided all materials necessary for giving first aid at the Project Site; and (2) established and made known procedures for removal of injured persons to a hospital or doctor's care. The Contractor shall ensure that at least one of its employees on site has adequate training in first aid.
- D. In order to protect the lives and health of persons performing work under this Contract, the Contractor shall comply with all CalOSHA rules and regulations and any violation of these safety requirements applicable to the Work may be considered a breach of this Contract.

3.17 HEALTH AND SAFETY PLAN

The Contractor shall prepare and provide to the County a written site specific "Health and Safety Program" demonstrating the methods by which all applicable safety requirements of this Contract will be met. The Contractor shall ensure its Subcontractors and Suppliers have a written Health and Safety Plan/Program or formally adopt the Contractor's site-specific "Health and Safety Plan". The Contractor shall designate a Safety Officer who shall be

responsible for proper implementation of the “Health and Safety Plan”. The Contractor shall submit a copy of its “Health and Safety Plan” and the Subcontractor’s Health and Safety Plan/Program to the County within fourteen (14) calendar days after the Contract Award. The County’s review of such plans shall not be deemed to constitute approval or acceptance thereof and shall not relieve or diminish the Contractor’s sole responsibility for Project Site safety. See Detailed Provisions Section 01 3500 – Health and Safety.

3.18 STORAGE OF CONTRACTOR’S PROPERTY

- A. The Contractor’s tools and equipment and building materials to be incorporated into the Project may be stored on the Project Site, but all such storage shall be subject to the requirements of the Contract. Any repairs, patching or cleaning of the Project Site that may be necessary to restore the Project Site to its previous condition due to storage of the Contractor’s materials, tools or equipment, or other aspects of the Contractor’s Work, shall be the responsibility of the Contractor. See Detailed Provisions Section 01 1400 – Work Restrictions.

SECTION 4 - ADMINISTRATION OF CONTRACT

4.1 TIME OF ESSENCE

- A. All time requirements set forth in the Contract Documents are of the essence.

4.2 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. The Contractor shall diligently and continuously prosecute the Project to Substantial Completion before the expiration of **Thirty (30) Working Days** from the date of the Contractor's receipt of the Notice to Proceed. Upon Contractor's receipt of the Certificate of Substantial Completion, a contractual time period of **Fifteen (15) Working Days** shall begin to allow the Contractor to complete remaining Punch List work to achieve Final Completion/Final Acceptance of the Project.
- B. The Liquidated Damage amounts, set forth in this Section, will be assessed for Contractor's failure to achieve completion for the following project milestones (See Detailed Provisions Section 01 2900 – Payment Procedures):
1. Project Substantial Completion – The Liquidated Damages reduction to the Contract Price for failure to reach Substantial Completion for the Project is **Two Hundred Fifty Dollars (\$250) per day** for each additional Working Day required to properly complete the Work in excess of the established contractual date for achieving Project Substantial Completion.
 2. Final Acceptance – The Liquidated Damages reduction to the Contract Price for failure to reach Final Acceptance for the Project is **One Hundred (\$100) per day** for each additional Working Day required to properly complete the Work in excess of the established contractual date for achieving Project Final Acceptance.
Work Progress
- C. The Contractor shall be required to:
1. Prosecute the Work diligently with adequate forces;
 2. Plan, coordinate, and layout the Work in advance so as to avoid delay;
 3. Achieve Substantial Completion of the Work and Final Acceptance in accordance with the requirements of Contract Documents; and,
 4. Complete all Contract closeout requirements in accordance with all applicable Contract requirements within the time period established by the County in the Certificate of Substantial Completion.

4.3 SCHEDULE OF VALUES

- A. Unless otherwise specified, within fourteen (14) Calendar Days after the date of Contract Award, the Contractor shall submit to the County a detailed Schedule of Values that identifies the various activities of the Contract Work and their values and quantities, including the overhead and profit for each

activity. The Contractor warrants that the values and quantities identified in the approved Schedule of Values shall be used as a basis for establishing unit prices for individual items of Work. Payment for Contract Work shall be made only for the actual quantities of Work performed or material furnished in accordance with those activities identified in the approved Schedule of Values. DO NOT SUBMIT THE SCHEDULE OF VALUES WITH BID PROPOSAL.

- B. The Contractor shall not be entitled to, nor shall the County be required to make, payment for any Contract Work until the Schedule of Values has been accepted by the County.
- C. The County shall review and accept the Schedule of Values or provide the Contractor with a written explanation of why the Schedule of Values was not acceptable. The County shall use reasonable efforts to review the Schedule of Values within fourteen (14) Calendar Days of the County's receipt of the Contractor's submittal of its Schedule of Values. The County's acceptance of the Schedule of Values shall not relieve the Contractor from its sole responsibility for the accuracy of the Schedule of Values and its compliance with all Contract requirements. The Contractor shall revise the Schedule of Values as necessary to accurately reflect Change Orders.
- D. Each Application for Payment shall include a current status of the Schedule of Values. No Application for Payment will be considered until the current status of the Schedule of Values has been submitted and accepted.
- E. The activities, which the Contractor identifies within its Schedule of Values, shall be specifically referenced within, and conform and be consistent with the activities set forth within the Project Schedule.
- F. See Detailed Provisions Section 01 2900 – Payment Procedures.

4.4 PROJECT SCHEDULE

- A. Unless otherwise specified, within fourteen (14) Calendar Days after Contract Award, the Contractor shall submit to the County a Project Baseline Schedule in accordance with Detailed Provisions Section 01 3200 – Construction Progress Documentation. Contractor shall not be allowed to mobilize at the Project Site until the aforementioned project schedule has been submitted by the Contractor and accepted by the County.
- B. By reviewing project schedules and providing written comments, the County is not approving or adopting the Contractor's plan, schedule, means, methods, techniques, sequences, or procedures required to perform the Work. Review and comment by the County of project schedules prepared by the Contractor shall not relieve the Contractor from the sole responsibility for the accuracy of a project schedule, and its compliance with all Contract requirements, and its responsibility to meet all required Contract completion dates. Failure by the

County to indicate items on the project schedule that do not conform with the Contract requirements shall not alter or waive the Contract requirements or relieve the Contractor from complying with all Contract requirements.

- C. The Contractor shall not be entitled to, nor shall the County be required to make payment for any Contract Work until the Project Baseline Schedule complies with all Contract requirements.
- D. The Contractor shall schedule the Contract Work so that the Contract Work is completed within the Contract Time. Float in the Project Schedule shall be defined as the period of time measured by the number of Working Days each non-critical path activity may be delayed before it and its succeeding activities become part of the Critical Path.
- E. The Contractor shall regularly enter the actual progress of the Work and Contract Time extensions approved by the County on the Project Schedule. Updated Project Schedules shall reflect actual progress and completion within the Contract Time and shall be provided to the County with each Application for Payment in format(s) as required by the Contract. Applications for Progress Payments will be considered by the County and the Contractor will not be paid until the Contractor complies with these requirements. The updated Project Schedule shall be used to assist the County in verifying the appropriate payment.
- F. If, in the opinion of the County, the Contractor falls behind in its progress of the Work due to acts or omissions of the Contractor, Subcontractors, and/or Suppliers, the Contractor shall take all necessary steps to improve its progress and bring its progress back in-line with the accepted Project Baseline Schedule, without additional cost to the County. In this circumstance the Contractor shall, as necessary, increase the number of shifts, overtime operations, and/or days of work, both on and off the Project Site, and submit for acceptance any supplementary schedule updates as the County deems necessary to demonstrate how the accepted rate of progress will be regained. Failure of the Contractor to comply with the requirements under these provisions shall be grounds for a determination by the County that the Contractor is not prosecuting the Work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the County may pursue any right it has under the law or the Contract, including but not limited to default termination.

4.5 SUBMITTALS

- A. Submittals include shop drawings, setting and erection drawings, schedules of materials, product data, samples, certificates and other information prepared for the Work by the Contractor or a Subcontractor as set forth in Detailed Provisions Section 01 3300 – Submittal Procedures. The Contractor shall perform no portion of the Work requiring Submittals until the Submittals have

been reviewed and returned by the County with one of the following annotations: (1) “no exceptions taken”, (2) “exceptions as noted”, (3) “revise and resubmit”, or (4) “rejected”.

- B. Prior to furnishing the Submittals to the County, the Contractor shall: (1) review all Contractor and Subcontractor Submittals for accuracy, completeness, and compliance with the Contract; (2) coordinate all Submittals with all Contract Work by other trades and with field measurements; and (3) indicate approval on the Submittals as a representation that it has complied with its obligation to review and coordinate Submittals. Where required by law or by the Contract, Submittals shall be stamped by an appropriate licensed professional. Submittals lacking required stamps or evidence of Contractor review and approval will be returned without review by the County for resubmission. Submittals shall be sequentially numbered.
- C. When submitting information, the Contractor shall identify and state reasons for any alteration, variation, addition, deviation, or omission from the Contract. The Contractor shall not perform work that alters, varies, adds, deviates, or omits work without prior specific written acceptance by the County.
- D. The Contractor shall provide Submittals with reasonable promptness and in such sequence as to facilitate the timely completion of the Contract. The Contractor shall prepare and keep current, for review by the County, a schedule of Submittals which is coordinated with the Contractor’s Project Schedule and allows the County the specified time for review.
- E. The County shall review the Contractor’s Submittals and respond in writing with reasonable promptness within the review timeframes specified in Detailed Provisions Section 01 3300 – Submittal Procedures so as not to unreasonably delay the progress of the Work. Unless otherwise agreed, no delay to the Contractor’s Work shall be attributable to the failure by the County to respond to a Submittal until twenty (20) days after the Submittal is received by the County, and then only if failure by the County to respond is unreasonable and affects the Contract completion date.
- F. If the Contractor is required to resubmit a Submittal, any revisions on resubmittals shall be specifically identified in writing and the resubmitted Submittal shall be sequentially alpha denoted and note revisions in numerical order. The cost of the review of the initial Submittal and the first revised Submittals shall be borne by the County. The costs for all additional revised Submittals shall be charged to the Contractor. The cost of review shall include, without limitation, administrative, design, and engineering activities directly related to review of Submittals. The County may deduct these costs from any amounts due to the Contractor.
- G. The County shall review the Contractor’s Submittals only for conformance with the design of the Work and compliance with the Contract. Review of the

Submittals are not conducted to verify the accuracy of dimensions, quantities, or calculations, the performance of materials, systems, or equipment, or construction means, methods, techniques, sequences, or procedures, all of which remain the Contractor's responsibility. Failure by the County to take exception to a Submittal shall not relieve the Contractor from any duty, including its responsibility for errors or omissions in Submittals, its duty to make Submittals and duty to perform the Work according to the requirements of the Contract. The County's review of a Submittal shall not alter or waive the requirements of the Contract unless the County has issued prior written approval of such change or alteration of the Contract requirements.

- H. The Contractor's failure to identify any error, deviation, or omission and subsequent acceptance of the Submittal by the County shall not relieve the Contractor from complying with the Contract requirements.

4.6 REQUESTS FOR INFORMATION

- A. If the Contractor determines that some portions of the drawings, specifications or other Contract Documents require clarification or interpretation by the County because of an apparent error, inconsistency, omission, or lack of clarity in the Contract, the Contractor shall promptly submit a Request for Information (RFI) and, unless otherwise directed, shall not proceed with the affected Work until the County has responded to the RFI. The Contractor shall plan its work in an efficient manner so as to allow for timely responses to RFIs.
- B. RFIs shall only be submitted by the Contractor on an RFI form provided by the County or on a form acceptable to the County (See Detailed Provisions Section 01 3100 – Project Management and Coordination). The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed by the County. In the RFI the Contractor shall set forth its own interpretation or understanding of the requirement along with reasons why it reached such an understanding.
- C. The County will review RFIs to determine whether they meet the requirements identified above in Paragraph B to qualify as an RFI. If the County determines that the document is not an RFI it will be returned to the Contractor unreviewed as to content. When appropriate the Contractor may resubmit the RFI on the proper form, with all required information and in the proper manner.
- D. The County shall respond in writing with reasonable promptness to Contractor's RFI.
 - 1. At the request of the County, the Contractor shall prioritize its RFIs, identify a date by which the Contractor prefers the RFI be answered, and reasons for such priority.
 - 2. If the Contractor submits an RFI on an activity less than thirty (30) days prior to the commencement of that activity, the Contractor shall not be

entitled to any time extension or adjustment in Contract Price due to the time it takes the County to respond to the RFI provided that the County responds within thirty (30) days. No delay to the Contractor's Work or damages to the Contractor shall be attributable to the failure by the County to respond to the RFI until thirty (30) days after the County's receipt of the RFI, and then only if failure by the County to respond is unreasonable and affects the Contract completion date.

- E. The County's response to an RFI shall not be considered a change to the Contract requirements. To the extent the Contractor believes that the County's response to the RFI constitutes changed work impacting Contract Price or Contract Time, the Contractor shall submit a Contractor's Request For Change Order to the County (See Detailed Provisions Section 01 3100 – Project Management and Coordination).

4.7 TESTS, INSPECTIONS, AND ACCESS TO THE WORK

- A. The Contractor shall document and maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract. The Contractor shall maintain all documentation related to testing and inspection and make such documentation available to the County at its request. Contractor shall be responsible for inspection and quality assurance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the County, or with the appropriate authority. If any governmental, regulatory, or permitting authority requires any portion of the Work to be inspected, tested, or approved, the Contractor shall make all arrangements for and cooperate with such inspections, tests, and approvals so as not to delay completion of the Contract Work. Unless otherwise noted, the Contractor shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the County at least two (2) days notice of: (1) when the Work is ready to be tested and inspected and (2) when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to the County upon request.
- B. The Contractor shall cooperate with the County in the performance of any tests and inspections of the Work. The Contractor has the duty to coordinate all tests and inspections in a manner, which does not negatively impact Contractor's compliance with the Contract.
- C. If any Work required to be inspected, tested, or approved is covered without such inspection, testing or approval being obtained, it must, if requested by the County, be uncovered for observation, and such uncovering shall be at Contractor's expense.

- D. Upon request by the County any Work, not otherwise required to be inspected or tested, shall be uncovered by the Contractor. If the Work is found to comply with the Contract or if any non-compliance was not caused by the Contractor, Subcontractor, or Supplier, the County will (1) pay the costs of testing and inspection; (2) pay the costs associated with the uncovering and recovering of the Work; and (3) adjust the Contract Time to the extent the inspection and repair impacted the Project Schedule and delayed completion of the Work, otherwise the Contractor shall bear such costs as well as all costs of correction and the Contractor shall not be entitled to an adjustment in Contract Time.
- E. The County may, at any reasonable time and at its own cost, conduct inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract. The County shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract. The County inspection and tests are for the sole benefit of the County and do not:
 - 1. Constitute or imply acceptance;
 - 2. Relieve Contractor of responsibility for providing adequate quality control measures;
 - 3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;
 - 4. Relieve Contractor of its responsibility to comply with the requirements of the Contract; or,
 - 5. Impair the County's right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.
- A. Neither observations by an inspector retained by the County or part of County staff, the presence or absence of such inspector on the Project Site, nor inspections, tests, or approvals by others, shall relieve the Contractor from any requirement of the Contract. Inspectors are not authorized to change any term or condition of the Contract.
- B. Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by the County. The County may charge Contractor any additional cost of inspection or testing, or when prior rejection makes re-inspection or retest necessary. The County shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

4.8 CORRECTION OF WORK OR DAMAGED PROPERTY

- A. If material, equipment, workmanship, or work proposed for, or incorporated into the Work, does not meet the Contract requirements or fails to perform satisfactorily, the County shall have the right to reject such Work by giving the Contractor written notice that such Work is either defective or non-conforming.
 - 1. The County, at its option, shall require the Contractor, within a designated time period as set forth by the County, to either:
 - a. Promptly repair, replace or correct all Work not performed in accordance with the Contract at no cost to the County; or
 - b. Provide a suitable corrective action plan at no cost to the County.
 - 2. Once the corrective action plan is reviewed and returned by the County with the annotation “no exception taken” or “exceptions as noted” by the County, the Contractor shall implement the corrective action plan.
 - a. Review and providing comments on the corrective action plan is not an acknowledgement by the County that such plan is adequate to remedy the defective or non-conforming Work.
 - b. If the corrective action plan does not remedy the defective or non-conforming Work, the Contractor shall remain responsible for remedying of the defective or non-conforming Work to the County’s satisfaction.
 - 3. The Contractor shall also be responsible for all repairs to any property and work damaged by the Contractor.
 - 4. Under no circumstances shall the Contractor be entitled to additional time or money for the correction of defective or non-conforming Work or for the repair of damaged property. The County shall not be responsible for any costs to prepare corrective action plans, correct work or repair damaged property.
- B. If the Contractor does not repair, replace or correct and/or remove defective or non-conforming Work or repair damaged property as required by the County, the County or County’s designee may repair, replace or correct and/or remove it and deduct the cost of such effort from any payment due to the Contractor.
 - 1. Under this provision, the County reserves the right to make use of the Contractor’s plant and equipment for this repair, replacement, correction or removed work. If the remaining payments due to the Contractor are not sufficient to cover the County’s cost of remedying the defective or non-conforming Work, the Contractor shall pay the difference to the County.

- C. The County may elect to retain work if the County determines that such defective or non-conforming Work is not of sufficient magnitude or importance to make the Work dangerous or undesirable or that removal of such Work is impractical or will create conditions, which are dangerous or undesirable.
 - 1. Just and reasonable value for such defective or non-conforming Work will be determined by the County and appropriate deductions will be made in the payments due or to become due to the Contractor.
 - 2. The County's exercise of the rights under this provision shall be without prejudice to any other remedy the County may have and shall not constitute a termination of the Contract.
- D. The Contractor shall be liable for all damages and costs incurred by the County caused by the Contractor's or its Subcontractors' and Suppliers' defective or non-conforming Work or workmanship, including but not limited to all special, incidental, or consequential damages incurred by the County. The Contractor agrees to indemnify and hold the County harmless from any personal injury or property damage caused by the Contractor or its Subcontractors defective or non-conforming Work or workmanship.

4.9 SUBSTITUTION OF PRODUCTS AND PROCESSES

- A. Substitutions requested by the Contractor will be subject to the County's prior written acceptance and at the County's sole discretion.
- B. Requests for substitution must specifically identify:
 - 1. Material, equipment, and labor costs included in the Contractor's Bid associated with the original item to be substituted;
 - 2. All costs for material, equipment, labor associated with the proposed substitution, including any impact costs;
 - 3. Proposed change to the Contract Price and/or Contract Time; and,
 - 4. Compatibility with or modification to other systems, parts, equipment or components of the Project and Contract Work.
- C. Contractor shall provide all documentation supporting its request as requested by the County.
- D. All costs of any redesign or modification to other systems, parts, equipment or components of the Project of Contract Work, which result from the substitution, shall be borne by the Contractor.
- E. When the County approves a substitution proposed by the Contractor, the Contractor shall guarantee the substituted article or materials to be equal to, or better than, those originally specified and shall be compatible with all other systems, parts, equipment or components of the Project and Contract Work. The County has the right to order an unaccepted, substituted article removed and replaced without additional cost to the County.

- F. The County has a right to a deductive Change Order if the substituted product or process is less costly than the contractually required product or process.
- G. If the County does not accept the substitution proposal the Contractor shall proceed, without delay or cost to the County, with the Contract Work as originally specified.
- H. See Detailed Provisions Section 01 6000 – Product Requirements.

4.10 LABOR SURCHARGE

Attention is directed to the provisions of Section 7.3.1.1.2. of the General Provisions. The labor surcharge percentage to be applied to the regular hourly wages paid as defined in Section 7.3.1.1. shall be ten percent (10%). The labor surcharge percentage to be applied to the overtime hourly wages paid as defined in Section 7.3.1.1. shall be ten percent (10%).

4.11 EQUIPMENT RENTAL

Attention is directed to the provisions of Section 7.3.1.3, of the General Provisions. The equipment rental rates to be applied shall be the rates that are in effect at the time of the award of the Contract, as published by the California Department of Transportation. A copy of said equipment rental rates is on file at the County office.

END OF SECTION

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DETAILED PROVISIONS

FOR THE

CONSTRUCTION OF GROUNDWATER WELLS

AT THE

BLYTHE SANITARY LANDFILL

JULY 2022

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 01 1100: SUMMARY OF WORK

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SECTION 01 1100 SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Project Information.
2. Project Description.
3. Definitions
4. Work by County and Others
5. Project Signs
6. Warranty
7. Available Information
8. Project Utility Sources

1.02 PROJECT INFORMATION

A. Project Title: Construction of Groundwater Wells at the Blythe Sanitary Landfill.

1. Construction of a groundwater monitoring well, non-potable water production well and a portable water tower at the Blythe Sanitary Landfill.

B. Site Address: 1000 Midland Road, Blythe, CA 92225.

C. Owner: County of Riverside.

D. Operator: Riverside County Department of Waste Resources.

1.03 PROJECT DESCRIPTION

A. General:

1. The descriptions in this Section are not intended to provide or be construed as a complete summary of the Contract Documents. The following only identifies in broad terms the general nature of the Work to be performed by the Contractor and its Subcontractors.
2. Contractor shall perform and complete all Work in accordance with the requirements set forth in the Contract Documents.
3. This Section should read as if "Provide and Install" were included at the front of sentences, as applicable.
 - a. Responsibility for the providing and the installing of every element of the Work is borne by the Contractor, unless otherwise noted.

4. The work to be performed by Contractor shall conform to the requirements of the General Provisions, Special Provisions, Detailed Provisions, Drawings, and other related documents, and include the furnishing of all labor, materials, tools, equipment, plant, and services necessary therefore and incidental thereto to complete the Project.
 5. The Work shall consist of constructing a groundwater monitoring well, a non-potable water production well and a portable water tower as indicated in the Contract Documents.
 - a. The groundwater monitoring well will be used to monitor groundwater levels and obtain groundwater samples to test the groundwater quality.
 - b. The non-potable water production well will be utilized to supply the portable water tower which in turn will be used by County Operation's personnel to provide water for daily landfill activities.
 - c. ***Each well borehole shall be drilled by a method chosen by the CONTRACTOR.***
- B. Outline of Work: The major features of the Work to be performed shall include, but are not limited to:
1. Provide required bonds, insurance and warranties for the project.
 2. Prepare and submit project specific safety plan.
 3. If applicable, prepare and submit Hazardous Materials Business Emergency Plan (HMBEP). Refer to County of Riverside Ordinance 651 for applicability. Implement hazardous materials controls and cleanup measures throughout the duration of the Project.
 4. Prepare and submit documents for the purpose of identifying construction planning, scheduling, and administration activities, including, but not limited to the work plan documents indicated in this Section.
 5. Perform field survey, which shall include, but is not limited to: optional survey to verify County-provided survey information, construction layout, staking and verification of utilities, datum verification, construction placement, and completed Work verification survey.
 6. Provide and maintain temporary facilities, including, but not limited to: temporary utilities, supplies, fencing, project signs, sanitary facilities, hazardous waste management and other means of protecting from safety hazards.
 7. Provide environmental controls to mitigate against soil erosion and sediment, dust, odor, contaminated surface water runoff, pest, and noise.
 8. Meet all applicable Federal, State and local air, water and waste discharge requirements.
 9. Mobilize and stage construction equipment.
 10. Modify existing groundwater well head, decommission existing electrical connections, and salvage existing control box for reuse.

11. The Contractor shall first drill and install the groundwater monitoring well (refer to Detailed Provisions Section 33 1153 – Groundwater Monitoring Wells).
 - a. Drill boreholes to approximate depths specified in Sheet 5 of the Project Drawings. Final drilling depths will be provided by the Engineer to the Contractor based on the subsurface field conditions encountered.
 - b. During drilling, provide means and assist the Engineer in collecting representative subsurface samples at a minimum of 5-foot depth intervals and at lithologic changes.
 - c. Construct wells as shown on Sheet 5 of the Project Drawings. Final well design details will be provided by the Engineer to Contractor based on the subsurface field conditions encountered.
 - d. Furnish and install 4-inch diameter, Schedule 80 PVC casing and screen.
 - e. Furnish and install filter pack material, transition sand and annular grout seals via a flush-threaded tremie (herein referred to as “tremie”).
 - f. Furnish and install cement sanitary seal via tremie.
 - g. Provide well head protection for well casings.
 - h. Develop well by flushing, bailing and airlifting/pumping.
 - i. Arrange for temporary storage of all fluids resulting from well development operations. The Engineer will direct the Contractor to discharge the development water or the Engineer will dispose of the development fluids.
 - j. Maintain drilling site area during construction and perform final site cleanup and restoration to original conditions.
 - k. Provide all records, as required herein.
12. After the groundwater monitoring well has been constructed, the Contractor shall begin drilling and constructing the non-potable water production well (refer to Detailed Provisions Section 33 1114 – Non-Potable Water Production Wells).
 - a. Drill boreholes to approximate depths specified in Sheet 5 of the Project Drawings. Final drilling depths will be provided by the Engineer to the Contractor based on the subsurface field conditions encountered.
 - b. During drilling, provide means and assist the Engineer in collecting representative subsurface samples at a minimum of 5-foot depth intervals and at lithologic changes.
 - c. Construct wells as shown on Sheet 5 of the Project Drawings. Final well design details will be provided by the Engineer to Contractor based on the subsurface field conditions encountered.
 - d. Furnish and install 8-inch diameter, Schedule 80, PVC casing and screen.
 - e. Furnish and install filter pack material, transition sand and annular grout seals via a flush-threaded tremie (herein referred to as “tremie”).
 - f. Furnish and install cement sanitary seal via tremie.

- g. Provide well head protection for well casing including bollards.
 - h. Develop wells by flushing, bailing and airlifting/pumping.
 - i. Arrange for temporary storage of all fluids resulting from well development operations. The Engineer will direct the Contractor to discharge the development water or the Engineer will dispose of the development fluids.
 - j. Provide a temporary test pump and discharge pipe to test the wells production capacities.
 - k. Arrange for temporary storage of all fluids resulting from temporary test pumping. The Engineer will direct the Contractor to discharge the development water or the Engineer will dispose of the development fluids.
 - l. Submit temporary test pump results.
 - m. Furnish and install new pump and motor. Final pump and motor depth will be provided by the Engineer to Contractor based on the subsurface field conditions encountered and test pumping results.
 - n. Furnish and install new 3-inch Schedule 80 PVC Certa-Lok column piping.
 - o. Furnish and install new 3-inch Schedule 40 hot-dipped galvanized column piping.
 - p. Furnish and install electrical conduits, wiring, switches, and receptacles for new pump and motor. Existing groundwater production well control box shall be salvaged and reused at the new production well site.
 - q. Preform and prepare short-circuit/coordination and arc flash hazard study.
 - r. Provide field testing and submit test result reports for all installed equipment systems. Provide and coordinate training for County staff for facility systems and operational equipment.
 - s. Arrange for temporary storage of all fluids resulting from new pump and motor testing. The Engineer will direct the Contractor to discharge the development water or the Engineer will dispose of the development fluids.
 - t. Prepare and submit Operation and Maintenance (O&M) Manuals for all specified equipment and systems.
 - u. Maintain drilling site area during construction and perform final site cleanup and restoration to original conditions.
 - v. Provide all records, as required herein.
13. Furnish and install a portable water tower (refer to Detailed Provisions Section 33 1600 – Water Utility Storage Tanks).
- a. The portable water tower shall be installed with a float valve that automatically starts the production well motor to supply the water tower with water for daily landfill activities.
14. Clean up site and demobilize.

15. This list is an overview of the scope of work. The construction details, which the Contractor is responsible to comply with, are described fully in the Detailed Provisions.

1.04 DEFINITIONS

- A. Throughout these Detailed Provisions, certain terms are capitalized. Capitalized terms have the definitions assigned to them in the Detailed Provisions. Definitions of terms will be found throughout these Detailed Provisions. There is no central location for defined terms.
 1. “**Addendum**” or “**Addenda**” means alteration or clarification of the plans or specifications provided to bidders by the County prior to bid time, which becomes part of the Contract Documents when the Contract is executed.
 2. “**ASTM Specifications**” the latest revised specifications or tentative specifications of the American Society for Testing and Materials.
 3. “**Basis of Design**” indicates project is based on specified equipment and equipment from other manufacturers may require, at a minimum, revisions to the Project Drawings and/or Detailed Provisions for surrounding infrastructure.
 4. “**Claim**” means a separate demand by the Contractor sent by registered mail or certified mail with return receipt requested for one or more of the following: (a) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the County under the Contract; (b) payment by the County of money or damages arising from work done by or on behalf of the Contractor and payment for which is not otherwise expressly provided or to which the Contractor is not otherwise entitled; (c) payment of an amount that is disputed by the County; (d) that Contractor’s performance is excused, or (d) other relief.
 5. “**Change Order**” means a written instrument, signed in accordance with the requirements of the General Provisions, setting forth the agreement of the County and the Contractor on the terms of a Contract Adjustment.
 6. “**Change Proposal**” means a document prepared by the Contractor at the request of the County, which proposes changes to the Work and/or changes to the Contract Price and/or Contract Time. County initiates all requests for Change Proposals.
 7. “**Contract**” means the Agreement included in the Administrative Provisions covering the Work signed by County and Contractor, which includes all Contract Documents.
 8. “**Contract Documents**” The “Contract Documents” for the Project are enumerated in the Agreement.
 9. “**Contract Award**” or “**Contract Execution**” occurs when the County Board of Supervisors or their designee signs the Contract, which shall only occur after the Contractor signs the Contract.
 10. “**Contract Price**” shall mean either the total aggregate amount of the lump sum, Unit Price, or Unit Prices named in the Agreement awarded by the County, subject

to adjustment for variances in quantities and Change Orders or Unilateral Change Orders, or the total of all payments under the Contract at the lump sum, Unit Price, or Unit Prices based on the Engineer's approvals of installed quantities of Work, as the case may be.

11. **“Contractor’s Representative”** is the individual who has authority to obligate the Contractor and is identified in the Agreement.
12. **“Contract Time”** means the total number of Working Days stated in the Agreement within which Contractor must complete the Work, as may be modified by a Change Order or Unilateral Change Order.
13. **“Contract Work”** or **“Work”** means all the resources, activities, construction work and other services specified, indicated, shown or reasonably inferable from the Contract Documents including labor, materials, equipment and services to fulfill the Contractor’s obligations.
14. **“Contractor”** means the person or persons, entity, including but not limited to, limited liability corporation, co-partnership, or corporation, private or municipal, who have entered into the Agreement with the County, or his or their legal representatives.
15. **“Contractor’s Surveyor”** is responsible to perform horizontal and vertical control of the actual construction, based on benchmarks established by County’s Surveyor.
16. **“County of Riverside”** or **“Riverside County Department of Waste Resources”** or **“County”** or **“Owner”** may be used interchangeably.
17. **“County’s Surveyor”** representing the County shall establish reference benchmarks for construction. County’s Surveyor shall also perform surveys to check line, grade, and calculate volumes, as required.
18. **“Critical Path”** is the longest continuous chain of activities for the Work that has the least amount of total float of all chains. In general, a delay on the critical path extends the scheduled completion date of the Work.
19. **“Cubic Yard”** – Unless otherwise specified in these Detailed Provisions, where the term cubic yard appears it shall mean bank(bulk) volume in the case of excavation; and compacted volume yielding the specified relative compaction, moisture content, and hydraulic conductivity, if required, in the case of engineered fill.
20. **“Day”** means calendar day, unless otherwise specified.
21. **“Facilities”** or **“RCDFM”** refers to Riverside County Department of Facilities Management.
22. **“Field Directive”** is a document prepared by the County directing the Contractor to proceed promptly with specific work and shall not, in and of itself, constitute a Change Order of entitlement to an adjustment in Contract Time and/or Contract Price.
23. **“Final Acceptance”** of the Work occurs when the Engineer determines that Final Completion of the Work has been achieved, the Board issues a written acceptance of a completed Contract, and, a Notice of Completion has been recorded with the

County of Riverside by the County. The date of Final Acceptance is the date the Notice of Completion is recorded by the County of Riverside Recorder.

24. **“Final Completion”** is the stage of performance of the Work when:

- a. All Work required by the Contract Documents has been fully completed in compliance with the Contract Documents and all Applicable Laws including, but not limited to, correction or completion of all punch list items noted upon Final Completion and final cleaning;
- b. Contractor has delivered to County all closeout documentation required by the Contract Documents;
- c. Final inspection and approval by the Inspector of Record and all applicable governmental agencies has occurred and a final certificate of occupancy (or equivalent inspection sign-off by applicable governing agency) has been issued by covering the entire Project site without exception or condition; and
- d. The County accepts the Work as complete and, in its discretion, records a Notice of Completion and Acceptance.
- e. **“Force Majeure”** means any of the following unanticipated events not caused by County or Contractor, which materially and adversely affect Contractor’s obligations under the Contract: Acts of God as defined in Public Contract Code §7105, embargo, rebellion, war, terrorism, riot, act of sabotage, civil commotion, discovery of any archeological, paleontological or cultural resources, spill of hazardous substances by a third party not under the control of Contractor at or near the Project site which is required to be reported to the California Environmental Protection Agency, Department of Toxic Substances Control, discovery at, near or on the site of any species listed as “threatened” or “endangered” under the Federal or State Endangered Species Act, fire, flood, landslide. Force Majeure does not include epidemic, pandemic, virus, infection or other disease.

25. **“Hazardous Material”** means any pollutant, contaminant, toxic or hazardous waste, dangerous substance, potentially dangerous substance, noxious substance, toxic substance, flammable material, explosive material, radioactive material, urea formaldehyde foam insulation, asbestos, PCBs, or any other substances the removal of which is required, or the manufacture, preparation, production, generation, use, maintenance, treatment, storage, transfer, handling, or shipment of which is restricted, prohibited, regulated, or penalized by any and all federal, state, county, or municipal statutes or laws and regulations promulgated thereunder, now or at any time hereafter in effect, including, but not limited to, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Hazardous Materials Transportation Act, the Resource Conservation and Recovery Act (RCRA), the Federal Water Pollution Control Act, the Toxic Substances Control Act, the Occupational Safety and Health Act, and the Model Toxics Control Act, or similar state or local statute, as the laws have been amended and supplemented.

26. **“Notice”** means a written document issued by the County or Contractor which is submitted to the other party and delivered by:
- a. Depositing in the U.S. Mail (or other method of commercial express mail), which notice shall be effective on the date of receipt;
 - b. Service on the Parties’ representative or at the Contractor’s home office or field office, which notice shall be effective on the date of service; or,
 - c. Facsimile to the Parties’ representative or Contractor’s home office or field office, which notice shall be effective upon receipt.
27. **“Notice to Proceed”** is a written directive issued by the County authorizing the Contractor to perform some or all of the Work.
28. **“Parties”** refers to the Contractor and County of Riverside.
29. **“Plans”** or **“Project Drawings”** means the official plans, profiles, typical cross sections, general cross sections, working drawings, and supplemental drawings, or exact reproductions thereof, approved by the County, which show the location, character, dimension and details of the Work, and which are to be considered a part of the Contract Documents.
30. **“Project”** means the total construction of the Project identified in the Notice Inviting Bids of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other contractors and the County’s own forces.
31. **“Project Manager”** is the designated representative of the County responsible for the project.
32. **“Request for Change”** means a document, designated as a Request for a Change, prepared by the Contractor requesting either (1) a change in Contract Price; (2) a change in Contract Time; (3) a change in Contract Work; (4) a payment of money or damages; and/or, (5) any other relief arising out of or relating to this Contract.
33. **“Request for Information”** is a request from the Contractor to the County seeking an interpretation of a clarification of some requirement of the Contract Documents.
34. **“Resident Engineer”** will serve as the Project Manager’s on-site representative. All coordination, reporting, and issues related to non-compliance will be directed to the Project Manager through the Resident Engineer. In addition, the Resident Engineer will participate with the Project Manager in all decisions related to design issues which arise during the course of construction.
35. **“Riverside County”** or **“Riverside County Department of Waste Resources”** or **“County”** or **“Owner”** may be used interchangeably and refers to the County of Riverside, organized as a General Law County under the provision of the California Government Code.
36. **“Site”** or **“Project Site”** shall be understood to refer to the location at which construction, equipment or services furnished by the Contractor under the Contract will be performed, completed and/or delivered.

37. **“Standard Drawings”** unless otherwise noted, the Standard Drawings shall be those of the Riverside County Flood Control and Water Conservation District, Riverside County Transportation Department and Standard Plans of the State Department of Transportation (Caltrans).
38. **“Standard Specifications”** is a direct reference to the publication “Standard Specifications for Public Works Construction”, latest edition, written and promulgated by the Joint Cooperative Committee of the Southern California Chapter American Public Works Association and Southern California Departments Associated General Contractors of California. This publication is also known as the “Green Book”.
39. **“State Standard Specifications”** are the Standard Specifications of the State of California, Department of Transportation, latest edition.
40. **“Subcontractor”** means a person or entity that has a direct contract with the Contractor or with another Subcontractor to perform a portion of the Work, including without limitation, subcontractors, sub-subcontractors, suppliers, equipment operators, manufacturers and vendors, of any and every Tier.
41. **“Supplier(s)”** The term Supplier(s) shall mean any person or firm who is not performing work or supplying labor on Site and is engaged in the business of supplying a manufactured product or resource to the County, Contractor, or Subcontractors. The term Supplier(s) includes materialmen, manufacturers, and fabricators.
42. **“Substantial Completion”** means that stage in the progress of the Work where:
- a. The County has full and unrestricted use and benefit of the Project for the purpose intended;
 - b. All the systems and parts of the Contract Work are functional;
 - c. Utilities are connected and operate normally;
 - d. Only minor incidental work or correction or repair remains to complete all Contract requirements; and,
 - e. At the County’s option, the Contractor has provided all required permits and certificates.
43. **“Technical Specifications”** shall refer to the Special Provisions and Detailed Provisions of these Contract Documents.
44. **“Testing/Inspection Provider”** to be hired by the County to perform field and laboratory soil and materials testing and structural inspection services.

1.05 WORK BY COUNTY AND OTHERS

A. Permits:

1. County of Riverside Department of Environmental Health: Water Well Application.
 - a. The County shall be responsible for procuring well permits for the Project.
2. Contractor shall be responsible for obtaining all other required permits for the Project.

B. County's Testing and Inspection Services:

1. As specified in the Contract Documents, the County shall contract with testing and inspection agencies and/or use in-house inspection/testing services to ensure the Contractor is in compliance with the Contract Documents.
2. The County's testing and inspection agencies provide services for the County exclusively, except as indicated in this Section and in Section 01 4300 – Quality Assurance and Control.
3. Contractor Responsibilities:
 - a. The Contractor is required to perform, at no additional cost to the County, their own quality control program, including testing, inspection, and special inspections, as necessary to verify compliance with Contract Documents including source quality control testing as specified in Section 01 4300 – Quality Assurance and Control.
 - 1) The Contractor is prohibited from employing the same testing and inspection agency or agencies employed by the County.
 - b. The Contractor shall be responsible for costs for testing of Work that is subject to corrective action or that was otherwise untested, not observed or other problems attributable to the Contractor's performance of the Work.
 - c. The Contractor shall pay for additional testing above and beyond that required by the Contract Documents to facilitate the performance of its means and methods.

1.06 WARRANTY

- A. The Work shall be warranted in accordance with the General Provisions and Detailed Provisions Section 01 7700 – Closeout Procedures.
- B. In addition, certain elements of the Work require extended warranties as defined within the Detailed Provisions sections in Divisions 02 through 33.
 1. Sample mandatory extended warranty documents are contained in Detailed Provisions Section 01 7700 – Closeout Procedures.
- C. Warranty bond will be required from the Contractor.

1.07 PROJECT UTILITY SOURCES

A. Water Supply:

1. The Contractor shall make arrangements for obtaining a water supply for the Project and provide all labor and equipment to collect, load, transport, apply, and dispose water as necessary for dust control, excavation, grading, and other Project purposes. Water shall be clean and free from objectionable deleterious amounts of acids, alkalis, salts, or organic materials. Payment for complying with this section shall be considered as included in the various items of Work, and no additional compensation shall be allowed.
 - a. No potable water supply exists on-site. The nearest municipal non-potable water source is an irrigation canal located off-site, just north of the intersection of Lovekin Boulevard and 4th Avenue, approximately two (2) miles south of the Blythe Landfill entrance road. The Contractor is responsible for supplying potable water for all other uses.
 - b. The Contractor may make arrangements for obtaining water supply for this Project via a separate water source. If the Contractor elects to do so, water shall be clean and free from objectionable deleterious amounts of acids, alkalis, salts, or organic materials. County must approve separate water source in advance and in writing. In either case, Contractor shall provide all labor and equipment to collect, load, and apply water in the Work areas.

B. Fire Protection Service:

1. Contractor shall make provisions for fire protection for its operations utilizing portable firefighting equipment.

C. Electrical Power:

1. Contractor shall provide power during construction operations using engine generators certified for use by the California Air Resources Board (CARB).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01 1100

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 01 1400: WORK RESTRICTIONS

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SECTION 01 1400 WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Access and use of site.
2. Allowed working days and hours.
3. Equipment staging and material storage areas.
4. Protection of existing facilities and landfill operations.

1.02 DEFINITIONS

A. Limits of Construction:

1. The boundary beyond which no construction is allowed.
2. The Limits of Construction are as indicated on the Project Drawings.

B. Staging Areas:

1. Those areas where the Contractor and its Subcontractors and suppliers shall store and stage all equipment, offices, parking, materials and supplies to perform and complete the Work under this Contract.

1.03 ACCESS AND USE OF SITE

A. General:

1. Contractor shall have full use of the Project Location, defined as the Limits of Construction, for construction operations during the construction period. County will inform the Contractor of areas that are essential for County operations which shall not be disturbed, blocked, or impacted by the construction efforts.
 - a. The Contractor shall be aware that the Blythe Sanitary Landfill is an active landfill site. The Contractor's Work relating to the Project shall not impede or interrupt daily landfill operations in any way. Full cooperation of the Contractor and its forces is required to assure safe working conditions. Therefore, it is necessary to emphasize that the County will have full authority to eject any of the Contractor's employees or Subcontractors employees who do not immediately abide by the landfill site rules (See Appendix A – Landfill Site Safety Rules) or the directions of the County.

B. Access to the Site:

1. The Contractor shall only enter and exit the Project Location as directed by the County.

2. The Contractor shall mobilize all equipment and trucks only through construction access routes approved by the County.
3. Observe all landfill safety rules (See Appendix A – Landfill Site Safety Rules). Contractor shall adhere to the posted speed limits within the landfill site.
4. Contractor vehicles and equipment shall yield right of way to all County staff and landfill customer traffic.

C. Use of Site:

1. Limit use of Project Site to work in areas indicated. Do not disturb portions of Project Site beyond areas in which Work is indicated:
 - a. Roadways and Entrances: Keep roadways and entrances serving premises clear and available to the County and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
2. The Contractor shall coordinate Contractor Entrance gate security with the County, including Contractor provision for adding locks and chains.

1.04 WORK DAYS AND HOURS

- A. Work days hours may be between 6:30 AM to 5:00 PM, Monday through Friday, unless otherwise approved in writing by the County.
1. Eight (8) hours shall constitute a standard work day. Five days, Monday through Friday, shall constitute a standard work week. Standard shift workday shall be worked between the hours of 7:00 AM to 3:30 PM Monday through Friday with one-half hour unpaid lunch period. The Contractor may vary the start time to take advantage of daylight hours, weather conditions or shifts, to permit an even and manageable workflow. Nothing herein shall be construed as guaranteeing any employee eight (8) hours per day or forty (40) hours per week.
 2. Contractor may elect to work a four ten-hour day schedule (“4/10”), Monday through Thursday. Ten (10) hours, between 6:30 AM and 5:00 PM, shall constitute a workday on a 4/10 schedule. Any 4/10 schedule must be worked for a minimum of two (2) weeks and must be approved by the County prior to start of schedule.
 3. The Contractor and their Subcontractors will schedule an unpaid meal period of not more than one-half hour duration at the Project Location approximately at the midpoint of the scheduled work shift.
 4. Work activities that require inspection by the Riverside County Department of Facilities Management (RCDFM), Riverside County Fire Department (RCFD), Southern California Edison (SCE) and any other agencies other than the County, shall be scheduled and coordinated by the Contractor for the hours between 8:00 AM to 4:00 PM on weekdays, unless prior approval from the affected agency is obtained in advance.

5. Work outside the daily hours of 6:30 AM to 5:00 PM weekdays and work on Saturday and Sunday shall be subject to the County's approval. County approval shall be contingent upon Contractor agreeing to reimburse the County for costs to provide construction management, observation, inspection, and testing services outside the allowable work days and hours.
- B. The following days have been designated by the County as holidays:
1. January 1st – New Year's Day
 2. Third Monday in January – Martin Luther King, Jr
 3. February 12th – Lincoln's Birthday
 4. Third Monday in February – President's Day and Washington's Birthday
 5. Last Monday in May – Memorial Day
 6. July 4th – Independence Day
 7. First Monday in September – Labor Day
 8. Second Monday in October – Columbus Day
 9. November 11th – Veterans Day
 10. Last Thursday in November – Thanksgiving Day
 11. Day after Thanksgiving
 12. December 25th – Christmas Day
 13. For a holiday that falls on a Saturday, both the Saturday and the preceding Friday shall be considered legal holidays. For a holiday that falls on a Sunday, both the Sunday and following Monday shall be considered legal holidays.
 14. The Contractor shall not be permitted to work on days designated by the County as holidays unless the Contractor submits a written request to work and the request is approved in writing by the County. All Contractor requests to work on designated holidays shall be submitted at least seven (7) days prior to the requested date(s).

1.05 EQUIPMENT STAGING AND MATERIAL STORAGE AREAS

- A. Locations:
1. The Contractor is responsible to identify the staging and material storage areas within the specified Limits of Construction.
 2. Staging areas are for the Contractor's own use in staging equipment, trucks, work trailers, materials and other work.
- B. Contractor's use of the staging and storage areas shall not disrupt or interfere with the operation of the landfill.
- C. Do not utilize the landfill entrance road or scale facility area for unloading, staging and storage of any items, materials, and equipment.

- D. Staging areas shall be accessible to the County so that it may verify the presence and condition of equipment being stored. The Contractor shall confine equipment and maintain construction operations within limits indicated by Applicable Laws, ordinances, permits, and as outlined by the County.
- E. The maximum allowable time equipment units shall remain on site, in a condition that makes it incapable of performing its designed function, shall be five (5) working days. Any equipment needing further maintenance shall be moved off site for repairs, at the full expense of the Contractor. Equipment no longer needed shall also be removed within five (5) working days of its last use.
- F. All imported materials shall be stored in the designated area unless the Contractor obtains the County's written approval for an additional area. All imported materials to be used in construction shall be unloaded, stored, and handled in accordance with manufacturer and supplier recommendations to prevent damage to the materials.
- G. When delivery of a material occurs, the Contractor shall promptly observe shipments to assure that the material complies with requirements, that quantities are correct, and that the material is undamaged. The Contractor shall take full responsibility for any delay caused by a supplier or manufacturer.
- H. The storage area shall be accessible to the County, so that it may observe, verify, and document the presence and condition of materials being stored.
- I. Contractor shall protect materials from sun, rain, mud, soil, and debris and as stated by the manufacturer(s). Care shall be taken to protect manufactured materials against damage from misuse, mishandling, or accident. The Contractor shall store materials and maintain construction operations within limits indicated by Applicable Laws, ordinances, and permits as outlined by the County. Care shall be exercised to avoid blocking roads, interfering with County operations, or presenting a hazard to County personnel and equipment, or to the public.
- J. Contractor shall assume full responsibility for any theft or vandalism occurring to the Contractor's equipment, tools, materials, supplies, and construction (prior to final acceptance of the entire Project by the County), and shall take appropriate measures necessary to eliminate their occurrences. It is highly recommended to obtain security services for equipment and materials to prevent theft and vandalism while the site is unattended.

1.06 PROTECTION OF EXISTING FACILITIES AND ADJACENT LANDFILL OPERATIONS

- A. The Blythe Sanitary Landfill is an active facility; thus, all construction Work relating to the Project shall not impede or disrupt daily landfill business and operations. Contractor shall take all necessary steps to plan and execute Work so as not to damage or disrupt existing facilities, operations, and utilities.
- B. Report any damage to existing facilities and utilities caused by Contractor's operations immediately to the County.

- C. Repair, restore or replace any facilities damaged by Contractor's operations to the satisfaction of the County at no cost to the County.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01 1400

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 2900: PAYMENT PROCEDURES
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SECTION 01 2900 PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes the following:
 - 1. Basis and Measurement of Payment Quantities
 - 2. Liquidated Damages
 - 3. Progress Payments
 - 4. Progress payment supporting materials
 - 5. Resubmittal of progress payment applications
 - 6. Conditions necessary for payment
 - 7. Example Schedule of Values

1.02 DEFINITIONS

- A. Cubic Yard (CY) – Unless otherwise specified in these Detailed Provisions, where the term cubic yard appears it shall mean bank volume in the case of excavation; and compacted volume yielding the specified relative compaction, moisture content, and hydraulic conductivity, if required, in the case of engineered fill.
- B. Linear Feet (LF) – shall be measured along the horizontal length of the centerline of the installed material, unless otherwise specified. Pipe/conduit shall be measured along the length of the completed pipeline/conduit, regardless of the type of joint required, without deduction for the length of valves or fittings. Pipe/conduit included within the limits of Lump Sum items will not be measured.
- C. Lump Sum (LS) – A fixed Contract price for completion of defined Scope of Work.
- D. Schedule of Values – Establishes Unit Prices for individual items of Work. Will be the basis for payment of Contract Work and will be used to establish payment for any “extra Work” i.e., Work requested which is beyond the scope of the original Contract.
- E. Square Feet (SF) – Area of a square with sides of one (1) foot. Quantities shall be calculated to the nearest square foot of true (i.e. including slope surface area) area.

1.03 SCHEDULE OF VALUES

- A. Submit the Schedule of Values no later than fourteen (14) calendar days following issuance of Notice of Intent to Award. DO NOT SUBMIT THE SCHEDULE OF VALUES WITH BID PROPOSAL.
- B. Submit corrected Schedule of Values within ten (10) calendar days upon receipt of reviewed or rejected Schedule of Values for approval by the County.
- C. Upon request, support prices with data which will substantiate their correctness.

- D. The County reserves the right to delete any item included in the approved Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.
- E. The County reserves the right to increase or decrease quantities of any item included in the approved Schedule of Values and increase or decrease the Contract Price by the scheduled amount.
- F. Software: Microsoft Excel 2010 or more recent; no other software will be permitted.
- G. Format:
 - 1. Develop a Schedule of Values format acceptable to the County, and that provides an effective tool for establishing monthly progress amounts and calculating earned value by the County.
 - 2. In general, indicate Work in the same Work Breakdown Structure used for the Project Baseline Schedule and further divided among the Project milestones.
 - 3. An example Schedule of Values format is included at the end of this Section only to provide a starting point for development of a practical and efficient Schedule of Values. The County may request additional detail as necessary to adequately represent the Work. The Contractor may provide an additional breakdown of any items listed in the example. The Contractor shall verify and revise, if necessary, all quantities and items of Work prior to submittal.
 - 4. Allocate costs to the Schedule of Values items consistent with the Scope of Work associated with the line item.
 - a. Breakdown costs, itemized by Detailed Provisions Section and trade, and distribute cost to individual applicable cost items.
 - b. Where structures, units, equipment or other components are identified by a specific series or identification number, utilize said designation throughout the Schedule of Values.
- H. Prorate overhead and profit to the activities.
 - 1. Each item in the Schedule of Values, and Applications for Payment, are to be complete, including its proportional share of supervision, overhead and profit margin.
- I. Updates of the Schedule of Values:
 - 1. County will provide coordinated Schedule of Values accompanying each Application for Payment, including approved Changes, for review and approval by the Contractor.
 - 2. Change Orders arising from additional Work will be listed as individual items in the schedule. Alterations to items originally included in the Contract will be tracked in the original lines with the quantity of the Change Order(s) noted and any deletions of such items crossed out.

1.04 BASIS AND MEASUREMENT OF PAYMENT QUANTITIES

- A. Although the County will keep track of and update the official Work completed quantities in the Schedule of Values, it is the Contractor's responsibility to measure and compute the quantities of Work completed under the terms of the Contract, subject to verification by the County. In computing quantities, the length, area, solid contents, number, weight, or time as specified in the Contract or the Schedule of Values must be used.
- B. The Contract Price shall cover the Work required by the Contract Documents. All costs in connection with the successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the Contractor's Bid Proposal and broken down into further detail in the approved Schedule of Values.
- C. All estimated quantities stipulated in the Contract Documents (Contractor's Proposal, example of Schedule of Values, etc.) are approximate and are to be used only for the purpose of comparing the Bids submitted for the Work and as a basis for determining an initial Contract Price. The actual amounts of Work completed and materials furnished under unit cost items may differ from the estimated quantities. The County does not expressly or by implication represent that the actual quantities involved will correspond exactly to the quantities provided by the County in the Contractor's Proposal or example of Schedule of Values; nor shall the Contractor plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the Work. Payment to the Contractor will be made only for the actual quantities of Work performed or material furnished for unit cost bid items, in accordance with the Project Drawings and Detailed Provisions, and it is understood that the quantities may be increased or decreased as provided in Section 2.6 of the General Provisions. The Contractor agrees that it will make no Claim for damages, anticipated profits, or otherwise because of any difference between the amounts of Work actually performed and materials actually furnished and the estimated amounts therefore.
- D. Methods of Measurement:
 - 1. Units of measurement shall be defined in general terms as follows:
 - a. Linear Feet (LF)
 - b. Square Feet (SF)
 - c. Square Yards (SY)
 - d. Cubic Yards (CY)
 - e. Each (EA)
 - f. Lump Sum (LS)
 - g. Acres
 - h. Tons

2. Unit Cost Items:

- a. The County reserves the right to delete any item included in the Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.
- b. Linear Feet (LF) shall be measured along the horizontal length of the centerline of the installed material, unless otherwise specified. Pipe/conduit shall be measured along the length of the completed pipeline/conduit, regardless of the type of joint required, without deduction for the length of valves or fittings. Pipe included within the limits of Lump Sum items will not be measured.
- c. Square Feet (SF), Square Yards (SY), Cubic Yards (CY), Each (EA), Acres and Tons shall be measured as the amount of the unit of measure installed and compacted within the limits specified and shown in the Project Drawings and Detailed Provisions. True area shall be determined by using surveying methods to measure slope angles and elevations. Contractor shall provide supporting documentation (i.e. drawings, delivery tickets, invoices, survey calculations, etc.) to verify actual installed quantities. Unless otherwise specified in these Detailed Provisions, where the term Cubic Yard appears it shall mean bank volume in the case of excavation; and compacted volume yielding the specified relative compaction, moisture content, and hydraulic conductivity, if required, in the case of engineered fill.
- d. Payment for Work will be based on the approved Schedule of Values per unit of measurement based upon the actual quantities of Work measured upon completion. Estimated quantities provided in the Contract Documents are for bidding purposes only, and the County does not express or imply that the actual amount of the Work or materials will correspond to the estimated quantities.
- e. Unit costs shall include all services, obligations, responsibilities, labor, materials, devices, equipment, royalties and license fees, supervision, temporary facilities, clean up, traffic control, survey, field offices, close out, overhead and profit, connections, appurtenances and any other incidental items of any kind or nature, as are necessary to complete the Work in accordance with the Contract Documents.

3. Lump Sum Items:

- a. The County reserves the right to delete any item included in the Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.
- b. Adjustments to Lump Sum costs provided in the accepted Schedule of Values may be made only by Change Order.
- c. Progress payments for each individual lump sum item will be processed on a percentage of completion basis as estimated by the Contractor and approved by the County. In instances where the line item must be performed over the life of the Project (such as Dust Control, SWPPP Implementation, Traffic Control, etc.), the line item payment made will be based on the percentage completion of the project multiplied by the item Lump Sum. Percentage completion of the

Project will be based on the percentage of the construction price approved to date.

- d. Lump Sum items shall include all services, obligations, responsibilities, labor, materials, devices, equipment, royalties and license fees, supervision, temporary facilities, clean up, traffic control, survey, field offices, close out, overhead and profit, connections, appurtenances and any other incidental items of any kind or nature, as are necessary to complete the Work in accordance with the Contract Documents.

4. Specific Cost Items:

a. Earthwork:

- 1) Unless otherwise stated, the final measurement of all earthwork quantities shall be calculated to the nearest cubic yard (CY) based upon comparison of pre-construction and post-construction surveyed surfaces of the project Work. These surfaces may be established by a combination of conventional ground surveying and photogrammetry of the Project Work areas performed by the County. Unless otherwise stated, the surface for any layer which will be covered by subsequent layers shall be established by ground surveying. Final volumetric calculation of earthwork quantities for payment purposes shall be performed by the County based upon the resulting Digital Terrain Models (DTM) using the grid volume method with a grid interval of five (5) feet by five (5) feet (See Detailed Provisions Section 01 4320 – Surveying). It should be noted that different methods may be used by the County for determining quantities for progress payments. However, the earthwork quantities used for progress payments will be adjusted at the completion of the Work based upon the final measurement method stated in this paragraph.

b. Mobilization:

- 1) For the purposes of this Contract, mobilization shall mean Contractor has received Notice to Proceed, provided necessary bonds and insurance, installed temporary structures and storage areas, has moved its primary construction equipment on site and is ready to proceed with construction operations. Unless otherwise noted in the Special Provisions, the maximum amount for mobilization shall be no greater than five percent (5%) of the Contract Price.
- 2) When five percent (5%) of the original Contract Price is earned, from Contract items, excluding amounts due or paid for materials on hand, fifty percent (50%) of the amount allowed for mobilization will be paid.
- 3) When ten percent (10%) of the original Contract Price is earned, from Contract items, excluding amounts due or paid for materials on hand, seventy-five percent (75%) of the amount allowed for mobilization will be paid.
- 4) When twenty percent (20%) of the original Contract Price is earned, from Contract items, excluding amounts due or paid for materials on hand, one

hundred percent (100%) of the amount allowed for mobilization will be paid.

- 5) The County will not pay additional mobilization compensation for a Contract Change Order unless necessary solely for the performance of Contract Change Order Work and prior written approval is obtained from the County.

c. Demobilization:

- 1) For the purposes of this Contract, demobilization shall mean the Contractor has received the Certificate of Substantial Completion, has removed temporary structures and storage areas, has removed its primary construction equipment, performed final clean-up of each Project Location, and no longer has physical presence on the Site. Unless otherwise noted in the Special Provisions, the minimum amount for demobilization shall not be less than one-half percent (0.5%) of the Contract Price.
- 2) When the conditions specified above for demobilization have been met one hundred percent (100%) of the amount allowed for demobilization will be paid.

1.05 AUTHORIZED TIME & MATERIAL WORK

- A. Authorized Time and Materials may be used by the County for extra work that has been negotiated in writing between the County and the Contractor. Use of Authorized Time and Material allocation will be at the sole discretion of the County. All or any portion of the allocation amount may be deleted from the Contract. The County shall have the right to add work of a different character or function, and have the Contractor perform such added work when such work is considered by the County to be appurtenant to the satisfactory completion of the project.
- B. The Contractor shall provide a rate schedule for all labor and equipment that may reasonably be anticipated for use during the project. Labor rates shall be consistent with those required by the prevailing wage rate requirements of the Contract and as set forth by the California Department of Industrial Relations "General Prevailing Wage Determinations" and shall reflect all benefits and employer costs. Once the labor and equipment rates have been approved by the County, they will become the basis for compensation for any Time and Material work requested by the County.
- C. The equipment rental rates to be applied shall be the rates that are in effect at the time of the award of the contract, as published by the California Department of Transportation (Caltrans).
- D. The signing of the contract by the Contractor will be deemed to be an agreement on their part to perform the added work, as and when ordered by the County. If the required added work results in delay to the project, the Contractor will be given an appropriate extension of time.
- E. Payment for "Authorized Time and Materials" shall be made when prior written authorization and approval has been provided to the Contractor by the County.

Contractor shall submit invoices for all aspects of “Authorized Time and Materials” work including but not limited to material receipts, equipment rental invoices, and subcontractor and vendor invoices.

- F. Unless otherwise negotiated by the County and Contractor, the cost of all work performed by the Contractor on an “Authorized Time and Material” basis will be computed in the manner described in Section 7.3. of the General Provisions in the Contract Documents, and the compensation thus provided shall be full payment to the Contractor related to the authorized time and material work.

1.06 LIQUATED DAMAGES

- A. The Liquidated Damage amounts, set forth in this Section, will be assessed for Contractor’s failure to achieve completion for the following Project milestones:
 - 1. Project Substantial Completion – The Liquidated Damages reduction to the Contract Price for failure to reach Substantial Completion for the Project is Two Hundred Fifty Dollars (\$250) per day for each additional Working Day required to properly complete the Work in excess of the established contractual date for achieving Project Substantial Completion.
 - 2. Final Acceptance – The Liquidated Damages reduction to the Contract Price for failure to reach Final Acceptance for the Project is One Hundred Dollars (\$100) per day for each additional Working Day required to properly complete the Work in excess of the established contractual date for achieving Project Final Acceptance.

1.07 PROGRESS PAYMENT SUBMITTAL

- A. No Progress Payment will be made when, in the judgement of the County, the Work is not proceeding in accordance with the provisions of the Contract, or when the total Work done since the last Progress Payment amounts to less than one thousand dollars (\$1,000). Unless otherwise agreed to at the Pre-Construction meeting or identified in the Special Provisions, on or about the last day of each month, the County shall make an estimate in writing of the total amount of Work done by the Contractor, and the acceptable materials furnished and incorporated in the Work, including that done under approved Change Orders, through the end of the month for Contractor’s review. Contractor shall notify the County within seven (7) days if they dispute the County’s estimate. County will then use the approved Schedule of Values to prepare a Progress Payment request for the items, or portions of items, of the Work completed during the monthly progress period. After deducting all previous payments, the retention as described in Section 1.08 of this Detailed Provisions Section and Section 7.5 of the General Provisions, and other withholdings or deductions specified in Section 1.07 of this Detailed Provisions Section, the County will pay the Contractor the balance.
- B. The payment of a Progress Payment or the acceptance of payment by the Contractor does not constitute acceptance of any portion of the Work, and does not reduce the Contractor’s liability to replace unsatisfactory Work, material, or equipment. An inadvertence or error in an approved Progress Payment request will not release the Contractor or the Contractor’s Surety from damages arising from the Work covered by

the approved payment request or from enforcement of every provision of the Contract. The County has the right to correct any error made in any Progress Payment.

C. Progress Payment Supporting Materials - the following items are required upon request by the County to be included with any request for Progress Payment:

1. Updated current status of the Schedule of Values.
2. Monthly Update Schedule identified in Detailed Provisions Section 01 3200 – Construction Progress Documentation.
3. Paid receipts to support payment for materials on hand.
4. Materials orders.
5. Paid equipment lists and rental agreements.
6. Work purchased but not installed:
 - a. Provide separate line items on the Application for Payment.
 - b. Identify the location, and disposition of materials, products, fabrications, and equipment as of the date of the Application for Payment.
 - c. Provide invoices and receipts.
 - d. Provide an Insurance Certificate or a copy of the bond from the bonded warehouse storing the material.
 - e. Provide photograph documentation.
 - f. Identify exact material; include quantity and measurement unit.

D. Resubmittal of Progress Payment Applications

1. Should the County determine the information to prepare an Application for Payment is incomplete, improperly executed, or incorrect, County will provide notice to the Contractor as soon as practicable, but no later than seven (7) days after becoming aware of such inconsistency. Such notice shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
2. Contractor shall revise and resubmit any such information in accordance with the provisions of this Detailed Provisions Section.
3. Processing of the resubmittal will begin when required revisions have been submitted, and are deemed fully documented for review by the County.
4. Comply with instructions provided by the County identifying required revisions.

1.08 WITHHOLDING/DENIAL OF PROGRESS PAYMENT REQUEST

- A. Failure to comply with the requirements of this Section will be cause for delay in review and acceptance of the Application for Payment as defined in the Contract.
- B. The Monthly Update Schedule identified in Detailed Provisions Section 01 3200 – Construction Progress Documentation and is required to accompany Applications for

Payment as a condition of receiving payment for Work accomplished each payment period.

- C. Record Drawings: Maintaining Record Drawings up to date.
- D. The County may deny a Progress Payment request and/or withhold money from any Progress Payment to:
 - 1. Cover any unpaid Claims filed pursuant to Civil Code Section 3179 et seq;
 - 2. Protect the County's interest; and/or
 - 3. Pay any fines levied against the Work by the County or other entities.
- E. The County may also deny a Progress Payment request and/or withhold money or modify any previous Progress Payment as necessary to protect the County from loss due to or resulting from:
 - 1. Defective Work not remedied.
 - 2. Stop notices filed. The County may, at its discretion, accept a bond in lieu of withholding funds for properly filed stop notices. However, the bond must be issued by a different Surety than the one that issued the Contractor's Payment Bond for the project. The amount withheld for stop notices will one-hundred twenty-five percent (125%) of the stop notice amount.
 - 3. Failure of the Contractor to make prompt payments properly to Subcontractors for labor, materials, or equipment as required by Business and Professions Code Section 7108.5.
 - 4. Evidence that the Work cannot be completed for the unpaid balance of the Contract sum.
 - 5. Evidence that the Work will not be completed within the Contract time.
 - 6. Damage to the County or another Contractor.
 - 7. Failure to carry out the Work in accordance with the Contract.
 - 8. Any violation or non-compliance with Contractor's legal responsibilities, including withholds for wages adjustments in accordance with California Labor Code Section 1727 and any fines incurred by the County as a result of the Contractor's actions.
- F. When, under the provisions of the Contract, the County charges any sum of money against the Contractor, the County will deduct and retain the amount of such charge from a Progress or Final Payment. If, on completion or termination of the Contract, sums due the Contractor are insufficient to pay the County charges against the Contractor, the County has the right to recover the balance from the Contractor or the Contractor's Surety.

1.09 RETENTION

- A. As stated in Section 7.5 of the General Provisions and in accordance with Public Contract Code section 7201(b)(1), five percent (5%) of each Progress Payment will be retained until the Work has been completed.
- B. Substitution of Securities – At the request and expense of the Contractor, in accordance with California Public Contract Code Section 22300, in lieu of the County withholding the five percent (5%) retention defined within this Detailed Provisions Section, the Contractor may: 1) substitute a deposit of securities at least equivalent to the retention to be paid, or 2) request the County pay retention directly to an escrow agent. The Contractor and County shall enter an escrow agreement in the exact form set forth in Public Contract Code Section 22300. Such an agreement will need to be approved by the County Board of Supervisors.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 SCHEDULE OF VALUES FORM

- A. See the following pages for a sample format of the Schedule of Values, which is provided only as an example to provide a starting point for development of a practical and efficient Schedule of Values. The County may request additional detail as necessary to adequately represent the Work. The Contractor may provide an additional breakdown of any items listed in the example. The Contractor shall verify and revise if necessary, all quantities and items of Work prior to submittal. The Schedule of Values submitted by the Contractor and approved by the County shall be incorporated as part of the Contract Documents for basis of payment. **DO NOT SUBMIT THE SCHEDULE OF VALUES WITH BID PROPOSAL.**

CONSTRUCTION OF GROUNDWATER WELLS AT THE BLYTHE SANITARY LANDFILL
EXAMPLE SCHEDULE OF VALUES FORM

DO NOT SUBMIT THE SCHEDULE OF VALUES WITH BID PROPOSAL.

DATE: _____

INSTRUCTIONS FOR CONTRACTOR'S SCHEDULE OF VALUES:

1. FILL OUT FORM COMPLETELY
2. LEAVE NO "VALUE" EMPTY.
3. ZERO ("0") IS NOT A "VALUE".
4. INSERT A "VALUE" INTO EVERY SPACE A "\$" SYMBOL IS INDICATED.
5. DO NOT ADD "LINE ITEMS" BELOW THE "TOTAL" VALUE.
6. DO NOT INCLUDE VALUES FOR BID ALTERNATES THAT ARE REQUIRED ON THE BID FORM.
7. DO NOT INCLUDE VALUES FOR ALLOWANCES.
8. COMPLETE THE ACKNOWLEDGEMENT, THEN SIGN, AND DATE WHERE INDICATED BELOW.

Item No.	Item Description	Contract Document Reference	Unit	Unit Cost	Quantity	Total Cost
BID ITEM NO. 1 - MOBILIZATION (Max 5% of Contract Price)						
1-1	Performance and Payment Bonds	Notice Inviting Bids	LS	\$	1	\$
1-2	Certificates of Insurance – Workers' Compensation, General and Professional Liability, and Motor Vehicle Insurance.	General Provisions, Special Provisions	LS	\$	1	\$
1-3	Schedule of Values Form Preparation and Maintenance	01 2000 - Payment Procedures	LS	\$	1	\$
1-4	Project Baseline Schedule Preparation and Maintenance	01 3200 - Construction Progress Documentation	LS	\$	1	\$
1-5	Health and Safety Plan Preparation and Implementation	01 3500 - Health and Safety	LS	\$	1	\$
1-6	Provide Temporary Facilities (structures, sanitary facilities) and Controls (construction fencing, barricades, signage, storage, utilities, security, etc.)	01 5000 - Temporary Facilities and Controls	LS	\$	1	\$
1-7	HMBEP (if applicable) Preparation and Implementation	01 5600 - Project Environmental Controls	LS	\$	1	\$
Bid Item No. 1 - Mobilization (Max 5% of Contract Price) (Total Cost Must Equal Contractor's Proposal)						\$

PAYMENT PROCEDURES

Item No.	Item Description	Contract Document Reference	Unit	Unit Cost	Quantity	Total Cost
BID ITEM NO. 2 – MODIFY EXISTING GROUNDWATER PRODUCTION WELLHEAD						
2-1	Remove Existing Wellhead Fitting and Appurtenances (Gate Valve, Well Vent, Electrical Junction Box, Run Timer Switch, etc.)	01 1100 – Summary of Work	LS	\$	1	\$
2-2	Furnish and Install 10” Diameter Locking Wellhead Cap	01 1100 – Summary of Work	EA	\$	1	\$
2-3	Decommission Existing Electrical Connections and Salvage Existing Pump Control Panel	01 1100 – Summary of Work	LS	\$	1	\$
Bid Item No. 2 – Modify Existing Groundwater Well Head (Total Cost Must Equal Contractor's Proposal)						\$
BID ITEM NO. 3 – DRILL AND DEVELOP GROUNDWATER MONITORING WELL						
3-1	Drill and Sample 10” Borehole (Contractor-Provided Water)	33 1153 – Groundwater Monitoring Wells	LF	\$	200	\$
3-2	Furnish and Install 4” Slotted Well Screen	33 1153 – Groundwater Monitoring Wells	LF	\$	20	\$
3-3	Furnish and Install 4” Blank Well Casing	33 1153 – Groundwater Monitoring Wells	LF	\$	180	\$
3-4	Furnish and Install Filter Pack	33 1153 – Groundwater Monitoring Wells	LF	\$	30	\$
3-5	Furnish and Install Transition Sand	33 1153 – Groundwater Monitoring Wells	LF	\$	5	\$
3-6	Furnish and Install Pellet Annular Seal	33 1153 – Groundwater Monitoring Wells	LF	\$	5	\$
3-7	Furnish and Install Transition Seal	33 1153 – Groundwater Monitoring Wells	LF	\$	155	\$
3-8	Furnish and Install Sanitary Seal	33 1153 – Groundwater Monitoring Wells	LF	\$	5	\$
3-9	Furnish and Install Above Ground Well Head Protection	33 1153 – Groundwater Monitoring Wells	EA	\$	1	\$
3-10	Well Development	33 0111 – Well Development	HR	\$	16	\$
3-11	Drill Rig Standby	33 1153 – Groundwater Monitoring Wells	HR	\$	4	\$
3-12	Rock Clause Drilling	33 1153 – Groundwater Monitoring Wells	HR	\$	4	\$
3-13	Furnish and Install Metal Bollards	33 1153 – Groundwater Monitoring Wells; 32 3913 Manufactured Metal Bollards	EA	\$	4	\$
Bid Item No. 3 – Drill and Develop Groundwater Monitoring Well (Total Cost Must Equal Contractor's Proposal)						\$

Item No.	Item Description	Contract Document Reference	Unit	Unit Cost	Quantity	Total Cost
BID ITEM NO. 4 – DRILL, DEVELOP, AND TEST GROUNDWATER PRODUCTION WELL						
4-1	Drill and Sample 14" Borehole (Contractor-Provided Water)	33 1114 - Non-Potable Water Production Wells	LF	\$	405	\$
4-2	Furnish and Install 8" Slotted Well Screen	33 1114 - Non-Potable Water Production Wells	LF	\$	160	\$
4-3	Furnish and Install 8" Blank Well Casing	33 1114 - Non-Potable Water Production Wells	LF	\$	240	\$
4-4	Furnish and Install Filter Pack	33 1114 - Non-Potable Water Production Wells	LF	\$	230	\$
4-5	Furnish and Install Transition Sand	33 1114 - Non-Potable Water Production Wells	LF	\$	5	\$
4-6	Furnish and Install Pellet Annular Seal	33 1114 - Non-Potable Water Production Wells	LF	\$	5	\$
4-7	Furnish and Install Transition Seal	33 1114 - Non-Potable Water Production Wells	LF	\$	160	\$
4-8	Furnish and Install Sanitary Seal	33 1114 - Non-Potable Water Production Wells	LF	\$	5	\$
4-9	Furnish and Install Temporary Test Pump, Electrical Cables, Column Piping, Wellhead Discharge Piping, and Pump Control Panel.	33 1114 - Non-Potable Water Production Wells	LS	\$	1	\$
4-10	Perform Two (2) Hour Continuous Test Pumping of Well and Document Results for Submittal to the County.	33 1114 - Non-Potable Water Production Wells	LS	\$	1	\$
4-11	Remove Temporary Test Pump, Electrical Cables, Column Piping, Wellhead Discharge Piping, and Pump Control Panel.	33 1114 - Non-Potable Water Production Wells	LS	\$	1	\$
4-12	Well Development	33 0111 – Well Development	HR	\$	32	\$
4-13	Drill Rig Standby	33 1114 - Non-Potable Water Production Wells	HR	\$	8	\$
4-14	Rock Clause Drilling	33 1114 - Non-Potable Water Production Wells	HR	\$	8	\$
4-15	Furnish and Install Above Ground Well Head Protection	33 1114 - Non-Potable Water Production Wells	EA	\$	1	\$

PAYMENT PROCEDURES

Item No.	Item Description	Contract Document Reference	Unit	Unit Cost	Quantity	Total Cost
4-16	Furnish and Install Metal Bollards	33 1114 - Non-Potable Water Production Wells; 32 3913 Manufactured Metal Bollards	EA	\$	4	\$
Bid Item No. 4 – Drill, Develop, and Test Groundwater Production Well (Total Cost Must Equal Contractor's Proposal)						\$
BID ITEM NO. 5 – FURNISH AND INSTALL NEW SUBMERSIBLE VERTICAL TURBINE PUMP SYSTEM						
5-1	Furnish and Install New 6-inch Stainless Steel Submersible Vertical Turbine Pump, Model SP 230N250-7 with MS6000CRQWFT40 3 PH, 460V, 60 Hz, 25 HP Motor and Appurtenances as Manufactured by Grundfos Pumps or Approved Equal.	33 1136 – Submersible Well Pumps	LS	\$	1	\$
5-2	Furnish and Install Submersible Cable within Well Casing, One (1) Continuous Length from Pump Motor leads to Wellhead Junction Box.	33 1136 – Submersible Well Pumps	LF	\$	370	\$
5-3	Furnish and Install Underground Power Cable from Wellhead Junction Box to Salvaged Pump Control Panel. Cable shall be Installed in Red-Dyed, Concrete-Encased Schedule 80 PVC Conduit sized per Cable Manufacturer Recommendations. Furnish and Install Detectable Warning Tape above Encasement.	33 1136 – Submersible Well Pumps; 26 0519 – Wire and Cable: 600 Volt and Below; 26 0533 – Raceways and Boxes; 26 0553 – Identification for Electrical Systems; 26 0543 – Electrical: Exterior Underground; 31 2133 – Trenching, Backfilling, and Compacting for Utilities	LF	\$	200	\$
5-4	Furnish and Install 3-inch Diameter Hot-Dipped Galvanized, PVC Tape Wrapped, Standard Weight Schedule 40 Steel Column Pipe. Steel Pipe shall start at Wellhead and Transition with Adapters to PVC Column Pipe.	33 1136 – Submersible Well Pumps	LF	\$	52	\$
5-5	Furnish and Install 3-inch Diameter Schedule 80 PVC Cert-Lok Column Pipe with Adapters to Transition to New Steel Column Pipe and Connect to New Pump.	33 1136 – Submersible Well Pumps	LF	\$	306	\$
5-6	Furnish and Install 1-inch Diameter Schedule 40 PVC Pipe to be used as Sounding Tube for Well.	33 1136 – Submersible Well Pumps	LF	\$	370	\$
5-7	Furnish and Install Sanitary Seal Wellhead to Accommodate Column Piping, Submersible Pump Cable, Sounding Tube and Well Vent.	33 1136 – Submersible Well Pumps	LS	\$	1	\$

Item No.	Item Description	Contract Document Reference	Unit	Unit Cost	Quantity	Total Cost
5-8	Furnish and Install Wellhead Fittings and Appurtenances (Gate Valve, Well Vent, Electrical Junction Box, etc.) and Connect to Underground Discharge Piping.	33 1136 – Submersible Well Pumps	LS	\$	1	\$
5-9	Install Salvaged Pump Control Panel consisting of NEMA Type 3 Enclosure and Furnish and Install Components as Recommended by Pump Manufacturer. At a Minimum, Panel shall include the following Components: Solid State Starter/Pump Controller, Fusible Disconnect Switch, Surge Protector Device, Lightning Arrester, Thermal Overload and Dry-Running Protection with Motor Temperature Readout, HOA Switch, Dry Contacts, Run Light, and Run Time Meter. Panel shall be installed using Steel-Slotted Support System supported independently by Concrete Post Footings.	26 0500 – Basic Electrical Requirements; 26 0526 – Grounding and Bonding for Electrical Systems; 26 0529 – Hangers and Supports for Electrical Systems; 26 0553 – Identification for Electrical Systems; 26 0916 – Control Equipment Accessories; 26 2419 – Motor-Control Centers; 26 2800 – Overcurrent and Short Circuit Protective Devices; 26 2816 – Safety Switches; 26 4313 – Low Voltage Surge Protection Devices	LS	\$	1	\$
5-10	Provide all necessary Inspection and Testing Services and obtain Manufacturer Certificates.	33 1136 – Submersible Well Pumps	LS	\$	1	\$
5-11	Perform and Submit to the County Results from Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Components of Pump System	33 1136 – Submersible Well Pumps; 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.	LS	\$	1	\$
5-12	Perform and Document Pump Start-Up and Efficiency Testing (Continuous 1-Hour), Provide Pump Manufacturer Certificate of Installation	33 1136 – Submersible Well Pumps	LS	\$	1	\$
5-13	Procure Pump Manufacturer Services to Provide a Minimum 4-Hour Training of County Staff.	33 1136 – Submersible Well Pumps	LS	\$	1	\$
Bid Item No. 5 – Furnish and Install New Submersible Vertical Turbine Pump System (Total Cost Must Equal Contractor's Proposal)						\$
BID ITEM NO. 6 – FURNISH AND INSTALL NEW 12,000-GALLON PORTABLE WATER TOWER WITH AUTOMATIC FILL						
6-1	Prepare Subgrade (Overexcavate, Moisture-Condition, & Recompect to 90% Compaction)	33 1600 - Water Utility Storage Tanks; 31 2133 - Trenching, Backfilling, and Compacting for Utilities	CY	\$	12	\$
6-2	Furnish and Install Wiring, Conduit, Connections, and Necessary Switch Controls for Automatic Filling System	33 1600 - Water Utility Storage Tanks	LS	\$	1	\$

PAYMENT PROCEDURES

Item No.	Item Description	Contract Document Reference	Unit	Unit Cost	Quantity	Total Cost
6-3	Furnish and Install Underground 4-inch Diameter PVC Discharge Piping and Fittings from Wellhead to Water Tower	33 1600 - Water Utility Storage Tanks	LF	\$	50	\$
6-4	Furnish and Install Aboveground 4-inch Diameter PVC Discharge Piping and Appurtenances to the Water Tower Fill Inlet	33 1600 - Water Utility Storage Tanks	LS	\$	1	\$
6-5	Furnish and Install New 12,000-Gallon Portable Water Tower by Valew or Approved Equal	33 1600 - Water Utility Storage Tanks	EA	\$	1	\$
Bid Item No. 6 – Furnish and Install 12,000-Gallon Water Tower with Automatic Fill (Total Cost Must Equal Contractor's Proposal)						\$
BID ITEM NO. 7 – AUTHORIZED TIME & MATERIALS (T&M)						
7-1	Authorized Time & Materials (T&M)		LS	\$25,000.00	1	\$25,000.00
Bid Item No. 7 – Authorized Time & Materials (T&M)						\$25,000.00
BID ITEM NO. 8 – DEMOBILIZATION (MIN. ½% OF CONTRACT PRICE)						
8-1	Prepare and Submit for County Acceptance all Required O&M Manuals	01 7823 Operation and Maintenance (O&M) Manuals	LS	\$	1	\$
8-2	Perform all Required Closeout Procedures including, but not limited to: Project Record Documents, Warranties, Repair Work, Work Verification Survey, Final Cleaning and Removal of all Equipment	01 7700 Closeout Procedures	LS	\$	1	\$
Bid Item No. 8 – Demobilization (Min. ½% of Contract Price) (Total Cost Must Equal Contractor's Proposal)						\$
PROJECT TOTAL COST (TOTAL COST MUST EQUAL CONTRACTOR'S PROPOSAL)						\$

Contractor's Signature

Date

END OF SECTION 01 2900

PAYMENT PROCEDURES



SPECIFICATIONS – DETAILED PROVISIONS

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SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes the following:
1. Project coordination.
 2. Coordination drawings.
 3. Informational submittals.
 4. Pre-construction meeting.
 5. Pre-installation meetings.
 6. Weekly progress meetings.
 7. Requests for Information (RFI).
 8. Requests for Change (RFC).
 9. Schedule for forms.

1.02 PROJECT COORDINATION

- A. General: Contractor shall coordinate construction activities to assure efficient and orderly performance of the Work and avoidance of interference with County landfill operations and customers. Coordinate construction activities included in different Sections of the Detailed Provisions that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Lost Time Avoidance:
1. Coordinate with crews and work areas to reduce and eliminate lost time.
- C. Utilities:
1. Coordinate construction activities with utility service providers required for performance of the Work.

- D. Administrative Procedures: Contractor shall coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation and maintenance of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-construction, pre-installation, and weekly project meetings.
 - 7. Startup and adjustment of systems.
 - 8. Project closeout activities.
- E. Contractor shall be responsible for completion, and administration of required forms.
 - 1. The County will provide required and suggested forms and formats during and after the Pre-Construction Meeting.
- F. Formats not prescribed by the County may be of the Contractor's own design, subject to the following:
 - 1. Contractor-designed forms shall use Arial typeface, eleven (11) point type size, and shall be double-sided printed.
 - 2. Submit draft forms for review and approval by the County.

1.03 COORDINATION DRAWINGS

- A. General: Prepare coordination drawings according to requirements in individual Detailed Provisions Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one (1) entity.
 - 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on the Drawings. Specifically, note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to County indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawings Shall Depict:

1. Equipment: Lighting, electrical panels, and any other equipment with particular clearance requirements or subject to interferences with other equipment or features of the adjacent mechanical, electrical, civil, structural or architectural systems.
2. Utility Ducts and Lines: Mechanical ductwork, electrical conduits and junction boxes, water lines, sewer lines, telecommunications lines, storm drain lines, fire protections systems, alarm system lines, hydraulic lines, low voltage system lines, building process system lines, pneumatic pressure lines and other ducts, lines, pipes, and conduits connecting components of utility systems.
3. Building and Site Features: Civil, structural and architectural features including all doors that affect the routing, placement or mounting of utility equipment, ducts, or lines.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Review: County will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility.

1.04 PRE-CONSTRUCTION MEETING

A. Schedule:

1. The County will schedule the Pre-Construction Meeting.
2. It is anticipated that the initial Pre-Construction Meeting will be held within fourteen (14) calendar days of Contract Award. The Pre-Construction meeting may be scheduled to coincide with the issuance of the Notice to Proceed, or scheduled at an earlier time if mutually agreed upon.

B. Purpose and Agenda: Discuss items of significance that could affect progress, including, but not limited to the following:

1. Establish lines of communication at the Project working level. Designate key personnel and their duties.
2. Discuss and review administrative requirements of the Contract.
3. Review forms required to be used by the Contractor in administration of the Work.
4. Review and discuss design intent, user and concurrent operations issues, and permitting issues including requirements of authorities having jurisdiction.
5. Definition of and interpretation of roles, and responsibilities in performance of the Contract. County to provide project management organizational chart.

6. Review and discuss Contract Documents including Project Drawings and Detailed Provisions.
 7. Review and discuss site access, security and procedural issues.
 8. Coordinate safety activities, including performance of the required Contractor's Health and Safety Plan.
 9. Coordinate mobilization activities.
 10. Tentative construction schedule and phasing of Work.
 11. Critical Work sequencing and long-lead items.
 12. Submittal procedures.
 13. Procedures for processing field decisions, RFIs, and Change Orders.
 14. Procedures for inspection, testing, and start-up.
 15. Procedures for processing Applications for Payment.
 16. Preparation of record documents.
 17. Work restrictions and working hours.
 18. Procedures for disruptions and shutdowns.
 19. Construction waste management and recycling.
 20. Staging and material storage areas.
 21. Equipment and material deliveries.
- C. Notification:
1. The County will notify the Contractor and required attendees not less than two (2) Calendar Days in advance of the proposed meeting time.
- D. Required Attendees:
1. County – Project Manager, Resident Engineer and Safety Representative.
 2. Testing/Inspection Provider (to be hired by the County).
 3. Contractor – Contractor's Representative, project manager, superintendent, safety officer, major Subcontractors, and other individuals involved in the execution of the Work.
- E. Meeting Minutes:
1. County will prepare and distribute the minutes from the Pre-Construction Meeting. Minutes will record significant meeting discussions, agreements, and disagreements, including required corrective measures and actions. Minutes shall be distributed to each party present.
- F. Authorities having jurisdiction may require their own pre-construction meeting with the Contractor and the County.
1. Refer to individual permits for preconstruction meeting requirements.

2. Contractor is responsible for arranging for these meetings.

1.05 PRE-INSTALLATION MEETINGS

- A. Pre-installation meetings will be scheduled for various portions of the Work as the Work progresses.
- B. The agenda of each pre-installation meeting shall include the following:
 1. Project conditions, including anticipated temperature and weather conditions, readiness of the substrate for installation; and project-specific issues affecting the Work.
 2. Installation schedule, sequencing, and coordination with Work of other trades.
 3. Installation, inspection, and testing procedures.
 4. Quality assurance procedures; specifically Contractor accommodation of inspections of the Work of the relevant Detailed Provisions Section and other quality expectations.
 5. Required performance results.
 6. Warranty requirements.
 7. The following is a partial list of systems, assemblies and products for which pre-installation meetings are required:
 - a. Earthwork (multiple meetings as necessary).
 - b. Cast-in-place concrete work (multiple meetings as necessary).
 - c. Electrical power utility.
 - d. Others as determined by the County.
- C. Required Attendees:
 1. County –Resident Engineer and inspection staff.
 2. Installer and representatives of manufacturers and fabricators involved in or affected by installation and its coordination or integration with other materials and installations that have preceded or will follow.
 3. Contractor – Project manager, superintendent, safety officer, major Subcontractors, and other individuals involved in the execution of the Work.
- D. Meeting Minutes:
 1. County will prepare and distribute the minutes from the Pre-Installation Meeting. Minutes will record significant meeting discussions, agreements, and disagreements, including required corrective measures and actions. Minutes shall be distributed to each party present.
- E. Do not proceed with installation if the meeting cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the meeting at earliest feasible date.

- F. If needed and schedule allows, installation meetings will be scheduled to occur immediately following Weekly Project Meetings.

1.06 WEEKLY PROGRESS MEETINGS

- A. Weekly Progress Meetings will be directed, and led by the County.
- B. The County will prepare agenda, coordinate, convene, and arrange Weekly Progress Meetings.
- C. Purpose:
 - 1. Maintain and improve lines of communication.
 - 2. Demonstrate performance of administrative requirements of the Contract.
 - 3. Complete and maintain forms required to be used by the Contractor in administration of the Work.
 - 4. Review and discuss project schedule, work progress, and work scheduled for next week.
 - 5. Review and discuss design intent, user and concurrent operations issues, work quality issues, and permitting issues including requirements of Authorities Having Jurisdiction.
 - 6. Review and discuss specific Contract Documents including Project Drawings and Detailed Provisions.
 - 7. Maintain and improve site access, security and procedural issues.
 - 8. Review and improve ongoing safety activities including performance of the required Contractor's Health and Safety Plan.
- D. Contractor to attend weekly project meetings; be prepared to discuss the agenda items identified in this Section.
- E. Contractor to follow the direction of the County in preparation for weekly meetings, including, but not limited to:
 - 1. Ensure the Contractor's project manager, superintendent, safety officer, representatives of Subcontractors, and others are present in accordance with provisions of this Section.
 - 2. Ensure required attendees are prepared, and familiar with the Project and the Project Schedule.
 - 3. Coordinate the time and place of the weekly meetings with the County. All weekly meetings will take place using County offices.
 - 4. Ensure the County has been consulted in advance of the meeting with respect to the proposed attendees, and their relationship to the Project.
 - 5. Submit Project Schedule updates to reflect Work progress.

6. Submit Weekly Reports:
 - a. Include a narrative describing the Work accomplished the preceding week.
 - a. Identify the completion of project milestones and Work activities.
 - b. Indicate problems and resolution of problems occurring during the week.
- F. Required Attendees:
 1. County – Project manager and Resident Engineer.
 2. Contractor – Project manager, superintendent, safety officer, and others as requested by the County.
 3. Subcontractors and suppliers pertinent to the agenda.
 4. Representatives of authorities having jurisdiction, as needed.
- G. Agenda for Weekly Progress Meetings: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of each Work item.
 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - a. Review schedule for next period.
 2. Contractor shall prepare three-week look ahead schedules for review at each progress meeting. The three-week look ahead schedules are not an acceptable substitute for CPM schedule updates that must be submitted with Contractor's monthly partial payment requests.
 3. Be prepared to discuss the following, to the extent deemed appropriate by the County:
 - a. Status of submittals and scheduled equipment/material deliveries.
 - b. Safety Report by the Contractor designated safety representative.
 - c. Weekend or extended hours work request, if any is requested by the Contractor for the coming week.
 - d. Review and approve minutes or record of previous meeting.
 - e. Review work progress during the preceding week.
 - f. Note field observations, problems and decisions.
 - g. Identify problems that impede planned progress.
 - h. Coordinate activities to the County's satisfaction, to permit the Project Schedule to be maintained, or improved.
 - i. Review off-site fabrication processes, and status.

- j. Develop corrective measures, and procedures to maintain or improve the Project Schedule.
- k. Discuss progress of preparation and maintenance of administrative documents required in accordance with the Contract Documents.
- l. Discuss updates to the Project Schedule in accordance with Detailed Provisions Section 01 3200 – Construction Progress Documentation.
- m. Review planned Work identified in the Weekly Look Ahead Schedule in accordance with Detailed Provisions Section 01 3200 – Construction Progress Documentation.
- n. Review impacts of Changes on the Project Schedule.
- o. Discuss status, and action related to Changes.
- p. Discuss additional scope, costs, schedule impacts, deviations, substitutions and other Changes.
- q. Review safety measures, including compliance with the required Contractor's Health and Safety Plan, and cooperation with governmental agencies, and authorities having jurisdiction.
- r. Maintenance and improvement of quality, work standards, and competence.
- s. Resolution of construction non-conformities.
- t. Review of status logs of submittals, RFIs, and RFCs.

H. Meeting Minutes:

- 1. County will prepare and distribute minutes from each Weekly Project Meeting. Minutes shall record significant discussions and agreements achieved during the meeting.
- I. It is noted that inspection will not be provided during scheduled progress meetings. Contractor is not permitted to perform work that requires inspection (as determined by County) during the progress meetings. Contractor shall adjust their schedule to accommodate progress meetings and no additional compensation will be provided for same. Contractor's bid shall consider County's requirements for weekly progress meetings. County, at its sole discretion, may decrease the frequency of progress meetings if deemed appropriate.

1.07 REQUEST FOR INFORMATION (RFI)

- A. Immediately on discovery of the need for additional information of interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified. A sample RFI form is included at the end of this Detailed Provisions Section.
 - 1. County will return RFIs submitted to the County by other entities controlled by Contractor with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's Work or Work of Subcontractors.

3. County will not review the Contractor's RFIs that in fact Requests for Changes (RFCs), as determined by the County. In such cases, Contractor will be required to resubmit on the appropriate RFC form.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project Name.
 2. Date.
 3. Name of Contractor
 4. RFI number, numbered sequentially for the project.
 5. RFI subject.
 6. Detailed Provisions Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Price, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms:
1. Software-generated form with substantially the same content as indicated above, acceptable to the County.
- D. County's Action:
1. County will review each RFI, determine action required, and respond. Allow seven (7) Working Days for County response for each RFI. RFIs received by the County after 1:00 p.m. PST will be considered as received the following Working Day.
 2. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - a. Requests for approval of substitutions.
 - b. Requests for coordination information already indicated in the Contract Documents.
 - c. Requests for adjustments in the Contract Time or the Contract Price.
 - d. Requests for interpretation of County's actions on submittals.
 - e. Incomplete RFIs or inaccurately prepared RFIs.
 3. County's action may include a request for additional information, in which case County's time for response will date from time of receipt of additional information.

4. County's action on RFIs that may result in a change to the Contract Time or the Contract Price may be eligible for Contractor to submit a Change Proposal.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Price, notify County in writing within ten (10) days of receipt of the RFI response.
- E. RFI Log: Contractor shall prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly if updates have occurred during the previous week. Software log shall not contain less than the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of County.
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date County's response was received.
- F. Upon receipt of County's action, Contractor shall update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify County within seven (7) Calendar Days if Contractor disagrees with response.

1.08 RFI MEETINGS

- A. RFI Meetings will be directed, and led by the County.
 1. RFI responses are prepared by the County in writing and are binding.
 2. Verbal responses and discussions about RFIs are unofficial, non-final, and non-binding on the parties.
 3. If needed, RFI meetings will be scheduled to occur immediately following the Weekly Project Meeting.
- B. Purpose:
 1. Maintain and improve lines of communication about Contractor-initiated questions, and questions from Subcontractors.
 2. Prioritize RFI responses to the Contractor.
 3. Review and discuss specific Contract Documents including Project Drawings and Detailed Provisions.
 4. Attendees shall be prepared to discuss agenda items identified in this Detailed Provisions Section.
- C. Follow the direction of the County in preparation for RFI meetings, including but not limited to:
 1. Ensure that the persons responsible for preparation of RFIs are present.

2. Ensure that required attendees are prepared to discuss the RFIs with the County and the County's representatives, in detail.
- D. Required Attendees:
1. County –
 - a. Project Manager,
 - b. Resident Engineer, and
 - c. Other individuals or entities involved in the execution of the Work.
 2. Contractor –
 - a. Contractor's Representative,
 - b. Project Manager,
 - c. Superintendent,
 - d. Safety Officer,
 - e. Major Subcontractors, and
 - f. Other individuals involved in the execution of the Work.
- E. Agenda for RFI Meetings:
1. Review of previous RFI responses, and actions taken.
 2. Review and discussion of current RFIs, and proposed responses by the County, when available.
 3. Discussion of forthcoming RFIs anticipated by the Contractor, when available.
- F. Meeting Minutes:
1. The County will prepare and distribute minutes for each RFI Meeting if such minutes are deemed necessary by the County.

1.09 REQUEST FOR CHANGE (RFC)

- A. Contractor shall submit a Request for Change (RFC) when Contractor proposes a change in the Contract requirements. All change requests shall be submitted on the RFC form included at the end of this Detailed Provisions Section. As shown therein, Contractor is required to fully describe the benefit(s) to the County, benefit(s) to the Contractor, the cost and/or schedule impact(s) associated with the requested change, along with whether or not Contractor proposes or requires a Contract Change Order for implementing the change.
- B. As noted on the RFC form, it is understood that certain RFCs can be responded to promptly, with minimal expenditures required by County. It is also understood that other RFCs require significant expenditures by County in order to properly evaluate and respond to Contractor's RFC. For those RFCs that fall in the latter category, County will provide an estimate (time and cost) to Contractor as an initial response to RFC. Contractor may then elect to have County proceed with evaluating Contractor's RFC

(with estimated value deducted from Contractor's Contract with the County), or elect to withdraw Contractor's RFC.

1.10 DOCUMENT FORMATS

- A. The County requires an original signed copy of every piece of written communication and submittals used in the Project.
 - 1. Electronic submittals of documents must be followed up with the submittal of the original signed hardcopy to the County.
- B. For documents created by the Contractor and/or its Subcontractors:
 - 1. Text: Submit electronically in Microsoft Word, current version.
 - 2. Tables: Submit electronically in Microsoft Excel, current version.
 - 3. Schedules: Submit electronically in Microsoft Project or approved equal along with an Adobe Portable Document Format (PDF) version.
 - 4. Coordination Drawings: Submit electronically in AutoCAD, or approved equal along with an Adobe PDF version.
 - 5. Figures and pictures: Submit as PDF or JPG files.
 - 6. Cut sheets from catalogs, and similar items: Submit as PDF files.
 - 7. Drawings: Submit as PDF files, except:
 - a. Provide AutoCAD version of files when requested by the County.
 - 8. For electronic files larger than ten (10) MB, supply the electronic version on a CD-ROM along with the hard copies.
 - 9. Obtain prior approval from the County to submit an electronic version in a format other than those specified herein.

1.11 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Contractor Staffing and Organization Chart:
 - 1. Submit an Organization Chart showing the Contractor personnel and key points of contact with the County within two (2) weeks following the Contract Award.
- C. Submit a list of Contractor's personnel and Subcontractors, to include their responsibilities and contact information within two (2) weeks following the Contract Award.
 - 1. Include the Project Manager, Project Superintendent, and Safety Officer.
 - 2. Provide telephone numbers with voice mail service, and e-mail addresses monitored daily for each designee of the Contractor.

3. Indicate emergency and after-hours contacts, and the means of reaching these people.
 4. Update the list as approved by the County whenever changes in staffing may occur.
- D. Subcontract List: Contractor shall prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, e-mail and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Detailed Provisions Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
- E. Coordination Drawings:
1. Provide in accordance with the requirements of this Detailed Provisions Section.
 2. Submit at least thirty (30) calendar days prior to start of any utility system Work and not later than one (1) week before the Pre-Installation Meeting.
 3. County's review of the drawings will be to verify that coordination of the Work is being fully addressed and does not relieve the Contractor of the obligation to coordinate the Work and to anticipate and resolve conflicts and interferences.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

SAMPLE
CONTRACTOR'S REQUEST FOR INFORMATION (RFI) #_____

To (County):	
From (Contractor):	
Subject:	
Reference: Construction Drawing:	Detailed Provisions (Section and Page):
REQUEST	
Information is requested as follows:	
Information Requested By (Name):	Date:
Response Requested By (Date):	
Received by County (Date):	
RESPONSE	
Response to Information Request:	
Response By (Name):	Date:

SAMPLE
CONTRACTOR'S REQUEST FOR CHANGE (RFC) # _____

To (County):	
From (Contractor):	
Subject:	
Reference: Construction Drawing:	Detailed Provisions (Section and Page):
REQUEST	
The following change is requested:	
Change Requested By (Name):	Date:
Response Requested By (Date):	
Received by County (Date):	
Benefit to County:	
Benefit to Contractor:	
Cost and/or Schedule Impact:	
Change Order Required or Proposed? _____YES _____NO	
RESPONSE	
Response to Change Request (1) :	
Response By (Name):	Date:

- (1) It is understood that certain RFCs can be responded to promptly, with minimal expenditures required by County. It is also understood that other RFCs require significant expenditures by County in order to properly evaluate and respond to Contractor's RFC. For those RFCs that fall in the latter category, County will provide an estimate (time and cost) to Contractor as an initial response to RFC. Contractor may then elect to have County proceed with evaluating Contractor's RFC (with estimated value deducted from Contractor's Contract with County), or elect to withdraw Contractor's RFC.

END OF SECTION 01 3100



SPECIFICATIONS – DETAILED PROVISIONS

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SECTION 01 3200 CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including, but not limited to the following:
1. Contractor's construction schedule.
 2. Construction schedule updating reports.

1.02 DEFINITIONS

- A. Project Baseline Schedule:
1. A complete Project Baseline Schedule will be reviewed and commented on by the County, to ensure that there is sufficient detailed information and work planning activities in accordance with this Detailed Provisions Section.
 2. The Project Baseline Schedule is required to be cost-loaded, resource-loaded, and Smart Activity ID – coded (Smart Activity IDs with a maximum of ten characters). The resource loading shall be accomplished by creating resource definitions of how many crews the Contractor and subcontractors will have working on specific activities. A narrative of the crew size and make up shall be submitted along with the Project Baseline Schedule.
- B. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 2. Predecessor Activity: An activity that precedes another activity in the network.
 3. Successor Activity: An activity that follows another activity in the network.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

- E. Total Float: Time between the earliest start date, and the latest start date of an activity, or succession of dependent activities.
 - 1. Float time is not for the exclusive use or benefit of either County or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
- F. Monthly Update Schedule: Actual current Project Schedule reflecting actual progress to date, changes to the Baseline Schedule, and Changes to the Work.
- G. Project Schedule: The Project Baseline Schedule, inclusive of any subsequent schedule updates.
- H. Weekly Look Ahead Schedule: Annotated, detailed version of the Monthly Update Schedule. Weekly Look Ahead Schedules shall be produced using the designated scheduling program from the Project Baseline Schedule. If the Contractor believes that additional detail is needed to show progress, then those activities shall be incorporated into the Monthly Update Schedule and described in the monthly narrative. The addition of activities during the course of the project shall not increase the existing contract duration unless approved by a Change Order.
- I. Working Day: Schedules shall be developed using a five (5) day, eight (8) hour per day work week. Schedules shall use the level of effort counter for the activity type to track the total Calendar Days allowed in the contract. Submittals and other items of work that are required to sue Calendar Days will use an appropriate calendar.

1.03 COORDINATION

- A. Coordinate Contractor's construction schedule with the Schedule of Values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.04 SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. Adobe Portable Document Format (PDF).
 - 3. Four (4) color paper copies.
- B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

- C. Contractor's Project Baseline Schedule: Baseline schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working electronic copy of scheduled labeled to comply with requirements for submittals. Include type of schedule (baseline, updated, look ahead) and date on label.
 - 2. Submit within fourteen (14) Calendar Days after Contract Award.
- D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and early start date, or actual start date if known.
 - 3. Total Float Report: List of activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- E. Construction Schedule Updating Reports: Submit Monthly Update Schedule and Narrative with Applications for Payment.
- F. Weekly Look Ahead Schedule and Narrative:
 - 1. Submit an electronic version twenty-four (24) hours in advance of Weekly Progress Meeting in accordance with Detailed Provisions Section 01 3100 – Project Management and Coordination.

PART 2 PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE – GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no construction activity is longer than twenty (20) days, unless specifically allowed by the County. Durations that are longer maybe used for the submittal development and review period, procurement of items, and fabrication activities.

2. Procurement Activities: Include procurement process activities for the long lead items and major items requiring a cycle of more than forty-five (45) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, inspection, testing, and delivery.
 3. Submittal Review Time: Include review and resubmittal times in schedule as indicated in Detailed Provisions Section 01 3300 – Submittal Procedures. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include no fewer than fifteen (15) days for startup and testing.
 5. Substantial Completion: Allow time for County and Contractor to complete administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than thirty (30) days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with utility company for electrical service.
 - b. Use of site restrictions
 - c. Seasonal variations
 - d. Uninterruptible services.
 3. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered Requests for Information.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
 5. Pending modifications affecting the Work and Contract Time.

- F. Recovery Schedule: When periodic update indicates the Work is fourteen (14) or more Calendar Days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
- G. Computer Scheduling Software: Prepare schedules using current version of Microsoft Project of software approved by the County that has been developed specifically to manage construction schedules.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart type, Contractor's construction schedule within fourteen (14) Calendar Days of issuance of the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within fourteen (14) Calendar Days of issuance of the Notice to Proceed. Outline significant construction activities for the first sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than thirty (30) days after issuance of the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of County's approval of the schedule.
 - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by County that may affect or be affected by Contractor's activities.
 - i. Testing and start-up.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges. Critical path will be continuous. If Contractor needs to show cure time for concrete or coatings a specific activity shall be added to show that duration with the appropriate calendar.
 - a. Sub networks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Project Baseline Schedule: Prepare baseline network diagram from a sorted activity list indicating straight "early start-total float". Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work of activity.
 2. Description of activity.

3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updates: Concurrent with making schedule updates, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.

PART 3 EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As Work progresses, indicate final completion percentage for each activity.
- B. Weekly Look Ahead Schedule: Annotated version of the Monthly Update Schedule that reflects work activities to be completed in the next three (3) week period and coordinated with the work results in the preceding two (2) week period.
1. The Contractor shall create the Weekly Look Ahead Schedule from the Project Baseline Schedule scheduling software.
 2. Submit weekly narrative describing impacts to and issues affecting the Project Baseline Schedule.

3. Excel spread sheets or bar graphs other than the annotated version of the Monthly Update Schedule will not be accepted.
- C. Distribution: Distribute copies of approved schedule to County, subcontractors, testing and inspection firms, and other parties identified by the County with a need-to-know schedule responsibility.
1. When updates and/or revisions are made, distribute updated schedules to the same parties.

END OF SECTION 01 3200



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SECTION 01 3300: SUBMITTAL PROCEDURES
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SECTION 01 3300 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals. The documenting the progress of construction during performance of the Work, including, but not limited to the following:
 - 1. Contractor's construction schedule.
 - 2. Construction schedule updating reports.
- B. Related Contract Document Sections include, but are not limited to:
 - 1. General Provisions.
 - 2. Detailed Provisions Section 01 3200 – Construction Progress Documentation.
 - 3. Detailed Provisions Section 01 7700 – Closeout Procedures.
 - 4. Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

1.02 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require County's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require County's responsive action. Submittals may be rejected for not complying with requirements.

1.03 ACTION SUBMITTALS

- A. Submittal Schedule: Contractor shall submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by County and additional time for handling and reviewing submittals required by those corrections.
- B. Construction Schedule: Within fourteen (14) calendar days after the Contract Award, the Contractor shall submit a construction schedule providing the starting and completion dates of the various stages of the Work. The Contractor shall be prepared to discuss its construction schedule at the Pre-Construction Meeting. See Detailed Provisions Section 01 3200 – Construction Progress Documentation.

- C. Schedule of Values or Lump Sum price breakdown: Within fourteen (14) calendar days after Contract Award, the Contractor shall submit a set of Schedule of Values or Lump Sum price breakdown for progress payment purposes. See Detailed Provisions Section 01 2900 – Payment Procedures.

1.04 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. County's Digital Data Files: Electronic copies of digital data files of the Project Drawings will be provided by County for Contractor's use in preparing submittals.
 - 1. Upon request, County will furnish Contractor with digital data drawing files of the Project Drawings for use in preparing Shop Drawings.
 - a. County makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Project Drawings.
 - b. Contractor shall execute a data licensing agreement in the form of Agreement acceptable to the County.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. The County reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on County's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow fourteen (14) calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. County will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow seven (7) calendar days for review of each resubmittal.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Include the following information for processing and recording action taken:
 - a. Project name.

- b. Date.
 - c. Name of County.
 - d. Name of Contractor.
 - e. Name of Subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Detailed Provisions Section number followed by a decimal point and then a sequential number (e.g., 013300.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 013300.01.A).
 - i. Number and title of appropriate Detailed Provisions Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
3. Submittal Copies: Unless additional copies are required for final submittal, and unless County observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
4. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. County will return without review, submittals received from sources other than Contractor.
- a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Name and address of County.
 - 6) Name of Contractor.
 - 7) Name of firm or entity that prepared submittal.
 - 8) Names of subcontractor, manufacturer, and supplier.
 - 9) Category and type of submittal.
 - 10) Submittal purpose and description.
 - 11) Detailed Provisions Section number and title.

- 12) Detailed Provisions paragraph number or drawing designation and generic name for each of multiple items.
- 13) Drawing number and detail references, as appropriate.
- 14) Indication of full or partial submittal.
- 15) Transmittal number.
- 16) Submittal and transmittal distribution record.
- 17) Remarks.
- 18) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Detailed Provisions Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Detailed Provisions Section number followed by a decimal point and then a sequential number (e.g., LC-013300.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LC-013300.01.A).
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by County.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to County, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of County.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Names of subcontractor, manufacturer, and supplier.
 - g. Category and type of submittal.
 - h. Submittal purpose and description.
 - i. Detailed Provisions Section number and title.
 - j. Detailed Provisions paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.

- m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Transmittal number.
 - p. Submittal and transmittal distribution record.
 - q. Remarks.
 - r. Other necessary identification.
- 5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. Project name.
 - b. Number and title of appropriate Detailed Provisions Section.
 - c. Manufacturer name.
 - d. Product name.
- F. Options: Identify options requiring selection by County.
- G. Deviations: Identify deviations from the Contract Documents on submittals.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they receive County's acceptance.
- I. Distribution: Furnish copies of final submittals to manufacturers, Subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project Site. Use only final action submittals that are marked as being accepted by the County.

PART 2 PRODUCTS

2.01 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements:
 - 1. Action Submittals: Submit one (1) electronic copy and one (1) hard copy of each submittal unless otherwise indicated by the County.
 - 2. Informational Submittals: Submit one (1) electronic copy and one (1) hard copy of each submittal unless otherwise indicated by the County.

3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's specifications.
 - c. Manufacturer's standard color charts.
 - d. Manufacturer statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not use base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.

- b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one (1) submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Detailed Provisions Section.
 - 3. Disposition: Maintain sets of approved Samples at the Project Location, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine Final Acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Detailed Provisions Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as County's property, are the property of Contractor.
 - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections showing full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two (2) full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. County will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finish in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit two (2) sets of Samples. County will retain one (1) Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) If variation in color, pattern, texture, or other characteristics is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Project Schedule: As required in individual Detailed Provisions Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Submit product schedule in the following format:
 - a. Four (4) paper copies of product schedule or list unless otherwise indicated. County will return three (3) copies.
- F. Coordination Drawings Submittals: Comply with requirements specified in Detailed Provisions Section 01 3100 – Project Management and Coordination.
- G. Contractor’s Construction Schedule: Comply with requirements specified in Detailed Provisions Section 01 3200 – Construction Progress Documentation.
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Detailed Provisions Section 01 4300 – Quality Assurance and Control.
- I. Project Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Detailed Provisions Section 01 7700 – Closeout Procedures.
- J. Operation and Maintenance Manual Submittals – Comply with requirements specified in Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.
- K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of engineers and owners, and other information specified.
- L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

- M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for the Project.
- T. Schedule of Tests Inspections: Comply with requirements specified in Detailed Provisions Section 01 4300 – Quality Assurance and Control.
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.02 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the County.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 EXECUTION

3.01 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to County.
- B. Project Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Detailed Provisions Section 01 7700 – Closeout Procedures.
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Detailed Provisions Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents. In the case of Shop Drawings, each sheet shall be so dated, signed and certified.

3.02 COUNTY'S ACTION

- A. General: County will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: County will review each submittal, make marks to indicate corrections or revisions required, and return it. County will mark each submittal appropriately to indicate action, as follows:
 - 1. "ACCEPTED AS SUBMITTED" or "APPROVED AS NOTED" will require no formal revision and resubmission.

2. "REVISE AND RESUBMIT" or "REJECTED" will require the Contractor to revise said submittal and shall resubmit the required number of copies of said revised submittal to the County.
- C. Informational Submittals: County will review each submittal and will not return it, or will return if it does not comply with requirements. County will forward each submittal to appropriate party.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- F. Fabrication of an item shall commence only after the County has reviewed the submittal and returned copies to the Contractor marked either "ACCEPTED AS SUBMITTED" or "APPROVED AS NOTED". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.

END OF SECTION 01 3300

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 01 3500: HEALTH AND SAFETY

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SECTION 01 3500 HEALTH AND SAFETY

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Contractor responsibilities for health and safety.
2. Governmental safety requirements.
3. Health, safety, and emergency response procedures.
4. Requirements for Contractor's Health and Safety Plan (HASP).

1.02 REFERENCES

A. Comply with requirements of Detailed Provisions Section 01 4200 – Reference Standards and Abbreviations and as listed herein. The following is a list of standards referenced and incorporated into this Section:

1. American Society of Safety Engineers (ASSE/SAFE):
 - a. ASSE/SAFE A10.32 – Fall Protection
 - b. ASSE/SAFE A10.34 – Protection of the Public on or Adjacent to Construction Sites.
 - c. ASSE/SAFE Z359.1 – Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
2. American Society of Mechanical Engineers (ASME):
 - a. ASME B30.22 – Articulating Boom Cranes
 - b. ASME B30.3 – Tower Cranes
 - c. ASME B30.5 – Mobile and Locomotive Cranes
 - d. ASME B30.8 – Floating Cranes and Floating Derricks
3. California Code of Regulations (CCR): CCR Title 8 – Industrial Relations.
4. California Labor Code
5. Code of Federal Regulations:
 - a. 10 CFR 20 – Standards for Protection against Radiation
 - b. 29 CFR 1910 – Occupational Safety and Health Standards
 - c. 29 CFR 1910.146 – Permit-required Confined Spaces
 - d. 29 CFR 1910.147 – Control of Hazardous Energy (Lock Out/Tag Out)
 - e. 29 CFR 1915 – Confined and Enclosed Spaces and Other Dangerous Atmospheres

- f. 29 CFR 1919 – Gear Certification
- g. 29 CFR 1926 – Safety and Health Regulations for Construction
- h. 29 CFR 1926.1400 – Cranes and Derricks in Construction
- i. 29 CFR 1926.16 – Rules of Construction.
- j. 29 CFR 1926.450 – Scaffolds
- k. 29 CFR 1926.500 – Fall Protection
- 6. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).
- 7. Federal Water Pollution Control Act (FWPCA).
- 8. HAZWOPER – 29 CFR 1910.120.
- 9. National Fire Protection Association (NFPA):
 - a. NFPA 10 – Standard for Portable Fire Extinguishers
 - b. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations
 - c. NFPA 306 – Standard for Control of Gas Hazards on Vessels
 - d. NFPA 51B – Standard for Fire Prevention during Welding, Cutting, and Other Hot Work.
 - e. NFPA 70 – National Electrical Code
 - f. NFPA 70E – Standard for Electrical Safety in the Workplace
- 10. Toxic Substance Control Act.

1.03 DEFINITIONS

- A. Competent Person – One who is capable of identifying existing and predictable hazards in surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them (OSHA 29 CFR 1926.32(f)).
- B. Contactor’s Safety Officer – Contractor’s representative that shall be responsible for oversight and management of the Contractors project-specific Health and Safety Plan as well as Subcontractor compliance with requirements of the Health and Safety Plan. The representative shall also be responsible for public safety where the County and Contractor have joint use areas.
- C. Medical Treatment – Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.
- D. Permit-Required Confined Space:
 - 1. It contains or has potential to contain a hazardous atmosphere.

2. It contains material that has potential for engulfing an entrant.
 3. It is shaped inside such that someone entering could be trapped or asphyxiated.
 4. It contains other recognized serious safety or health hazards.
 5. In general, all vaults, tanks, pipes, sumps, and manholes are typically considered permit-required confined spaces.
- E. Potential Serious Accidents/Incidents – Accidental occurrences or near misses with the potential to be a serious accident/incident such as major equipment failures, contact with power lines, spills or personal contacts with excessive amounts of toxic or hazardous materials, slides, cave-ins, etc.
- F. Recordable Injuries of Illnesses – Any work-related injury or illness that results in
1. Death, regardless of the time between the injury and death, or the length of the illness;
 2. Days away from work (any time lost after day of injury/illness onset);
 3. Restricted work;
 4. Transfer to another job;
 5. Medical treatment beyond first aid;
 6. Loss of consciousness; or
 7. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in 1 through 6 above.
- G. SDS – Safety Data Sheets.

1.04 PERFORMANCE REQUIREMENTS

- A. The Contractor has the responsibility to develop and provide its employees and Subcontractors with a project-specific Health and Safety Plan (HASP) prior to commencement of work on the Site. The Contractor is responsible for ensuring that all activities shall be conducted in such a manner so as to avoid hazards and injury or damage to any persons or properties. The safety provisions of Applicable Laws and of building and construction codes shall be observed. The safety of Contractor's employees, suppliers, manufacturers, Subcontractors, County employees and their representatives shall be the Contractor's responsibility.
- B. The Contractor shall develop and maintain, for the duration of the Project, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint a Safety Officer who is qualified and authorized to supervise and enforce compliance with the safety program and HASP. At a minimum, the Safety Officer shall perform the following throughout the duration of the Project:
1. Conduct daily safety and health inspections and maintain a written log, which includes: area/operation inspected, date of inspection, identified hazards, recommended corrective actions, and estimated and actual dates of corrections.

2. Conduct mishap investigations and complete required reports. Maintain OSHA Form 300 (Log of Work-Related Injuries and Illnesses) for Contractor and Subcontractors.
3. Maintain applicable safety reference material and display signage at the Project Location.
4. Attend Pre-Construction Meeting, Pre-Installation Meetings, Weekly Progress Meetings, and mandatory Weekly Safety Meetings.
5. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution.
6. Ensure Subcontractor compliance with safety and health requirements.
7. Maintain a list of hazardous materials on-site and their Safety Data Sheets.

Failure to perform the above duties will result in dismissal of the Project Superintendent and/or Safety Officer, and a Project Work stoppage. The Project Work stoppage will remain in effect pending approval of a suitable replacement.

- C. The duty of the County to observe the progress of the Work does not include review or approval of the adequacy of the Contractor's HASP, safety program, Safety Officer, or any safety measures taken in, or near the Project Location.
- D. The Contractor, as a part of its safety program, shall maintain an updated copy of the HASP at the Project Location. In addition, Contractor shall be responsible for providing all items necessary for health and safety, including, but not limited to: personal protective equipment, fall protection, dust control, wash stations, first-aid equipment, fire protection, decontamination equipment if required, and collection and disposal of rinse waters, in accordance with local, state, and federal regulations.
- E. If death or serious injuries, illnesses, or serious damages are caused, the accident shall be reported immediately to the County and to others as directed in the HASP. In addition, the Contractor must promptly report in writing to the County all accidents or near misses whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to the Project Location, giving full details and statements of witnesses.
- F. The Contractor shall make all reports as are required by any authority having jurisdiction and shall permit all safety inspections of the Work being performed under this Contract. Before proceeding with any construction Work, the Contractor shall take the necessary action to comply with all provisions for safety and accident prevention.
- G. Contractor shall be responsible for conducting mandatory weekly safety meetings at the Project Location. The Contractor shall notify the County of the time of all meetings and allow the County to participate. Meetings shall reiterate all safety measures to be taken and shall discuss any violations committed and preventive measures to avoid subsequent violations. The Contractor shall provide the County with a copy of the meeting minutes showing project title, printed names and signatures of attendees, and list of topics discussed.

- H. The Contractor shall be prepared to respond to potential injuries, illnesses or situations of imminent hazard to employees or public health or safety. Personnel from local medical facilities shall be contacted in case of a medical need, and the quickest route to these facilities shall be determined in advance
- I. Where necessary, trenches, pits, and other excavations shall be properly shored, braced and sloped to provide safe and acceptable working conditions. Any damage occurring from earth pressures, slides, cave-ins, or other causes due to failure to provide proper shoring or bracing, or through other negligence or fault of the Contractor, shall be repaired at the Contractor's sole expense. Reference is made to Section 5.1.5 "Accident Prevention" of the General Provisions, in which the Contractor is required to submit to the County a detailed plan showing the design or shoring, bracing, sloping of the sides of trenches, or other provisions to be made for protection of personnel during earthwork operations in advance of any such operation.
- J. HASP shall include procedures that address the clean-up in the event of a spill of toxic or hazardous materials. Any accidental spills or spills that are produced during routine equipment maintenance shall be cleaned up by removing all contaminants and the contaminated soil, disposing of it at an approved facility, and replacing the removed contaminated soil volume with clean soil material. The County may require documentation showing proper containment and removal of any toxic, hazardous, or contaminated soil that the Contractor has introduced or produced on Site.
- K. The County reserves the right to direct removal of any of the Contractor's employees or Subcontractors who are not adhering to or meeting the requirements of the landfill safety rules (See Appendix A – Landfill Site Safety Rules), law, HASP, or applicable regulations.

1.05 SUBMITTALS

A. Health and Safety Plan (HASP):

- 1. Submit a project-specific Health and Safety Plan (HASP) within fourteen (14) Calendar Days of the Award of Contract by the Riverside County Board of Supervisors, and prior to delivering equipment and commencing work at the Project Location.
- 2. County acceptance of the HASP does not release the Contractor of liability in the event of an accident or injury, nor does it place any liability on the County or any County employees.
- 3. HASP must, at a minimum, comply with all federal, state, and local requirements regarding all construction activities.
- 4. HASP shall address all demolition, earthwork, surveying, electrical, mechanical, building construction, and all other aspects of the Work through all phases of the Work.
- 5. The HASP shall be specific to the Project and include, at a minimum, the following items:
 - a. SDS for chemical materials stored, used, or otherwise required for the Project.

- b. Map and directions to hospitals and urgent care facilities.
- c. Personal protective equipment requirements and descriptions.
- d. Security and signage requirements.
- e. Tool and equipment preventative maintenance.
- f. Training for specific work conditions associated with the Project.
- g. Coordination with Contractor's Safety Officer regarding the shutdown and safety lockout/tagout of pressurized systems, electrical, mechanical, pneumatic, hydraulic, etc., systems, and other equipment and utilities.
- h. Confined space permit requirements and procedures.
- i. Hot work permit requirements and procedures.
- j. Fall Hazard Protection and Prevention Plan.
- k. Crane operation procedures and critical lift plan.
- l. Good housekeeping procedures.
- m. Safe work practices.
- n. Incident investigation procedures.
- o. Accident Prevention Program – Outline project-specific anticipated hazards and safety controls necessary to safeguard the Contractor's employees, public, and County staff and representatives.
- p. Traffic control procedures for approaching, crossing, or traveling along public roadways or landfill access roads according to the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD), which prescribes uniform standards and specifications for all official traffic control devices in California. The MUTCD can be viewed from Caltrans website at <http://www.dot.ca.gov/hq/traffops/engineering/mutcd/>. Signs and traffic control devices along public roadways or landfill access roads shall be removed and stored or covered during periods of time when they are not needed, such as the end of each Working Day, weekends, and any time when no construction activities are being performed.
- q. Excavation procedures.
- r. Project-specific activity hazard analysis (AHA) performed for Project tasks.
- s. Exposure to toxics and hazardous materials procedures.
- t. Spill containment and cleanup procedures.
- u. The Contractor shall provide appropriate gas detection monitoring equipment (e.g. flammable and/or explosive gas meters) during invasive construction activities. The use of the gas detection equipment (e.g. permissible threshold concentrations) shall be specified in the site specific HASP.
- v. No smoking is permitted within 100 feet of any boreholes.

- w. The Contractor shall require all personnel on the site to wear the appropriate field gear, which may include but is not limited to, steel toe boots, hard hats and visible safety clothing (e.g. orange safety vests).
 - x. The Contractor shall secure all work areas and close any open holes or excavations when not working by appropriately marking or delineating the area (e.g. with ribbons or cones), and posting signs indicating to the public or County personnel to stay away due to the existence of a deep open excavation.
 - y. The Contractor shall close access to the work area prior to performing other work and shall maintain the closure until construction in that area is complete. The Contractor shall provide such means as are necessary to ensure the effectiveness of the closure (e.g. fences, barricades, posting of signs).
- 6. The Contractor's Safety Officer shall participate in the development of the HASP and be responsible for adherence to the HASP at all times.
 - 7. Provide a system of informing workers, Subcontractors, and others about the HASP and conditions of the Work.
 - 8. Revisions to the HASP:
 - a. Revise the HASP prior to the start of Work as necessary to accommodate changes requested by the County, regulatory agencies, and jurisdictions having authority.
 - b. Revise the HASP as necessary to accommodate changes in site conditions.
 - 9. Contractor shall post copies of the HASP and all other applicable documents at the Project Location.
- B. Excavation Plan:
- 1. In accordance with Section 5.1.5 – Accident Prevention of the General Provisions, Contractor shall submit to the County a detailed plan showing the design of shoring, bracing, sloping of the sides of trenches, or other provisions to be made for the protection of personnel during earthwork operations.
 - 2. County acceptance of the Excavation Plan does not release the Contractor of liability in the event of an accident or injury, nor does it place any liability on the County or any County employees.
 - 3. See Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities.
- C. Permits and Certificates:
- 1. Confined Space Entry Permit (if applicable).
 - 2. Hot Work Permit (if applicable).
 - 3. Machinery and Mechanized Equipment Certificates – as required by local, state, federal regulations.
- D. Contractor Safety Self-Evaluation Inspection.

E. Qualifications:

1. Contractor's Safety Officer – "40 Hour Construction Safety Hazard Awareness Training Course for Contractors".
2. Crane Operators – Provide proof of qualification for operating cranes with rated capacities of 50,000 pounds or greater.

F. Weekly Safety Meetings:

1. Contractor shall submit minutes and the attendance list of all weekly safety meetings.

1.06 QUALIFICATIONS AND MEETINGS

A. Contractor's Safety Officer:

1. A Competent Person shall be provided for all of the hazards identified in the Contractor's HASP and shall be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed.
2. Contractor's Safety Officer shall have successfully completed and received a certificate for "40 Hour Construction Safety Hazard Awareness Training Course for Contractors". At a minimum, course shall include the following OSHA course subjects:
 - a. OSHA 510 – Occupational Safety and Health Standards for Construction
 - b. OSHA 2264 – Permit-Required Confined Space Entry
 - c. OSHA 3010 – Excavation, Trenching and Soil Mechanics
 - d. OSHA 3095 – Electrical Standards
 - e. OSHA 3110 – Fall Arrest Systems
 - f. OSHA 7115 – Lockout/Tagout
 - g. Scaffolds in accordance with 29 CFR 1926.450, Subpart L
3. Project Superintendent or other Contractor personnel may act as the Contractor's Safety Officer provided the individual meets the competency level required of the Contractor's Safety Officer position.
4. As part of the HASP submittal, Contractor shall provide current certification to the County of Safety Officer's completion of "40 Hour Construction Safety Hazard Awareness Training".

B. Competent Person for Confined Space Entry:

1. Provide a "Competent Person" to supervise the entry into each confined space. All confined space and enclosed space work shall comply with NFPA 306, OSHA 29 CFR 1915, Subpart B, "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment" or as applicable , 29 CFR 1910.147 for General Industry.

C. Crane Operators:

1. For mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators as qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualifications as part of HASP submittal to the County.

1.07 DISPLAY OF SAFETY INFORMATION

- A. Within one (1) Calendar Day after commencement of Work, erect a safety bulletin board at the Project Location. Where size, duration, or logistics of Project do not facilitate a bulletin board, an alternative method, acceptable to the County, that is accessible and includes all mandatory information for employee and visitor review, shall be deemed as meeting the requirement for a bulletin board. Items required to be post include, but are not limited to the following:

1. Confined Space Entry Permit.
2. Hot Work Permit.

1.08 NOTIFICATIONS AND REPORTS

A. Accident Notification:

1. Notify the County as soon as practical, but no more than four (4) hours after any accident or near miss meeting the definition of Recordable Injuries of Illnesses or Potential Serious Accidents/Incidents. Within notification, include: Contractor name; project title; type of Contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of equipment used, PPE used, etc.). Preserve the conditions of the accident site until County determines if accident will require a site investigation.

B. Accident Reports:

1. Conduct an accident investigation for recordable injuries and illnesses, for incidents requiring Medical Treatment, property damage accidents resulting in at least \$2,500 in damages to establish the root cause(s) of the accident. Submit the completed accident report to the County within five (5) Calendar Days of the accident. If requested by the County, report may be required for Potential Serious Accidents/Incidents.
2. Conduct an accident investigation for any weight handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfactions of the County and Contractor's Safety Officer.

C. Crane Reports:

1. Maintain crane inspection reports as attachments to the Project Location copy of the HASP.

1.09 HOT WORK REQUIREMENTS

- A. "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices. At a minimum, provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal.

1.10 CONFINED SPACE ENTRY REQUIREMENTS

- A. Contractors entering and working in confined spaces while performing general industry work are required to follow the requirements of OSHA 29 CFR 1926 and comply with the requirements in OSHA 29 CFR 1910, and OSHA 29 CFR 1910.146.

1.11 RADIATION SAFETY REQUIREMENTS

- A. License certificates for radiation materials and equipment shall be submitted to the County for all specialized and licensed material and equipment that could cause fatal harm to employees or visitors.
- B. Workers shall be protected from radiation exposure in accordance with 10 CFR 20 – Standards for Protection against Radiation.
- C. Loss of radioactive material shall be reported immediately to the County.
- D. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, no assumptions shall be made as to building occupancy. Where necessary, the County will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, a fully instructed employee shall be positioned inside such building or area to prevent exiting while external radiographic operations are in process.
- E. Transportation of Regulated Amounts of Radioactive Material will comply with 49 CFR, Subchapter C, Hazardous Material Regulations.

1.12 SEVERE STORM PLAN

- A. In the event of a severe storm warning, the Contractor must:
 1. Secure outside equipment and materials and place materials that could be damaged in protected areas.
 2. Check surrounding area, including roof, for loose material, equipment debris, and other objects that could be blown away or against existing facilities.
 3. Ensure that temporary erosion control measures are in place.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 CONSTRUCTION AND OTHER WORK

- A. Comply with NFPA 70, NFPA 70E, NFPA 241, the HASP, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails. Personal protective equipment (PPE) is governed in all areas by the nature of the Work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be carried/available for each person.

3.02 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

- A. Ensure that each employee is familiar with and complies with lockout/tagout procedures outlined in the HASP.

3.03 FALL HAZARD PROTECTION AND PREVENTION PLAN

- A. Establish a Fall Hazard Protection and Prevention Plan, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSE/SAFE Z359.1. Plan shall be provided to the County as part of the Contractor's submittal of the HASP.
- B. Training:
 - 1. As part of the Fall Hazard Protection and Prevention Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection.
- C. Fall Protection Equipment and Systems:
 - 1. Enforce use of the fall protection equipment and systems designated for each specific Work activity in the fall hazard protection and prevention program and/or activity hazard analysis (AHA) at all times when an employee is exposed to a fall hazard. Personal fall arrest systems are required when working from an articulating or extendable boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500 and ASSE/SAFE A10.32.

D. Personal Fall Arrest Equipment:

1. Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1. Only a full-body harness with a shock-absorbing lanyard of self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 meters. The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

E. Fall Protection for Roofing Work:

1. Implement fall protection controls based on the type of roof being constructed and Work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.
 - a. Low Sloped Roofs:
 - 1) For Work within six (6) feet of an edge, on low-sloped roofs, protect personnel from falling by use of personal fall arrest systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not allowed.
 - 2) For Work greater than six (6) feet from an edge, erect and install warning lines in accordance with 29 CFR 1926.500
 - b. Steep-Sloped Roofs:
 - 1) Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets.

F. Horizontal Lifelines:

1. Design, install, certify and use under the supervision of a qualified person, horizontal lifelines for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

G. Guardrails and Safety Nets

1. Design, install and use guardrails and safety nets in accordance with 29 CFR 1926 Subpart M.

H. Rescue and Evacuation Procedures

1. When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirements; specialized training for the rescuers; procedures for requesting rescue and medical assistance;

and transportation routes to a medical facility. Include the Rescue and Evacuation Plan in the Fall Hazard Protection and Prevention Plan.

3.04 SCAFFOLDING

- A. Provide employees with a safe means of access to the Work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access scaffold platforms greater than six (6) meter maximum in height by use of a scaffold stair system. Do not use vertical ladders commonly provided by scaffold system manufacturers for accessing scaffold platforms greater than twenty (20) feet maximum in height. The use of an adequate gate is required. Ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four (4) times the maximum intended load or without appropriate fall protection as delineated in the accepted Fall Hazard Protection and Prevention Plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Give special care to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to four (4) times the width of the smallest dimension of the scaffold base. Place Work platforms on mud sills. Scaffold or Work platform erectors shall have fall protection during the erection and dismantling of scaffolding or Work platforms that are greater than six (6) feet in height. Delineate fall protection requirements when working above six (6) feet or above dangerous operations in the Fall Hazard Protection and Prevention Plan.

3.05 EQUIPMENT

A. Material Handling Equipment:

1. Material handling equipment such as forklifts shall not be modified with Work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.
2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
3. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

B. Weight Handling Equipment

1. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the Work. Perform erection under the supervision of a designated person as defined in ASME B30.5. Perform all testing in accordance with the manufacturer's recommended procedures.
2. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

3. Under no circumstances shall a Contractor make a lift at or above ninety percent (90%) of the cranes rated capacity in any configuration.
4. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and follow the requirements of ASME B30.5 or ASME B30.22 as applicable.
5. Do not crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane.
6. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10 – Standard for Portable Fire Extinguishers.
7. All employees must keep clear of loads about to be lifted and of suspended loads.
8. Use cribbing when performing lifts on outriggers.
9. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
10. A physical barricade must be positioned to prevent personnel from the entering the counterweight swing (tail swing) area of the crane.
11. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by the County.
12. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by the County.
13. Certify that all crane operators have been trained in proper use of all safety devices.

C. Use of Explosives

1. Explosives shall not be used or brought to the Project Site without prior written approval from the County. Such approval shall not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.
2. Storage of explosives, when permitted on County property, shall be only where directed and in approved storage facilities. These facilities shall be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

3.06 EXCAVATIONS

- A. Soil classification must be performed by a competent person in accordance with 29 CFR 1926.
- B. Utility Locations:
 1. All underground utilities in the Work area must be positively identified by a third party, independent, private utility locating company in addition to any station locating service and coordinated with the station utility department.

2. Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction Work is expected to come within five (5) feet of the underground system.
3. See Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities.

3.07 ELECTRICAL

A. Portable Extension Cords:

1. Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protected from damage. Immediately remove from service all damaged extension cords. Portable extension cords shall meet the requirements of NFPA 70E, and OSHA electrical standards.

3.08 WORK IN CONFINED SPACES

A. Comply with the requirements in OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, OSHA Directive CPL 2.100 and OSHA 29 CFR 1926.

1. Entry Procedures:
 - a. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. All hazards pertaining to the space shall be reviewed with each employee during review of the activity hazard analysis process.
2. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level.
3. Perform required atmosphere monitoring with audible alarm for toxic gas detection.

END OF SECTION 01 3500

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SPECIFICATIONS – DETAILED PROVISIONS

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SECTION 01 4200

REFERENCE STANDARDS AND ABBREVIATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Detailed Provisions Format and Content Explanation.
2. Industry Standards.
3. Governing Regulations/Authorities.
4. Abbreviations.

1.02 DETAILED PROVISIONS FORMAT AND CONTENT EXPLANATION

- A. Detailed Provisions Format: The Detailed Provisions, Divisions 01 through 33, are generally organized into Divisions and Sections based on the Construction Specifications Institute's 2014 fifty (50) Division format.
- B. Detailed Provisions Content: These Detailed Provisions use certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
1. Abbreviated Language: Language used in Detailed Provisions and other Contract Documents are the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
 2. Imperative and streamlined language is used generally in the Detailed Provisions. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled directly by the Contractor or by others when so noted.
 - a. The words "shall", "shall be", or "shall comply with", depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 3. Detailed Provisions requirements are to be performed by Contractor unless specifically stated otherwise.
- C. General Provisions and Special Provisions: Requirements of General Provisions and Special Provisions of the Contract Documents apply to Work of all Sections in the Detailed Provisions.

1.03 DRAWING CONVENTIONS

- A. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Detailed Provisions. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Detailed Provisions Sections.
 2. Abbreviations: Materials and products are identified by abbreviations and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Detailed Provisions Section numbers.

1.04 DEFINITIONS

- A. **“Approved”** used to convey County’s action on Contractor submittals, applications and requests.
- B. **“Directed”** means a command or instruction by County. Other terms including “requested”, “authorized”, “selected”, “required”, and “permitted” have the same meaning as “directed”.
- C. **“Indicated”** are requirements expressed by graphic representations or in written form on Drawings, in Detailed Provisions, and in other Contract Documents. Other terms including “shown”, “noted”, “scheduled”, and “specified” have the same meaning as “indicated”.
- D. **“Regulations”** are laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- E. **“Furnish”** means supply and deliver to Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- F. **“Install”** means unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean and similar operations at Project Site.
- G. **“Plans”** or **“Project Drawings”** are the contract Project Drawings specifically prepared for the Project.
- H. **“Provide”** means furnish and install, complete and ready for intended use.

1.05 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, referenced construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Unless noted otherwise, comply with the standard in effect as of the date of the Bid Proposal.

- C. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with referenced industry standards applicable to that entity's construction activity. Copies of referenced standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
- D. All Work specified herein shall conform to or exceed the requirements of the referenced specifications, codes and standards to the extent that the provisions of such documents are not in conflict with the requirements of these Detailed Provisions.
- E. References herein to "Building Code" shall mean the California Building Code (CBC) of the International Code Council (ICC).
- F. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the County for clarification and directions prior to ordering or providing any materials or labor. The Contractor's Bid Proposal shall take into account costs for the most stringent requirements.
- G. Applicable Standard Specifications: The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards and specifications listed herein.
- H. Referenced herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

1.06 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in the Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States". Names
- B. Abbreviations and Acronyms: The following abbreviations and acronyms, as referenced in Contract Documents, are defined to mean the associated names. Names and contact information are subject to change and are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

AA	Aluminum Association; www.aluminum.org
AABC	Associated Air Balance Council; www.aabc.com
AAMA	American Architectural Manufacturers Association; www.aamanet.org
AASHTO	American Association of State Highway and Transportation Officials; www.transportation.org
ABMA	American Bearing Manufacturers Association; www.americanbearings.org
ACI	American Concrete Institute (formerly: ACI International); www.concrete.org
ACPA	American Concrete Pipe Association; www.concrete-pipe.org
AGA	American Gas Association; www.aga.org

AGC	Associated General Contractors
AGMA	American Gear Manufacturers Association; www.agma.org
AHA	American Hardboard Association; www.domensino.com/AHA/default.htm
AHAM	Association of Home Appliance Manufacturers; www.aham.org
AHRI	Air-Conditioning, Heating, and Refrigeration Institute; www.ahrinet.org
AI	Asphalt Institute; www.asphaltinstitute.org
AIA	American Institute of Architects
AIA	American Insurance Associates; www.americaninsassoc.com
AIHA	American Industrial Hygiene Association; www.aiha.org
AISC	American Institute of Steel Construction; www.aisc.org
AISI	American Iron and Steel Institute; www.steel.org
AITC	American Institute of Timber Construction; www.atic-glulam.org
AMCA	Air Movement and Control Association International, Inc.
ANLA	American Nursery and Landscape Association
ANSI	American National Standards Institute; www.ansi.org
AOSA	Association of Official Seed Analysis; www.aosaseed.com
APA	APA – The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute; www.api.org
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agriculture Engineers
ASC	Adhesive and Sealant Council; www.ascouncil.org
ASCE	American Society of Civil Engineers; www.asce.org
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers; www.asme.org
ASPE	American Society of Plumbing Engineers; www.aspe.org
ASQC	American Society of Quality Control
ASSE	American Society of Safety Engineers
ASSE	American Society of Sanitation Engineering; www.asse-plumbing.org
ASTM	American Society for Testing and Materials International; www.astm.org
ATIS	Alliance for Telecommunications Industry Solutions
AWI	Architectural Wood Institute; www.awinet.org
AWPA	American Wood Protection Association; www.awpa.com
AWPI	American Wood Preservers Institute
AWS	American Welding Society; www.aws.org
AWWA	American Water Works Association; www.awwa.org
BHMA	Builders Hardware Manufacturers Association; http://buildershardware.com/
BIA	Brick Industry Association
BICSI	Building Industry Consulting Service International; www.bicsi.org
BOCA	BOCA (Building Officials and Code Administrators International, Inc.)

CDA	Copper Development Association
CGA	Compressed Gas Association
CI	Chlorine Institute; www.chlorineinstitute.org
CISPI	Cast Iron Soil Pipe Institute; www.cispi.org
CLFMI	Chain Link Fence Manufacturers Institute
CMA	Concrete Masonry Association
CPA	Composite Panel Association
CRSI	Concrete Reinforcing Steel Institute; www.crsi.org
CSQA	California Stormwater Quality Association; www.casqa.org
DASMA	Door and Access Systems Manufacturers Association
DHI	Door and Hardware Institute
EJMA	Expansion Joint Manufacturers Association; www.ejma.org
ETL	Electrical test Laboratories
FM	FM Global Research; www.fmglobal.com
GA	Gypsum Association; www.gypsum.org
GANA	Glass Association of North America; www.glasswebsite.com
GBCI	Green Building Certification Institute; www.gbci.org
GRI	Geosynthetics Research Institute; www.geosynthetics-institute.org
HI	Hydraulic Institute
HMMA	Hollow Metal Manufacturers Association (see NAAMM)
HPVA	Hardwood Plywood & Veneer Association; www.hpva.org
ICBO	International Conference of Building Officials (see ICC)
ICC	International Code Council; www.iccsafe.org
ICEA	International Cable Engineers Association, Inc.; www.icea.net
ICPA	International Cast Polymer Alliance
ICRI	International Concrete Repair Institute, Inc.
IEC	International Electrotechnical Commission; www.iec.ch
IEEE	Institute of Electrical and Electronics Engineers; www.ieee.org
IES	Illuminating Engineering Society of North America; www.iesna.org
IFC	International Firestop Council; www.firestop.org
IGCC	Insulating Glass Certification Council; www.igcc.org
IGMA	Insulating Glass Manufacturers Alliance; www.igmaonline.org
IMSA	International Municipal Signal Association; www.imsasafety.org
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	International Society of Automation; www.isa.org
ISO	International Organization for Standardization
LEED	Leadership in Energy and Environmental Design
LPI	Lightning Protection Institute; www.lightning.org
MBMA	Metal Building Manufacturers Association
MCA	Metal Construction Association
MHIA	Material Handling Industry of America
MPI	Master Painters Institute
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry Inc.; www.mss-hq.org

NAAMM	National Association of Architectural Metal Manufacturers; www.naamm.org
NACE	NACE International (National Association of Corrosion Engineers International); www.nace.org
NAIMA	North American Insulation Manufacturers Association
NAPA	National Asphalt Pavement Association; www.asphaltpavement.org
NAPF	National Association of Pipe Fabricators; http://napf.com
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association; www.ncma.org
NEBB	National Environmental Balancing Bureau; www.nebb.org
NEC	National Electrical Code; www.nfpa.org
NECA	National Electrical Contractors Association; www.necanet.org
NEMA	National Electrical Manufacturers Association; www.nema.org
NETA	InterNational Electrical Testing Association; www.netaworld.org
NFPA	NFPA (National Fire Protection Association); www.nfpa.org
NFPA	National Forest Products Association
NFRC	National Fenestration Rating Council
NHLA	National Hardwood Lumber Association
NIST	National Institute of Standards and Technology; www.nist.gov
NLGI	National Lubricating Grease Institute
NPCA	National Paint and Coatings Association; www.paint.org
NRCA	National Roofing Contractors Association; www.nrca.net
NRMCA	National Ready Mixed Concrete Association; www.nrmca.org
NSF	NSF International (National Sanitation Foundation International); www.nsf.org
NSPE	National Society of Professional Engineers
NSSGA	National Stone, Sand & Gravel Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association; www.cement.org
PCI	Precast/Prestressed Concrete Institute; www.pci.org
PDI	Plumbing & Drainage Institute; www.pdionline.org
PTI	Post Tensioning Institute; www.post-tensioning.org
RCSC	Research Council on Structural Connections; http://boltcouncil.org/
SCTE	Society of Cable Telecommunications Engineers; www.scte.org
SDI	Steel Deck Institute; www.sdi.org
SDI	Steel Door Institute
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPFA	Spray Polyurethane Foam Alliance
SPRI	Single Ply Roofing Industry; www.spri.org
SSPC	Society for Protective Coatings; www.sspc.org
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
SWPA	Submersible Wastewater Pump Association

TCNA	Tile Council of North America; www.tcnatile.com
TIA	Telecommunications Industry Association, www.tiaonline.org
UBC	Uniform Building Code (see ICC)
UL	Underwriters Laboratories, Inc.; www.ul.com
USGBC	United States Green Building Council; www.usgbc.org
WASTEC	Waste Equipment Technology Association
WCRSI	Western Concrete Reinforcing Steel Institute
WDMA	Window & Door Manufacturers Association; www.wdma.com
WRI	Wire Reinforcement Institute, Inc.; www.wirereinforcementinstitute.org
WSC	Water Systems Council; www.watersystemscouncil.org
WWPA	Western Wood Products Association
WWPA	Woven Wire Products Association; www.wovenwire.org

C. Code Agencies: Where abbreviations and acronyms are used in the Contract Documents, they shall mean the recognized name of the entities in the following list:

1. DIN – Deutsches Institut für Normung e. V.; <http://www.din.de/en>
2. IAPMO – International Association of Plumbing and Mechanical Officials; www.iapmo.org
3. ICC – International Code Council; www.iccsafe.org
4. ICC-ES-ICC Evaluation Service, LLC; www.icc-es.org

D. Federal Government Agencies: Names and titles of federal government standard or Specification producing agencies are often abbreviated. The following abbreviations and acronyms are used in the Contract Documents indicate names of standard or Specification producing agencies of the federal government. Names and contact information are subject to change and are believed to be, but are not assured, accurate and up to date as of the date of the Contract Documents.

1. CFR – Code of Federal Regulations; www.gpo.gov
2. CPSC – Consumer Product Safety Commission; www.cpsc.gov
3. DOC – Department of Commerce; National Institute of Standards and Technology (NIST); www.nist.gov
4. DOD – Department of Defense; <http://www.defense.gov>
5. DOE – Department of Energy; www.energy.gov
6. DOT – Department of Transportation; www.dot.gov
7. EPA – Environmental Protection Agency; www.epa.gov
8. FAA – Federal Aviation Administration; www.faa.gov
9. FG – Federal Government Publications; www.gpo.gov
10. FS – Federal Specification (from GSA); www.gsa.gov
11. GSA – General Services Administration; www.gsa.gov
12. HUD – Department of Housing and Urban Development; www.hud.gov

13. LBL – Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov
 14. OSHA – Occupational Safety & Health Administration; www.osha.gov
 15. SD – Department of State; www.state.gov
 16. TRB – Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org
 17. USBLS – United States Bureau of Labor Statistics; www.bls.gov
 18. USCOE – Army Corps of Engineers; www.usace.army.mil
 19. USDA – Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov
 20. USDA – Department of Agriculture; Rural Utilities Service; www.usda.gov
 21. USDJ – Department of Justice, Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov
 22. USP – U.S. Pharmacopeial Convention; www.usp.org
 23. USPS – United States Postal Service; www.usps.com
- E. Local Government Agencies: Names and titles of local government standard or Specification producing agencies are often abbreviated. The following abbreviations and acronyms referenced in Contract Documents indicate names of standard or Specification producing agencies of local and state government. Names and contact information are subject to change and are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.
1. State of California
 - a. BPELSG –California Department of Consumer Affairs – Board for Professional Engineers, Land Surveyors, and Geologists; <http://www.bpelsg.ca.gov/>
 - b. BSC – California Building Standards Commission; www.bsc.ca.gov
 - c. CALGreen – BSC California Green Building Standards; www.bsc.ca.gov/Home/CALGreen.aspx
 - d. CalEPA – California Environmental Protection Agency; www.calepa.ca.gov
 - e. CalOSHA – California Department of Industrial Relations – Division of Occupational Safety and Health; <http://www.dir.ca.gov/DOSH/dosh1.html>
 - f. CalRecycle – California Department of Resources Recycling and Recovery; www.calrecycle.ca.gov
 - g. Caltrans – California Department of Transportation; www.dot.ca.gov
 - h. CARB – California Air Resources Board; www.arb.ca.gov
 - i. CCR – California Code of Regulations; www.oal.ca.gov/ccr.htm
 - j. CDI – California Department of Insurance; www.insurance.ca.gov
 - k. CHSC – California Health and Safety Code
 - l. CPUC – California Public Utilities Commission; <http://www.cpuc.ca.gov>
 - m. CSLB – Contractors State Licensing Board; www.cslb.ca.gov
 - n. DIR – California Department of Industrial Relations; www.dir.ca.gov

- o. DTSC – California Department of Toxic Substances Control;
<http://www.dtsc.ca.gov/>
 - p. DWR – California Department of Water Resources; www.water.ca.gov
 - q. DWC – California Department of Industrial Relations – Division of Workers’ Compensation; www.dir.ca.gov/dwc
 - r. LWDA – California Labor and Workforce Development Agency;
<http://labor.ca.gov/>
 - s. SWRCB – CalEPA: State Water Resources Control Board;
www.swrcb.ca.gov
2. Regional Agencies
- a. SARWQCB – Colorado River Basin Regional Water Quality Control Board;
<http://www.waterboards.ca.gov/coloradoriver/>
 - b. MDAQMD – Mojave Desert Air Quality Management District;
<https://www.mdaqmd.ca.gov/>
3. County of Riverside
- a. BOS – County of Riverside Board of Supervisors;
<http://www.countyofriverside.us/AboutTheCounty/BoardofSupervisors.aspx>
 - b. DEH – Riverside County Department of Environmental Health;
www.rivcoeh.org
 - c. EPD – County of Riverside Environmental Programs Division;
www.rctlma.org/epd
 - d. RCDFM – Riverside County Department of Facilities Management;
<https://rivcofm.org/>
 - e. RCDWR – Riverside County Department of Waste Resources;
www.rcwaste.org
 - f. RCFC&WCD – Riverside County Flood Control and Water Conservation District; www.floodcontrol.co.riverside.ca.us
 - g. RCFD – Riverside County Fire Department; <http://www.rvcfire.org>
 - h. RCTD – Riverside County Transportation Department; <http://rctlma.org/trans/>
 - i. TLMA – County of Riverside Transportation and Land Management Agency;
www.rctlma.org

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01 4200

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 4300: QUALITY ASSURANCE AND CONTROL
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SECTION 01 4300

QUALITY ASSURANCE AND CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes the following:

1. Administrative and procedural requirements for quality assurance and quality control.
2. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - a. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and –control procedures that facilitate compliance with the Contract Document requirements.
 - b. Requirements for Contractor to provide quality-assurance and –control services required by County or authorities having jurisdiction are not limited by provisions of this Section.
 - c. Specific test and inspection requirements are not specified in this Section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

1.03 DEFINITIONS

- A. Quality-Assurance Services – Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services – Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include Contract enforcement activities performed by County.

- C. Mockups – Full-sized physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups – Full-size physical assemblies constructed at testing facility to verify performance characteristics.
- D. Preconstruction Testing or Conformance Testing – Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing – Tests and inspections that are performed by an Nationally Recognized Testing Laboratory (NRTL), an NVLAP (National Institute of Science and Technology (NIST) National Voluntary Laboratory Accreditation Program), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing – Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing – Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency – An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector – Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced – Unless noted otherwise, when used with an entity or individual, “experienced” means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to the Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.04 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. In case of conflict between the Contract Documents, the following order of governing documents shall be followed (with first listed document controlling):
1. Permits issued by jurisdictional regulatory agencies.
 2. Change Orders, Construction Change Directives and/or Supplemental Agreements, or Addenda to any of the Contract Documents; whichever occurs last.
 3. Construction Agreement.
 4. Detailed Provisions.
 5. Special Provisions.
 6. Administrative Provisions.
 7. General Provisions.
 8. Project Drawings and Specifications
 9. Standard Drawings
 10. Reference Specifications

The Special Provisions, Detailed Provisions, Drawings, and Standards are intended to be complimentary so that any Work exhibited in the Drawings, but not mentioned in the Special and/or Detailed Provisions, or vice versa, shall be executed to the true intent thereof and the same as if both exhibited in Drawings and set forth in the Special Provisions. The Contractor shall consult with the County to obtain interpretations of the Contract Documents. The Contractor shall also assist in resolutions of questions and transmit written interpretations to concerned parties.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the County for a decision before proceeding.

1.05 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. At the minimum, include the following:
1. Date of issue.
 2. Project title.
 3. Name, address, e-mail, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Detailed Provisions Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. At the minimum, include the following:
1. Name, address, e-mail, and telephone number of representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Detailed Provisions Sections.
- C. Permits, Licenses, and Certificates: For County's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgements, correspondence, records and similar documents, established for compliance with standards and regulations bearing performance of the Work.

1.06 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Detailed Provisions Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for the Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for the Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for the Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for the Project.
- F. Specialists: Certain Detailed Provisions Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, and NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A Nationally Recognized Testing Laboratory according to 29 CFR 1910.7
 - 2. NVLAP: A testing agency accredited according to National Institute of Science and Technology (NIST) National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that similar in material, design, and extent to those indicated for the Project.
- I. Preconstruction Testing and Conformance Testing: Where testing agency is indicated to perform preconstruction/conformance testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - d. When testing is complete, remove test specimens, assemblies, and mockups, and laboratory mockups; do not reuse products.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to County, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by the County.
 2. Notify County seven (7) Calendar Days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain County's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven (7) Calendar Days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed unless otherwise indicated.
- K. Laboratory Mockups: Comply with requirements of preconstruction/conformance testing and those specified in individual Detailed Provisions Sections.

1.07 QUALITY CONTROL

- A. County Responsibilities: Where quality-control services are indicated in individual Detailed Provisions Sections as County's responsibility, County will engage a qualified testing agency to perform these services. It is the Contractor's responsibility to schedule the testing provided by such agencies.
1. County will furnish Contractor with names, addresses, e-mail, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs associated with retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with Contract Documents due to the Contractor's actions, shall be charged to the Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to County are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by County, unless agreed to in writing by the County.

2. Notify testing agencies at least forty-eight (48) hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with County and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify County and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.

5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and –control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.08 SPECIAL INSPECTIONS AND TESTS

- A. Special Inspections and Tests: Conducted by a qualified special inspector as required by California Building Code (CBC), as indicated in individual Detailed Provisions Sections and indicated in the Project Drawings, and as follows:
 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 2. Notifying County and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to County, Contractor, and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and re-inspecting corrected work.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. At a minimum, include the following:
 1. Date of test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date of test or inspection results were transmitted to County.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project Location. Post changes and revisions as they occur. Provide access to test and inspection log for County’s reference during normal working hours.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Detailed Provisions Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.03 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK

- A. If any Work is concealed or performed without the requisite inspection notice, then the Work shall be subject to such tests or exposure as may be necessary to prove to the Engineer that the materials used and the Work performed are in conformity with the Plans and Specifications, or said materials or Work may be removed and installed or performed again at the discretion of the Engineer. All labor, equipment, and materials necessary for exposing, testing or complete removal, and installation or replacement shall be furnished by the Contractor at its own expense. The Contractor shall replace, at its own expense, any materials or Work damaged by exposure or testing.
- B. Cost of rework inspection incurred by the County will be deducted from the Contract Price via Change Order. Rework inspection cost is as follows:
 - 1. Contractor's failure to complete the Work within the Contract Time, including any previously authorized extensions thereof.
 - 2. Extra inspections required for Contractor's correction of defective Work.
 - 3. Overtime costs for acceleration of Work done for Contractor's convenience.
 - 4. All associated costs including travel.
- C. All Work which has 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 or replacement. Any Work done beyond the lines and grades as described by the Contract Documents, or any Extra Work done without proper written authority, will be considered as unauthorized and will not be paid for. Work so done may be ordered removed at the Contractor's expense. Upon failure on the part of the Contractor to comply, the County shall have authority to cause defective or unauthorized Work to be remedied, or removed and replaced, and to deduct the costs for this Work from any monies due or to become due the Contractor.

END OF SECTION 01 4300

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SPECIFICATIONS – DETAILED PROVISIONS

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SECTION 01 4320 SURVEYING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes the following:
 - 1. Acceptance of County-provided survey.
 - 2. Construction surveying.
 - 3. Completed Work Verification Survey.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Section 05 1200 – Structural Steel
 - 2. Section 31 2300 – Earthwork

1.02 DEFINITIONS

- A. DTM: Digital terrain modeling.
- B. Project Datum and Date of County-Provided Survey:
 - 1. The three dimensional coordinate system, as follows:
 - a. Vertical Datum: North American Vertical Datum of 1988 (NAVD 88).
 - b. Horizontal Datum: North American Datum of 1983 (NAD 83), Epoch 2007.0, California State Plane Coordinate System, Zone VI.
 - 2. Date County-Provided Survey Was Performed:
 - a. Performed using photogrammetric methods on November 30, 2016 and a ground survey performed on June 18, 2020. .

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Surveyor Qualifications:
 - 1. Provide within seven (7) Calendar Days following the issuance of the Notice to Proceed the following for each licensed professional surveyor whose services the Contractor proposes to rely upon:
 - a. Name, address, e-mail, telephone number, and complete contact information.
- C. Field Engineering prior to Commencing Layout:
 - 1. Provide the County a complete closed survey loop identifying Project benchmarks, vertical and horizontal control, and data demonstrating these points relative to the Project Datum.

- D. Contractor's Letter of Acceptance of County-Provided Survey (as shown on the Project Drawings) or written notice of discrepancies of County-provided survey.
- E. Completed Work Verification Survey:
 - 1. Submit electronic survey, certified by the Contractor's surveyor, of the entire completed Work, including, but not limited to: well locations and elevations, conduits, and utility systems documenting the physical completion and accuracy of Work in accordance with the Contract Documents.
 - a. Submittal shall be provided to the County prior to Contractor's Request for Substantial Completion.
 - b. Demonstrate that the Work complies with the construction tolerances specified in Detailed Provisions Section 01 7000 – Execution Procedures.

1.04 ACCEPTANCE OF COUNTY-PROVIDED SURVEY

- A. The nature and extent of the Work is dependent on original ground surface elevations and planimetric features as presented on the Project Drawings.
- B. The Contractor has a single opportunity, during the preconstruction phase of the Contract, to either accept or to identify differences or discrepancies in the County-provided survey, as shown on the Project Drawings.
 - 1. Differences or discrepancies refer to variations in the elevations and locations shown on the Project Drawings that exceed the allowable tolerances stated in Detailed Provisions Section 01 7000 – Execution Procedures.
- C. The Contractor has the option of:
 - 1. Surveying the original ground surface elevations and planimetric features prior to issuance of the Notice to Proceed.
 - a. Contractor's survey shall be no less than ½ - foot contour interval.
 - 2. Accepting the elevations and planimetric features indicated on the Project Drawings.
- D. Contractor's Letter of Acceptance of County-Provided Survey:
 - 1. If the Contractor accepts the County-provided survey, the Contractor shall provide a letter stating the Contractor has reviewed and accepted the County-provided survey, as shown on the Project Drawings, and that the information is complete and accurate within the Tolerances of Preconstruction Conditions in accordance with Detailed Provisions Section 01 7000 – Execution Procedures.
 - a. The Contractor's Letter of Acceptance of County-Provided Survey shall be provided no later than two (2) weeks after issuance of the Notice to Proceed and prior to commencing structure layout and earthwork operations.

E. Contractor Identification of Correction of County-Provided Survey:

1. If the Contractor does not accept the County-provided survey, the Contractor shall complete its own survey and identify and quantify discrepancies, errors or differences in a letter to the County no later than two (2) weeks after issuance of the Notice to Proceed and prior to commencing work activities.
 - a. Contractor shall provide a minimum of two (2) Working Days' notice to County for access to the Project Location.
 - b. The County will escort the Contractor during its onsite survey.
2. Provide a Digital Terrain Model (DTM) of the Contractor's survey to the County upon completion of the Contractor's survey. DTM shall be compliant with Bentley InRoads software format.
 - a. The County will compare the Contractor's DTM with the County's DTM to attempt to substantiate the Contractor's results.
3. In the event of a discrepancy between the County and Contractor surveys, the County shall reconcile the difference through additional survey and consultation with the Contractor.
4. If the County-reconciled survey differs beyond the tolerances, specified within Detailed Provisions Section 01 7000 – Execution Procedures, from the County-provided survey, as indicated on the Project Drawings, the Contractor may request an adjustment to the Contract Price or Contract Time in accordance with the General Provisions.

1.05 CONTRACTOR'S OWN SURVEY WORK

- A. Perform surveying activities to sufficiently set out, control, and as-built the Work.

1.06 QUALITY ASSURANCE

- A. Survey work of this Section is to be performed by a licensed Professional Land Surveyor registered in the State of California.
- B. Corrections of the Work due to survey errors and omissions are the responsibility of the Contractor.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Survey Control Points:

1. At the Blythe Sanitary Landfill, County surveyors have established external primary survey control points on firm ground outside the limits of the Work to be used throughout the construction period for the Contractor's Work.

B. Surveying and Layout:

1. Work from lines and levels established by County surveyors and provided in the Project Drawings.
2. Establish secondary benchmarks and control points to set lines and levels throughout the Project Location.
3. Locate and flag/stake the continuous Construction Limits indicated on the Project Drawings.
 - a. Construction Limits flagging shall consist of continuous orange safety fencing.
 - b. Keep the fencing in place, fully functional, until directed to remove it by the County.
4. Locate and layout site improvements, including but not limited to grade stakes, grading, fill placement, cut and fill slopes, invert elevations, utility alignments, foundations, finish pad elevations and corners, and pavements.
5. Locate and layout batter boards for structures, vaults, control lines, and levels.
6. Provide and maintain temporary means of checking and rechecking layout to confirm correct and accurate placement of materials and items.
7. Accurately record as-built information on the Record Drawings.

C. Do not scale Contract Documents provided by the County.

D. Surveyor Log:

1. Maintain a Surveyor Log of control data and other survey work at the Project Location.
2. Provide access to the Surveyor Log when requested by the County.

3.02 COMPLETED WORK VERIFICATION SURVEY

- A. Contractor's surveyor shall survey the entire completed Work documenting the physical completion and accuracy of the Work in accordance with the Contract Documents.
- B. Completed Work Verification Survey shall include all aspects of the Work, including, but not limited to:
 1. Well locations and elevations.
 2. Utility system locations, grades and elevations including rim and invert elevations of all structures and the location and elevation of all vaults, pull boxes, valves, and fittings.
- C. Survey results shall be in an electronic format, including a DTM compatible with Bentley InRoads software.

- D. County surveyors may elect to perform verification survey work to ensure all construction conforms to the requirements of the Contract Documents, and for surveying as-built information. The Contractor shall provide County surveyor's with access to the completed portions of the Work before they are covered by subsequent construction to allow County surveyor's to verify that all construction conforms to the requirements of the Contract Documents. The Contractor shall therefore provide notice to the County at least two (2) Working Days prior to the time the respective areas will be ready for verification surveys, and at least one (1) Working Day for the survey work or any other inspection to be completed. Major construction items requiring County surveyor verification include, but are not limited to:
1. Well locations and elevations.
 2. Utility system locations, grades and elevations including rim and invert elevations of all structures and the location and elevation of all vaults, pull boxes, valves, and fittings.
 3. Other miscellaneous surveys as deemed necessary by the County to complete the Project.
- E. County will check the Contractor's Completed Work Verification Survey and report any discrepancies to the Contractor for resolution as part of the Substantial Completion Punch List. In the event of discrepancies between Contractor's Completed Work Verification Survey and County verification survey, the County verification survey results shall govern.

3.03 FIELD QUALITY CONTROL

- A. Survey Accuracy: Measurements performed in accordance with requirements of this Detailed Provisions Section are to be accurate within one-hundredth (0.01) of a foot in both vertical and horizontal planes.

3.04 PROTECTION

- A. Protect benchmarks and control points used in the Work.
1. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
 2. Do not relocate benchmarks without prior written approval from the County.
 3. Promptly replace lost or destroyed project control points to the satisfaction of the County, at no additional cost to the County.

END OF SECTION 01 4320

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**SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 5000: TEMPORARY FACILITIES AND CONTROLS
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SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Contract Document Sections include, but are not limited to:
 - 1. General Provisions
 - 2. Detailed Provisions Section 01 1100 – Summary of Work

1.02 REFERENCES

- A. Comply with requirements of Detailed Provisions Section 01 4200 – Reference Standards and Abbreviations and as listed herein. The following is a list of standards referenced and incorporated into this Section:
 - 1. American Society of Testing and Materials (ASTM):
 - a. ASTM E136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Deg C.
 - 2. Code of Federal Regulations (CFR):
 - a. 29 CFR 1926 – Safety and Health Regulations for Construction.
 - 3. National Fire Protection Association (NFPA):
 - a. NFPA 70 – National Electrical Code.
 - b. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.03 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Permits and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain all required certifications and permits.

1.04 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service/facility to assume responsibility for operation, maintenance, and protection of each permanent service/facility during its use as a construction facility before County's acceptance, regardless of previously assigned responsibilities.

1.05 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Site Plan:
 - 1. Submit for County approval drawing showing temporary facilities, utility hookups, staging areas, storage areas and parking areas for construction personnel.
- C. Fire-Safety Program:
 - 1. Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized steel, chain-link fabric fencing; minimum six (6) feet high with galvanized-steel pipe posts; minimum 2-3/8" OD line posts and 2-7/8" OD corner and pull posts.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized steel, chain-link fabric fencing; minimum six (6) feet high with galvanized-steel pipe posts; minimum 2-3/8" OD line posts and 2-7/8" OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
- C. Construction/Safety Fencing:
 - 1. 4-foot tall orange fabric mesh as manufactured by:
 - a. Tenax Corporation (Beacon Plus or Diamex); www.tenaxus.com;
 - b. Or approved equal
 - 2. Use metal T-Posts installed up to ten (10) feet apart or as necessary to prevent sagging at all times. Due to safety concerns and potential high wind conditions at the Project Location, rebar, metal u-post, and wooden stakes shall not be allowed as supports for construction/safety fencing.

2.02 TEMPORARY FACILITIES

- A. Contractor's Field Office: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for wind and seismic loading. Sufficient size to accommodate needs of construction personnel activities. Keep office clean and orderly.
- B. Storage and Fabrications Sheds: Contractor may provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- C. Final location of Contractor's temporary facilities shall be coordinated with the County to ensure that access critical to operations is maintained at all times.

2.03 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures. The Contractor shall provide fire extinguishers and other fire protection equipment to adequately protect new and existing facilities and temporary facilities against damage by fire. Water casks, chemical equipment or other sufficient means shall be provided for fighting fires in the new, existing and temporary structures and other portions of the Work and responsible persons shall be designated and instructed in the operation of such fire apparatus so as to prevent or minimize the hazard of fire. The Contractor's fire protection program shall conform to the requirements of the OSHA Standards for Construction. The Contractor shall employ every reasonable means to prevent the hazard of fire.
- B. HVAC Equipment: Unless County authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
 - 3. Permanent HVAC System: If County authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air-grille in system and remove at end of construction and clean HVAC system.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION

- A. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work. Locate facilities to limit site disturbance.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, County, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Supply:
 - 1. No potable water supply exists on-site. The nearest non-potable water source is an irrigation canal located off-site, just north of the intersection of Lovekin Boulevard and 4th Avenue, approximately two (2) miles south of the Blythe Landfill entrance road. The Contractor is responsible for supplying potable water for all other uses.

2. The Contractor may make arrangements for obtaining water supply for this Project via a separate water source. If the Contractor elects to do so, water shall be clean and free from objectionable deleterious amounts of acids, alkalis, salts, or organic materials. County must approve separate water source in advance and in writing. In either case, Contractor shall provide all labor and equipment to collect, load, and apply water in the Work areas.
3. The Contractor shall properly identify all construction water trucks and vessels and inform all workers and the general public when reclaimed waste water is used as construction water.
4. All drinking water on the site during construction shall be furnished by the Contractor and shall be bottled water or water furnished in NSF approved metal dispensers.
5. The Contractor shall not make connection to, or draw water from, any fire hydrant or pipeline without first obtaining permission of the authority having jurisdiction over the use of said fire hydrant or pipeline and from the Agency owning the water system. For each such connection made the Contractor shall first attach to the fire hydrant or pipeline a valve, backflow preventer and a meter, if required by the said Authority, of a size and type acceptable to said Authority and Agency.
6. Prior to Final Acceptance of the Work, all temporary water connections, tanks, and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the County and to the agency owning the affected utility.

C. Waste Collection:

1. Provide trash cans and instruct personnel to maintain a clean site. Waste-collection containers shall be adequately sized to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

D. Sanitary Facilities:

1. Provide temporary toilets, wash facilities, sanitary supplies, and drinking water for use of construction personnel. Comply with requirements of Authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - a. Toilets: Portable toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Subpart D, Section 1926.51 of the OSHA Standards for Construction. Portable toilets shall be provided with and placed in a secondary containment pan. Contractor shall provide hand wash sink(s) and all necessary sanitary supplies for the toilet facilities throughout the duration of the Project.

- b. The Contractor shall establish adequate and regular collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of in a manner satisfactory to the County and in accordance with all laws and regulations pertaining thereto. At a minimum, portable toilets shall be serviced and refuse from trash cans collected once per week or as often necessary for safe and sanitary conditions.

E. Heating and Cooling:

1. Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low and high temperatures. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control:

1. Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service:

1. The Contractor shall be responsible to provide necessary electrical power. The Contractor will be responsible for all temporary power and generators required during the construction and planned power shut-downs.

H. Lighting:

1. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

I. Telephone Service: The County's telephone system shall not be used by the Contractor's work force.

1. Post a list of important telephone numbers at the Project Location, including, but not limited to the following:
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's office.
 - d. Contractor's emergency after-hours telephone number(s).
 - e. County's office.
 - f. Principal Subcontractors' office.
2. Provide Project Superintendent and Contractor's Safety Officer with cellular telephone.

3.03 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within thirty (30) feet of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.

B. Temporary Roads:

1. Access to the Project Location shall be provided by the County. The Contractor shall not construct any staging areas, haul roads, and access roads without the approval of the County.
2. Provide dust-control treatment that is non-polluting and non-tracking. Reapply treatment as required to minimize dust.

C. Traffic Controls:

1. Comply with requirements of Authorities having jurisdiction and coordinate with County staff.
2. Protect existing site improvements to remain including curbs, pavement, and utilities.
3. Maintain access for fire-fighting equipment and emergency services.
4. Traffic control procedures for approaching, crossing, or traveling along public roadways or access roads according to the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD), which prescribes uniform standards and specifications for all official traffic control devices in California. The MUTCD can be viewed from Caltrans website at <http://www.dot.ca.gov/hq/traffops/engineering/mutcd/>. Signs and traffic control devices along public roadways or access roads shall be removed and stored or covered during periods of time when they are not needed, such as the end of each Working Day, weekends, and any time when no construction activities are being performed.

D. Parking: Use designated areas on Contractor's site plan as approved by the County, for construction personnel parking.

E. Dewatering Facilities and Drains: Comply with all Federal, State, and Local Government requirements. Maintain Project Location, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding of adjoining properties of endanger permanent Work or temporary facilities.

F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

G. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at the Project Location and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution of other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Site Access: Prior to commencing Work the County will supply the Contractor with the opportunity to install Contractor's lock in series with County's lock to provide shared access to the landfill entrance gate. The Contractor is responsible to:
 - 1. Maintain security by limiting number of keys and/or codes to Contractor's locks and restricting distribution to authorized personnel. Furnish one set of keys to County for any gates, enclosures or fenced areas constructed by the Contractor.
 - 2. The Contractor shall assume full responsibility for any theft or vandalism occurring to the Contractor's equipment, tools, materials, supplies, and construction (prior to Final Acceptance of the entire Project by the County), and shall take appropriate measures necessary to eliminate their occurrences.
- G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each Work Day.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. Temporary Egress: Maintain temporary egress for existing occupied facilities as required by the County.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.
1. Prohibit smoking in construction areas.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and-protection program for personnel at the Project Location. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.05 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosure, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. County reserves right to take possession of Project signs.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Detailed Provisions Section 01 7700 – Closeout Procedures.

END OF SECTION 01 5000



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 5600: PROJECT ENVIRONMENTAL CONTROLS
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SECTION 01 5600 PROJECT ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes mitigation measures to be integrated into the Project to reduce the potential environmental impacts resulting from construction activities. The Contractor shall implement mitigation measures identified herein during the construction process, as well as any other measures required in the Contract Documents, and as required by Federal, State, and Local government entities.
- B. Related Contract Document Sections include, but are not limited to:
 - 1. General Provisions
 - 2. Detailed Provisions Section 01 1100 – Summary of Work

1.02 REFERENCES

- A. Comply with requirements of Detailed Provisions Section 01 4200 – Reference Standards and Abbreviations and as listed herein.
- B. Reference Codes, Regulations and Policies: The following codes, regulations and policies, including documents referenced therein, form part of this Detailed Provision and are incorporated herein by reference.
 - 1. American Society of Testing and Materials (ASTM):
 - a. ASTM E136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Deg C.
 - 2. California Code of Regulations (CCR):
 - a. 13 CCR 2449 – General Requirements for In-Use Off-Road Diesel-Fueled Fleets
 - b. 13 CCR 2485 – Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling
 - c. 19 CCR – Public Safety
 - 3. California Department of Transportation (Caltrans):
 - a. Caltrans Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual, current edition
 - b. Caltrans Construction Site Best Management Practices (BMPs) Manual, current edition

4. California Health and Safety Code (CHSC):
 - a. CHSC Division 20, Chapter 6.95 – Hazardous Materials Release Response Plans and Inventory.
 5. Code of Federal Regulations (CFR):
 - a. 29 CFR 1926 – Safety and Health Regulations for Construction.
 - b. 40 CFR 112 – Oil Pollution Prevention
 6. California State Water Resources Control Board (SWRCB):
 - a. SWRCB National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities, Order No. 2014-0057-DWQ, NPDES No. CAS000001 (“the Industrial General Permit”).
 - b. SWRCB National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 (“the General Permit”).
 7. California Stormwater Quality Association (CSQA):
 - a. CSQA Construction BMP Handbook
 - b. CSQA Industrial and Commercial BMP Handbook
 8. County of Riverside:
 - a. County Ordinance 651 – Requiring Disclosure of Hazardous Materials and the Formulation of Business Emergency Plans.
 9. National Fire Protection Association (NFPA):
 - a. NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 - b. NFPA 704 – Standard System for the Identification of the Hazards of Materials for Emergency Response.
 10. Mojave Desert Air Quality Management District (MDAQMD):
 - a. MDAQMD Rule 403 – Fugitive Dust Control.
- C. Additional reference information is provided as information to assist the Contractor with document preparation and registration requirements; and form part of this Detailed Provision and are incorporated herein:
1. Stormwater Water Pollution Prevention Plan (SWPPP):
 - a. The 1972 amendments to the Federal Water Pollution Control Act (known as the Clean Water Act or CWA) provide the statutory basis for the National Pollutant Discharge and Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. Section 402 of the CWA specifically required the United States Environmental Protection Agency (EPA) to develop and

implement the NPDES program. The full text of the Clean Water Act reference and SWPPP preparation assistance is available from the following agency websites:

Agency Website	Reference	Website Address
EPA	Clean Water Act	http://www.epa.gov/npdes/pubs/cwatxt.txt
EPA	SWPPP Assistance	https://www3.epa.gov/npdes/pubs/sw_swppp_guide.pdf
Caltrans	SWPPP Assistance	http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm
California Stormwater Quality Association	SWPPP Assistance	https://www.casqa.org/

2. Hazardous Materials Management:

- a. Title 40 of the Code of Federal Regulations (CFR) Part 112 establishes requirements for Oil Pollution Prevention. In accordance with this Regulation, the County has prepared a site-specific Spill Prevention Control and Countermeasure Plan (SPCCP) for the Blythe Sanitary Landfill. Copies of the SPCCP are located at the Site and available for review at the County office.
- b. Title 19 Public Safety of the California Code of Regulations (CCR), along with the California Health and Safety Code (HSC), Division 20, Chapter 6.95 establish the requirements for hazardous material release reporting, inventory, and response plans. The County of Riverside has further adopted County Ordinance 651 “Requiring Disclosure of Hazardous Materials and the Formulation of Business Emergency Plans”. The intent of this Ordinance is to impose additional and more stringent requirements on businesses that handle hazardous materials than those imposed by Chapter 6.95 of the HSC.
- c. In addition to the above Codes and Regulations, the Riverside County Department of Environmental Health (DEH) offers forms and guidelines for preparing a HMBEP. The full text of the above mentioned references and HMBEP preparation assistance is available from the following agency websites:

Agency Website	Reference	Website Address
e-CFR	CFR Title 40, Part 112 - Oil Pollution Prevention	http://www.ecfr.gov/cgi-bin/text-idx?SID=2feeeddb24b102687dcde2336206819c&mc=true&node=pt40.22.112&rgn=div5
California EPA	CCR Title 19 – Public Safety & CH&SC Chapter 6.95	http://www.calepa.ca.gov/cupa/LawsRegs/
County of Riverside, Clerk of the Board	County Ordinance 651	http://www.rivcocob.org/ords/600/651.4.pdf
County of Riverside Department of Environmental Health	HMBEP preparation assistance, Certified Union Program Agency (CUPA) & Hazardous Waste Generator Forms	http://www.rivcoeh.org/Forms/hazmat_guidance
Department of Toxic Substances Control (DTSC)	EPA ID Number	http://www.dtsc.ca.gov

D. Related Available Information:

1. As specified herein, comply with all requirements for the following County documents referenced and incorporated into this Section:
 - a. Riverside County Department of Waste Resources; National Pollutant Discharge Elimination System: Storm Water Pollution Prevention Plan for the Blythe Sanitary Landfill (Blythe SWPPP).
 - b. Riverside County Department of Waste Resources; Spill Prevention, Control, and Countermeasure Plan, Blythe Sanitary Landfill (SPCCP).
2. Copies of the Blythe SWPPP and SPCCP are incorporated into the Contract Documents by reference and are available for review at the Site and at the County's office.

1.03 DEFINITIONS

- A. Best Management Practices (BMPs) – BMPs are scheduling of activities, prohibitions of practices, maintenance procedures, and other management activities to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
- B. Dust – shall mean airborne particulate that is associated with or results from the Contractor's activities: Of particular concern is dust associated with the Contractor's earthwork activities; truck traffic onto and off of the Site; and wind traversing exposed stockpiled soil and debris.
- C. General Permit – California State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 ("the General Permit").
- D. Industrial General Permit – California State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities, Order No. 2014-0057-DWQ , NPDES No. CAS000001 ("the Industrial General Permit").
- E. Likely Precipitation Event – Any weather pattern that is forecasted to have a 50% or greater chance of producing precipitation in the project area. The QSP shall obtain likely precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at: <http://www.weather.gov>).
- F. NOI – Notice of Intent for General Permit.
- G. Qualifying Rain Event – Any event that produces 0.5-inches or more precipitation with a 48-hour or greater period between rain events.
- H. Qualified SWPPP Developer (QSD) – Individual who is trained and authorized to develop and revise SWPPPs pursuant to the Industrial General Permit and General Permit.

- I. Construction General Permit Qualified SWPPP Practitioner (QSP) – Individual responsible for non-storm water and storm water visual observations, sampling and analysis, and for ensuring full compliance with the General Permit.
- J. REAP – Rain Event Action Plan. The General Permit requires the QSP of Risk Level 2 and 3 sites to develop and implement REAPs that must be designed to protect all exposed portions of the site within 48-hours prior to any likely precipitation event.
- K. SWPPP – Storm Water Pollution Prevention Plan
- L. Visible Dust – shall mean dust that can be detected visibly, without instrumentation.

1.04 QUALITY ASSURANCE

- A. In order to minimize the discharge of pollutants to storm water, the Contractor shall implement temporary site controls.
- B. A qualified Contractor experienced in the proper installation of BMPs shall provide installation, maintenance and repair in accordance with: manufacturers' specifications; in keeping with recognized BMPs; and in keeping with compliance of the Site's Industrial General Permit for construction activities.

1.05 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Construction Fugitive Dust Control Plan (If applicable):
 - 1. If applicable, Contractor shall prepare, submit for review and acceptance, and implement a dust control plan that conforms to Mojave Desert Air Quality Management District (MDAQMD) Rule 403 requirements. Submit to County within two (2) weeks of the Award of Contract by the Riverside County Board of Supervisors, and prior to delivering equipment and commencing work at the Project Location.
- C. Hazardous Materials Business Emergency Plan (HMBEP) (If applicable):
 - 1. If applicable, Contractor shall prepare and submit for County review and acceptance a project-specific HMBEP, if a Contractor's work requires the on-site storage of petroleum products, including, but not limited to: lubrication oils, antifreeze, greases or fuels, or if it is necessary for the Contractor to store petroleum waste products on-site such as waste oil, oil filters, antifreeze, greases, contaminated soil, and waste fuel on-site. Submit to County within two (2) weeks of the Award of Contract by the Riverside County Board of Supervisors, and prior to delivering equipment and commencing Work at the Project Location.
- D. Product Data:
 - 1. Provide manufacturer's catalog sheets, installation instructions, material testing, and data sheets for all products used in all BMPs prior to installation on the site.

2. Provide manufacturer's catalog sheets, installation instructions, material testing, and data sheets for all proposed soil stabilizers along with certification from Colorado River Basin Regional Water Quality Control Board for approved use.

PART 2 PRODUCTS

2.01 BMP MATERIALS:

- A. General: Specific site control devices shall be furnished and installed by the Contractor. Where such devices are indicated, their material composition shall comply with this section.
- B. Silt Fences: implemented to filter, and remove sediment from storm water shall be composed of the following materials:
 1. Geotextile Fabric – a non-woven, polypropylene, polyethylene, or polyamide fabric with non-raveling edges. It shall be non-biodegradable, inert to most soil chemicals, ultraviolet resistant, unaffected by moisture and other weather conditions, and permeable to water while retaining sediment. Fabric shall be 36-inches wide, with a minimum weight of 4.5 oz/yd.
 2. Posts – metal fence posts shall be made of hot-rolled steel, galvanized or painted, a minimum of 4-feet long, with a Y-bar or TEE cross-section.
 3. Wire Backing – a galvanized, 2-inch x 4-inch, welded wire fencing, 12 gauge minimum. Width shall be sufficient to support geotextile fabric 24-inches above adjacent grades.
 4. Chain link fences located along the same lines as silt fences may be used to support geotextile fabric. In this circumstance, the geotextile fabric shall be firmly attached to the fence.
 5. Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide product identification sufficient for inventory and quality control purposes. Rolls shall be stored in a manner that protects them from the elements.
 6. Prefabricated Fence: Prefabricated fence systems may be used provided they meet all of the above material requirements.
- C. Triangular Filter Dikes: for use on surfaces or in locations where standard silt fence cannot be implemented, shall be composed of the following:
 1. Geotextile fabric – of the type described above, in a minimum width of 60-inches. Dike Structure – 6 gauge, 6x6 welded wire mesh, 60-inches wide, folded into a triangular form. Each side shall be 18-inches with an overlap of 6-inches.
 2. Ties – metal shoit rings or standard wire/cable ties for attachment of wire mesh to itself, and for attachment of geotextile fabric to wire mesh.

- D. Rock Berms: shall be composed of the following materials:
1. Rock – clean, open-graded rock, with a maximum diameter of 3-inches.
 2. Wire Mesh Support – a galvanized, woven wire sheathing having a maximum opening size of 1-inch, and a minimum wire diameter of 20 gauge.
- E. Fiber Rolls: shall consist of straw or flax rolled and bound into a tube and placed on slopes at regular intervals to reduce flow velocity and minimize sediment runoff.
1. Stakes, for the fiber rolls, shall be softwood lumber, chisel pointed.
- F. Soil Retention Blankets: shall govern for providing and placing wood, straw or coconut fiber mat, synthetic mat, paper mat, jute mesh or other material as a soil retention blanket for erosion control on slopes, ditches and high traffic pedestrian areas of barren soil, for short term protection of seeded or sodded areas.
1. Samples of soil retention blankets must be submitted to the County for approval prior to use. Examples of soil retention blankets include:
 - a. Jute Mat – a plain fabric made of jute yarn, woven in a loose and simple manner, with a minimum unit weight of 2.7 pounds per square yard. Width shall be as required for the dimensions of the area to be covered.
 - b. Wood Fiber Mat – a mat composed of wood fibers, which are encased in nylon, cotton or other type of netting.
 - c. Synthetic Webbing Mat – a mat manufactured from polyvinyl chloride or polypropylene monofilaments, which are bonded together into a three-dimensional web to facilitate erosion control and/or re-vegetation.
 2. Fasteners shall conform to the manufacturer's recommendations.
- G. Geotextiles are woven or non-woven synthetic fabrics, which are designed to be used for erosion control and soil stabilization applications.
- H. Organic Mulches: shall be used for covering bare soil, retaining moisture under existing vegetation being preserved, and for absorbing the energy of compaction caused by foot or vehicular traffic. Mulch shall be one or more of the following:
1. Straw – from broken straw bales that are free of weed and grass seed where the grass from the seed is not desired vegetation for the area to be protected.
 2. Hay – from broken hay bales containing an approved species of grass and seed, for use where the germinated grasses from the hay bales is considered desirable vegetation in the area to be protected.
 3. Wood Chips – from chipped limbs of cleared trees on site, or delivered in chipped form, in bulk quantities of pine, cedar or cypress. Wood chips of all species shall be partially decomposed to alleviate nitrogen depletion of the soil in areas where existing vegetation is to be preserved and protected.
 4. Shredded Mulches – from pine, cypress or cedar, mechanically shredded, and capable of forming an interlocking mat following placement, and after sufficient wetting and drying has taken place naturally.

2.02 SOIL BINDER OR STABILIZER:

- A. Soil binders and stabilizers shall be non-toxic dust palliative approved for use by the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) and the County.

2.03 DUST CONTROL FABRIC:

- A. Fabric shall be woven mesh polypropylene fabric, closed black or green mesh, with manufacturer's recommendations for dust and wind control.

PART 3 EXECUTION

3.01 CALIFORNIA STATE WATER RESOURCES CONTROL BOARD (SWRCB) NATIONAL POLLUTION DISCHARGE AND ELIMINATION SYSTEM (NPDES) PERMIT

- A. The County complies with the SWRCB General Industrial Activities NPDES permit through regular inspections, monitoring, and implementation of best management practices (BMPs) as described in the current NPDES Storm Water Pollution Prevention Plan for Blythe Sanitary Landfill (Blythe SWPPP). The Contractor shall be responsible for compliance with the Blythe SWPPP.
- B. The Contractor shall responsible for compliance with the County's Site-specific Blythe SWPPP.
- C. The Contractor shall implement all BMPs required to provide erosion and sediment controls, control of non-stormwater discharges, and hazardous spill prevention and response. The following items are examples of BMPs that would be implemented during construction to avoid causing water quality degradation:
 - 1. Erosion control BMPs, such as use of blankets, mulches or hydroseeding to prevent detachment of soil, following guidance presented in Caltrans Construction Site Best Management Practices (BMPs) Manual.
 - 2. Sediment control BMPs such as silt fencing, fiber rolls and/or detention basins that trap soil particles.
 - 3. Construction staging areas designed so that stormwater runoff during construction will be collected and treated in a detention basin or other appropriate structure.
 - 4. Management of hazardous materials and wastes to prevent spills or contact with stormwater discharge.
 - 5. Treatment BMPs such that localized trench dewatering does not impact surface water quality.
 - 6. Vehicle and equipment fueling BMPs such that these activities occur only in designated staging areas with appropriate spill controls.
 - 7. Maintenance checks for equipment and vehicles to prevent spills or leaks of liquids of any kind.

D. Corrective Actions:

1. Any corrective actions found to be needed for compliance with the Blythe SWPPP and permit requirements during any inspection shall be implemented by the Contractor immediately. If the Contractor does not implement corrective actions within 24 hours of notification, the Contractor shall be in breach of Contract, and the County may suspend construction activities until corrective action is implemented by the Contractor.
- E. Implementation of storm water quality measures shall be performed at no additional cost to the County and the Contractor shall include appropriate allowance in the Contractor's Bid Proposal to cover such measures.

3.02 AIR QUALITY

- A. Construction Fugitive Dust Control Plan: If applicable, Contractor shall prepare, submit for review and acceptance, and implement a dust control plan that conforms to Mojave Desert Air Quality Management District (MDAQMD) Rule 403 requirements. The Contractor is responsible for implementing all necessary mitigation measure to ensure compliance with regulatory thresholds relating to air quality including, but not limited to MDAQMD Rule 403 Fugitive Dust Control requirements. The dust control plan shall include the following dust control procedures or others as required by MDAQMD or authorized Agencies having jurisdiction:
1. Water all active construction areas at least twice daily, taking into consideration of temperature and wind conditions.
 2. Cover all trucks/equipment hauling soil, sand, and other loose materials or require trucks/equipment to maintain at least two (2) feet of freeboard.
 3. Pave, apply water three (3) times daily, or apply (non-toxic, biodegradable) soil stabilizers on unpaved access roads, parking areas and staging areas at construction sites. Soil stabilizers shall be approved for use by the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB).
 4. If visible soil material is carried onto paved access roads or public streets, sweep daily (with water sweepers) all paved areas where soil material has been determined to be from Contractor's operation. Containerize, characterize, and properly dispose of soil collected from street sweeping.
 5. Hydroseed or apply (non-toxic, biodegradable) soil stabilizers to inactive construction areas (previously graded areas inactive for ten (10) Calendar Days or more).
 6. Enclose, cover, water twice daily or apply (non-toxic, biodegradable) soil binders to exposed stockpiles (dirt, sand, etc.).
 7. Limit traffic speeds on access roads (paved and unpaved) to 15 mph.
 8. Construct stabilized construction entrance/exit ways for any unpaved transition to paved roadways. Install fiber rolls, gravel bags or other erosion control measures to prevent silt runoff to paved roadways.

- B. The County shall have the authority to immediately suspend all construction operations if, in the County's opinion, the Contractor fails to adequately provide for dust control. In the event wind speeds exceed 20 mph for more than 15 minutes, causing visible dust, Contractor shall halt earthwork activities until wind speeds decrease and no visible dust is observed.
- C. If either (1) observations or measurements made by the Contractor, County or regulatory agencies, or (2) complaints by MDAQMD or nearby receptors indicate the need for more stringent dust control measures, Contractor shall promptly:
 - 1. Increase the magnitude of dust control measures.
 - 2. Increase the frequency of dust control measures.
 - 3. Add dust palliative or surfactant to dust control water as approved by the CRBRWQCB and County.
- D. Construction Exhaust Emissions Control Plan: Contractor shall implement an exhaust emissions control plan that shall include, but not limited to the following controls and practices:
 - 1. On road vehicles with a gross vehicular weight rating (GVWR) of 10,000 pounds or greater shall not idle for longer than five (5) minutes at any location as required by Section 2485 of Title 113, Division 3, Chapter 10, Article 1 of the California Code of Regulations (CCR). This restriction does not apply when vehicles remain motionless during traffic or when vehicles are queuing.
 - 2. Off road equipment engines shall not idle for longer than five (5) minutes per Section 2449(d)(3) of Title 13, Division 3, Chapter 9, Article 4.8 of the California Code of Regulations (CCR). All vehicle operators shall receive a written idling policy to inform them of idling restrictions. The policy shall list exceptions to this rule that include the following: idling when queuing; idling to verify that the vehicle is in safe operating condition; idling for testing, servicing, repairing or diagnostic purposes; idling necessary to accomplish Work for which the vehicle was designed (such as operating a crane); and idling required to bring the machine to operating temperature as specified by the manufacturer.
 - 3. Off road engines greater than 50 horsepower shall, at a minimum, meet Tier 2 emissions standards. When available, higher Tier engines shall be utilized.
- E. Implementation of air quality measures shall be performed at no additional cost to the County and the Contractor shall include appropriate allowance in the Contractor's Bid Proposal to cover such measures.

3.03 NON-HAZARDOUS MATERIALS SITE CLEANUP

- A. Cleanup of the site will include complete removal and disposal of all solids, liquids and substance either used or generated during any Work. All materials will be properly disposed by the Contractor.

3.04 HAZARDOUS MATERIALS MANAGEMENT AND SPILL PREVENTION

A. General:

1. The Contractor shall at all times keep the site neat, tidy, and free of waste materials or rubbish resulting from Work. Toxic materials, including oil, fuel oil, diesel, gasoline, contaminated soil, coolant, fluid filters, and other contaminants, shall be transported off-site and disposed of at an approved facility. Containers temporarily holding these toxic materials shall be properly labeled, covered and stored in secondary containment areas, have no leaks and shall be removed from the site as quickly as is reasonably possible.
2. Any accidental spills or spills that are produced during routine equipment maintenance shall be cleaned up by removing all the contaminants and the contaminated soil, disposing of it at an approved facility, and replacing the removed contaminated soil volume with clean soil material.
3. In the event that evidence of potential soil contamination such as discoloration, noxious odors, debris, or buried storage containers, is encountered during construction, the Contractor shall have a contingency plan for sampling and analysis of potentially hazardous substances, including use of photoionization detector. The required handling, storage, and disposal methods depend on the types and concentrations of chemical identified in the soil. Any site investigations or remediation shall comply with Applicable Laws and will coordinate with the appropriate Agencies.
4. The Contractor shall comply with the requirements of the Blythe Spill Prevention Control and Countermeasure Plan (SPCCP) and include spill response procedures in their project-specific Health and Safety Plan (HASP). The Contractor shall be responsible for any spills caused by its Subcontractors.

B. Hazardous Materials Business Emergency Plan (If applicable): If a Contractor's Work requires the on-site storage of petroleum products including, but not limited to: lubrication oils, antifreeze, greases or fuels, or if it is necessary for the Contractor to store petroleum waste products on-site such as waste oil, oil filters, antifreeze, greases, contaminated soil, and waste fuel on-site the following actions must take place:

1. The Contractor shall prepare a Hazardous Materials Business Emergency Plan (HMBEP) for submittal to the County prior to performing any Work. The plan and the associated "Business Activities", "Business Owner/Operator Identification" and "Hazardous Materials Inventory" forms shall be also submitted to the Riverside County Department of Environmental Health (DEH) for registration and issuance of a Facility ID Number.
2. The Contractor may additionally be required to apply for a permit as a hazardous waste generator from the Riverside County Department of Environmental Health (DEH), and an EPA ID number as required by Federal, State, or Local authorized agencies. To obtain an EPA ID number, the Contractor should contact the Department of Toxic Substances Control (DTSC) Telephone Information Center at (800) 61-TOXIC or (800) 618-6942, to obtain information on EPA ID #'s. Applications are available at the DTSC website referenced above in Section 1.02.

3. The Contractor will be required to comply with the terms and conditions of Riverside County Ordinance 651, which include, but are not limited to:
 - a. Immediate correction of unsafe conditions.
 - b. Maintain proper separation of hazardous materials from other potentially dangerous materials and from buildings.
 - c. Restrict access by unauthorized persons.
 - d. Post warning and hazard identification signs in accordance with NFPA Standard 704 where applicable. Post appropriate signage at hazardous materials storage areas, entrances and exits.
 - e. Label all containers and maintain labels in legible condition at all times. Label above ground storage tanks with the appropriate NFPA 704 when applicable. Correctly label all containers, barrels, etc containing hazardous materials and/or hazardous waste.
 - f. Submit revised forms to the County prior to making changes to chemical inventory.
 - g. Submit copies of all hazardous waste manifests to the County for all materials being properly disposed from the site.
4. The Contractor shall additionally be required to comply with the conditions of the Blythe Landfill Spill Prevention, Control, and Countermeasure Plan (SPCCP), Section 10, "Contractor's Responsibility" which is outlined as follows:
 - a. The Contractor's tanks or drums used to store the product or waste must comply with the County's SPCCP requirements including, but not limited to: secondary containment system, drainage control and periodic inspection.
 - b. Secondary containment systems shall comply with the following minimum guidelines:
 - 1) Methods of Containment – Recessed floors, raised sills, containment pallets, double-walled tanks, dikes, berms or walls.
 - 2) Capacity of Containment – Contain the entire volume of the largest container/ tank and the volume from a 24-hour rainfall as based on a 25-year storm frequency.
 - 3) Construction of Containment – Containment area shall be lined with compatible (impervious, chemical and puncture resistant) material and have no unsealed seams or gaps. No open or uncontrolled drains shall be located within the containment area. Floor of containment area shall be sloped to a recessed collection sump.
 - c. Containment areas shall be sufficiently impervious to contain any discharge and be designed to prevent any drainage. Any accidental spills within the containment area shall be immediately cleaned up by removing the contaminants and properly disposing of them. When rain is forecasted, the containment area shall be covered to prevent rainfall accumulation. Any

contained rainwater in the area must be inspected for contamination by County staff prior to being discharged by the Contractor. Any discharge that occurs must be observed and logged by County staff on a "Drainage Discharge Report Form (WM880)" located in Appendix 1 of the SPCCP.

- d. The Contractor shall conduct a daily inspection of their above ground storage tanks using the "Contractor's Daily Aboveground Storage Tank Inspection Form (WM850)" located in Appendix 1 of the SPCCP.
 - e. The Contractor shall conduct a weekly inspection of their work area using the "Contractor's Weekly Inspection Form (WM 860)" located in Appendix 1 of the SPCCP.
 - f. The Contractor shall document all problems found during the inspection and provide immediate correction of problems.
 - g. The Contractor shall document all corrections in writing and attach the documentation to the inspection form.
 - h. The Contractor shall submit their completed forms (including daily inspections, weekly inspections, hazardous waste manifests and correction documentation) to the County on a weekly basis.
- C. Implementation of hazardous materials management and spill prevention measures shall be performed at no additional cost to the County and the Contractor shall include appropriate allowance in the Contractor's Bid Proposal to cover such measures.
- D. Hazardous Materials Site Cleanup
- 1. Any materials suspected by the Engineer of being contaminated due to ambient and/or existing conditions, which were not a result from the Contractor's equipment, materials or actions, will be analyzed by the Engineer for potential contaminants.
 - a. Materials that contain levels of contaminants in excess of Federal and/or State disposal standards shall be properly disposed of by the Engineer.
 - 2. Contractor shall perform necessary work to contain/control leaking equipment.
 - 3. Generation of hazardous materials by the Contractor during the course of work caused by his normal operational procedures or negligence (e.g., oil, and/or hydraulic spills or leaks) shall be cleaned, removed, and properly disposed of at the sole cost of the Contractor.
 - 4. Any materials suspected of contamination due to Contractor negligence will be submitted by the Contractor to a State-certified laboratory for analysis at the Contractor's sole expense.
 - 5. The sample shall be analyzed by approved Federal and/or State methods to determine if the sample contains hazardous materials.
 - 6. The County reserves the right to request additional testing if the methods requested by the Contractor are insufficient to determine the types of potentially hazardous materials.

7. Tests must be run within 24 working hours of suspected contamination and must be requested at expedited turn-around times, as quick as possible considering the analytical method.
8. The test results shall be provided to the Engineer as soon as available by the Contractor.
9. The Contractor, in accordance with applicable Federal and State laws, shall properly dispose of any material that contains levels of contaminants in excess of Federal or State disposal standards within 48 working hours of receiving test results.
10. This will include preparation of a hazardous materials disposal manifest by the Contractor, and the Contractor, not the County, shall be listed as the generator of the hazardous waste on all manifests.
11. The Contractor shall provide the County with a copy of the initial manifest and the final manifest, which indicates waste receipt by the receiving disposal facility.

3.05 NOISE

- A. Contractor shall assure that construction equipment with internal combustion engines have sound control devices at least as effective as those provided by the original equipment manufacturer (OEM). No equipment shall be permitted to have an unmuffled exhaust.

3.06 SEASONAL RESTRICTIONS

- A. Streambed/riparian areas are often habitat for nesting birds. For this reason, if construction activity takes place in any streambed/drainage course in the Project construction area during the period from February 1 through September 15th, the Contractor shall notify the County ten (10) days prior to the initiation of the construction activity to allow for survey/assessment of potential nesting bird activity. If nesting birds are found to be present, a buffer area shall be placed around the feature (size dependent upon species) and no Work shall occur within the buffer area, to include the streambed/drainage course, during the breeding season (February 15th – September 15th). The County shall be responsible for all costs associated with the survey/monitoring efforts, as well as determining the appropriate buffer area. Additional time will be granted to the Contractor if construction delays occur as a result of nesting bird seasonal restrictions.

3.07 CULTURAL RESOURCES

- A. Inadvertent Discoveries: If discovery is made of items of historical or archaeological interest, the Contractor shall immediately cease all Work activities in the area (within approximately 100 feet) of discovery. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g. projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil (“midden”) containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones

and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. After cessation of excavation the Contractor shall immediately contact the County. The Contractor shall not resume work until authorization is received from the County.

1. In the event of unanticipated discovery of archaeological indicators during construction, the County may elect to retain the services of a qualified biologist or archaeologist to evaluate the significance of the items prior to resuming any activities that could impact the site.
 2. In the case of an unanticipated archaeological discovery, if it is determined that the find is unique under the National Historic Preservation Act (NHPA) and/or potentially eligible for listing in the National Register, and the site cannot be avoided, the County shall provide a research design and excavation plan, prepared by an archaeologist, outlining recovery of the resource, analysis, and reporting of the find.
- B. Discovery of Human Remains: If potential human remains are encountered, the County shall halt Work in the vicinity of the find and contact the County coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. If the coroner determines the remains are Native American, the coroner shall contact the Native American Heritage Commission (NAHC). As provided in Public Resources Code Section 5097.98, the NAHC shall identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.

3.08 EXPLOSIVES AND BLASTING

- A. Unless approved otherwise in writing by the County, the use or storage of explosives on the Work or Site will not be permitted.

3.09 SANITATION

- A. The Contractor shall provide approved fixed or portable chemical toilets wherever needed for its employees. The Contractor shall establish regular intervals of collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of in a manner satisfactory to the County and in accordance with all laws and regulations pertaining thereto. The County's toilet facilities shall not be used by the Contractor. See Detailed Provisions Section 01 5000 – Temporary Facilities and Controls.

END OF SECTION 01 5600

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 6000: PRODUCT REQUIREMENTS
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SECTION 01 6000 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes the following:

1. Product delivery, storage, and handling requirements.
2. Products submitted as "Or Approved Equal" or "Or Approved Alternate".
3. Substitution procedure for requesting the approval of substitution of a product that is not equivalent to a product which is specified by descriptive or performance criteria or defined by reference to manufacturer, vendor, trade name, and/or model or catalog number.
4. Product warranties.

B. Related Contract Document Sections include, but are not limited to:

1. General Provisions

1.02 REFERENCES

A. National Fire Protection Association (NFPA) Standards.

1.03 DEFINITIONS

A. Approved Equal or Approved Alternate: A material, product, equipment, or process proposed by the Contractor that has demonstrated and approved by the County through the submittal process having same function, quality, durability, appearance, strength, and design characteristics equal to or better than those originally specified in the Contract Documents; and shall be compatible with all other systems, parts or components of the Project and Work under the Contract.

B. Assembly: Two or more products, materials or components that are utilized together to produce a composite application satisfying a set of requirements.

1. Examples of Assemblies in these Contract Documents:

- a. Submersible pump and motor.
- b. Electrical panels.

C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product", including make or model number, manufacturer name, or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of

evaluating comparable products of additional manufacturers named in the Specification.

- D. Manufacturer: The entity or firm that produces, manufactures or assembles a material, product or item of equipment incorporated in the Work. “Vendor” and “Supplier” are used interchangeably with Manufacturer.
 - 1. Manufacturers specifically named in Division 02 through 33 Detailed Provisions Sections are believed to have the capability of producing products, assemblies and systems meeting the requirements of the Contract Documents. Proposing a product, assembly or system produced by one of the named Manufacturers does not relieve the Contractor of the responsibility to demonstrate the proposed product, assembly or system meets the requirements of the Contract Documents.
- E. Manufacturer’s Representative: The person(s) designated by the Manufacturer as its representative(s) and technical authority(s) who is/are knowledgeable about and able to answer technical questions about the Manufacturer’s products, equipment and services.
- F. Manufacturer’s Instructions: Written instructions and recommendations provided by the product Manufacturer regarding the use, installation, preparation of Work to receive the product, or similar written guidance to be followed by the installer and provided as part of the product submittal or by the Manufacturer’s Representative.
 - 1. Manufacturer’s Instructions provided by the Manufacturer’s Representative are subject to review and approval of the County.
- G. Product: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term “product” includes the terms “material”, “equipment”, “system”, and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer’s product name, including make or model number or other designation shown or listed in manufacturer’s published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
- H. Qualified Professional Engineer: A Professional Engineer who is legally authorized to practice in California (licensed) and who is experienced in providing engineering services related to a specific system, assembly or product proposed by the Contractor to meet the requirements of the Contract Documents.
 - 1. For systems, assemblies, or products structural in nature and performance, the Qualified Professional Engineer shall be a licensed structural engineer.
- I. System: Equipment of an electrical and/or mechanical nature that requires some form of energy input to operate and produce a useful result.
 - 1. Examples of Systems in these Contract Documents:
 - a. Non-Potable Water Production Well

b. Groundwater Monitoring Well

1.04 QUALITY ASSURANCE

A. In making request for substitution or in using an approved product, Contractor:

1. Has investigated proposed product, and has determined that it is adequate or superior in all respects to that specified, and that it will perform function for which it is intended.
2. Will provide same guarantee for substitute item as for product specified.
3. Will coordinate installation of accepted substitution into Work, to include structure modifications, if necessary, making such changes as may be required for Work to be complete in all respects.
4. Waives all Claims for additional costs related to substitution which subsequently arise.

1.05 SUBMITTALS

A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.

B. Substitution Requests:

1. Submit the Substitution Request Form at the end of this Section.
2. If necessary, County will request additional information or documentation for evaluation within one (1) week of receipt of a substitution request. County will notify Contractor of approval or rejection of proposed substitution request within fifteen (15) Working Days of receipt of request, or seven (7) Working Days of receipt of additional information or documentation, whichever is later.
 - a. Use product specified if County does not issue a decision on substitution request within the time allocated.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Arrange deliveries of items in accordance with the Project Schedule identified in Detailed Provisions Section 01 3200 – Construction Progress Documentation.
2. Coordinate deliveries in accordance with provisions of Detailed Provisions Section 01 1400 – Work Restrictions.
3. Deliver products in undamaged condition.
 - a. Deliveries are to be made in Manufacturers' original packaging, with seals and labels intact.
 - b. Inspect deliveries immediately to ensure compliance with requirements of the Contract Documents and approved submittals.

- c. Assure that products are properly protected.
- B. Store products, items, materials and equipment in accordance with Manufacturers' Instructions and provisions as follows:
 - 1. Seals and labels are to remain intact until such time protective coverings are removed.
 - 2. Protective covers must remain in place until items are prepared for installation.
 - a. Remove and replace protective covers which get wet, or are otherwise damaged to the degree that leaving the protective covers in place threatens the integrity of the item.
 - 3. Store products susceptible or subject to damage by the elements in weathertight enclosures.
 - 4. Maintain temperature and humidity within the ranges required by Manufacturers' instructions.
 - 5. Do not allow storage of combustible materials inside enclosed spaces except when allowed in accordance with applicable NFPA standards.
 - 6. Exterior Storage:
 - a. Store fabricated products aboveground.
 - 1) Position on blocking or skids.
 - 2) Prevent soiling, staining, and other damage.
 - 3) Cover products subject to deterioration using impervious sheet coverings.
 - 4) Provide adequate ventilation to prevent formation of condensation.
 - b. Store loose granular materials in well-drained areas, and on solid unyielding surfaces.
 - 1) Prevent mixing and contamination with foreign matter.
 - c. Comply with the requirements of Detailed Provisions Section 01 1400 – Work Restrictions for Project storage, staging and laydown areas.
- C. Safety Data Sheets:
 - 1. The Contractor is responsible for interpretation of information contained in Safety Data Sheets (SDS).
 - 2. Do not submit or send SDSs for review unless specifically requested by the County. Remove SDS sheets from submittals prior to transmittance.
 - 3. Submit SDS sheets when required for demonstration of sustainability objectives being met.

D. Protection:

1. Protect items after installation.
 - a. Protect structures and Work from damage through County issuance of Certificate of Substantial Completion.
 - b. Protect against traffic damage.
2. Repair or replace damaged items, products, materials and equipment.

1.07 SUBSTITUTIONS

A. General:

1. Certain types of equipment and kinds of material are described in Specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers.
 - a. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are "Or Approved Equal" or "Or Approved Alternate", as determined by the County.

B. Substitution of Items, Materials, and Processes:

1. Products for the Project are specified "Or Approved Equal" or "Or Approved Alternate" unless identified otherwise in this Section.
 - a. It is the Contractor's responsibility to demonstrate to the County satisfaction that the products being proposed are equals to the products identified in the Contract Documents.
 - 1) If applicable, substitutions may impact LEED® credit achievement. The Contractor shall investigate proposed substitutions with respect to the following environmental concerns:
 - (a) Contractor shall identify which LEED® credit strategies may be affected by the proposed substitution.
 - (b) All substitutions shall be accompanied with documentation indicating the pertinent environmental performance criteria of the substitute material are equal or superior to the specified material.
 - a. The County will not unreasonably withhold acceptance of an approvable equal product.
 - 1) Decisions of the County regarding substitutions are final and not subject to appeal.
 - 2) Do not assume acceptance at any time prior to written acceptance in a submittal response prepared by the County.
 - b. Lack of complete information, defective information, or other problem associated with Available Information for a named product does not relieve the Contractor of the responsibility to demonstrate the approvability and equal of

an “Or Approved Equal” or “Or Approved Alternate” product for the intended application or purpose.

2. Submit the same required information for products proposed by the Contractor as Approved Equal, as would be required for the named items, materials and equipment.
- C. Substitution Requests after the Contract Award:
1. Submit a completed Substitution Request Form with the associated submittal information for the material, product, equipment, or process.
 - a. Fill out the form included in this Section fully and completely.
 - b. The Contractor shall sign the document.
 - c. Provide samples as requested by the County.

1.08 PRODUCT WARRANTIES

- A. Warranties specified in other Detailed Provisions Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer’s disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer’s Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to County.

PART 2 PRODUCTS

2.01 GENERAL

- A. All material, products, and equipment incorporated in the completed Work shall be new and acceptable for the use intended except where reuse of materials, products, and equipment is specifically indicated in the Contract Documents.

PART 3 EXECUTION

3.01 GENERAL

- A. All material, products and equipment incorporated in the completed Work shall be installed in accordance with the Manufacturer’s Instructions unless such instructions are contrary to the requirements of the Contract Documents as determined by the County.



SECTION PRODUCT REQUIREMENTS SUBSTITUTION REQUEST FORM

DATE: _____

PROJECT: CONSTRUCTION OF GROUNDWATER WELLS AT THE BLYTHE
SANITARY LANDFILL

_____ hereby submits for County of Riverside's
(NAME OF CONTRACTOR)
consideration the following item instead of the specified item for the above project:

<u>SECTION</u>	<u>PARAGRAPH</u>	<u>SPECIFIED ITEM</u>
----------------	------------------	-----------------------

_____	_____	_____
-------	-------	-------

PROPOSED SUBSTITUTION:

Provide product data sheets, manufacturers' written installation instructions, drawings, details and similar information to demonstrate the Contractor's proposed substitution is an Approved Equal. Where answers require additional space, provide information on additional attached pages. Fill in blanks below:

State differences between proposed substitution and specified item. Differences include, but are not limited to interrelationship with other items; materials and equipment; function; utility; life cycle costs; applied finishes; appearance; and quality.

Demonstrate how the proposed substitution is compatible with or modifies other systems, parts, equipment or components of the Project and Work under the Contract.

PRODUCT REQUIREMENTS

What effect does the proposed substitution have on dimensions indicated on the Project Drawings and previously reviewed Shop Drawings?

What effect does the proposed substitution have on the construction schedule and Contract Time?

What effect does the proposed substitution have on the Contract Price? This includes all direct, indirect, impact and delay costs.

Manufacturer's guarantees of the proposed and specified items are:

_____ Same _____ Different (explain on attachment)

The undersigned state that the function, utility, life cycle costs, applied finishes, appearance and quality of the proposed substitution are equal or superior to those of the specified item.

Submitted by:

For Use by County:

Contractor's Signature

Accepted _____ Accepted as Noted _____

Not Accepted _____ Received Too Late _____

Firm

By _____

Date _____

Remark _____

Telephone _____

Date _____

END OF SECTION 01 6000



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 7000: EXECUTION REQUIREMENTS
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SECTION 01 7000 EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes the following:

1. Examination, preparation, and general installation procedures.
2. Construction.
3. Tolerances.
4. Site Restoration.
5. Cleaning and protection.
6. Starting of systems and equipment.
7. Demonstration and instruction of County personnel.

1.02 REFERENCES

A. Comply with the requirements of Detailed Provisions Section 01 4200 – Reference Standards and Abbreviations and as listed herein.

1.03 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Execute Work by methods to minimize raising dust from construction operations. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.04 COORDINATION

- A. Coordinate scheduling, submittals, and requirements of Detailed Provisions Section 01 3100 Project Management and Coordination to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Notify and coordinate with affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduits, as closely as practicable; place runs parallel with lines of building.

Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- E. After County occupancy of facility, coordinate access to the Site for correction of defective Work and Work not in accordance with Contract Documents, to minimized disruption of County's activities.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. The Contractor shall require the Subcontractors, suppliers, and installers of each element of the Work to perform a detailed inspection of work conditions prior to its performance of Work.
 - 1. Inspect substrates, quality of Work, conditions of the Work area, and activities associated with adjacent and concurrent Work by others.
 - 2. Examine and verify specific conditions described in individual Detailed Provisions Sections.
 - 3. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
 - 4. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.
 - 5. Review all Contract Documents, RFI responses, Changes to the Work, Shop Drawing reviews.
- B. Contractor Responsibilities for Existing Underground Conditions, Utilities, Structures, and Improvements.
 - 1. Certain Available Information and Drawings provided by the County indicate existence of underground conditions, obstructions, utilities, structures, and improvements known to the County prior to execution of the Contract, which are within the Construction Limits.
 - a. Review the Available Information and Drawings prior to performing Work adjacent, above or otherwise potentially affecting underground conditions, obstructions, utilities, structures, and improvements.
 - b. Immediately notify the County of conditions which are not as indicated within the Available Information and Drawings.
 - 2. Coordinate efforts to locate existing underground utilities.
 - a. Contractor shall call Underground Service Alert of Southern California (USA/SC) at 811, the one-call underground facility locating service two (2) Working Days prior to making an excavation. Contractor shall be responsible

for such notification of Subcontractor's Work or shall require Subcontractor to assume this responsibility.

- b. The Contractor's attention is directed to the possible existence of pipe, conduit and other underground improvements which may or may not be shown on the Project Drawings. Preserve and protect any such improvements whether shown on the Project Drawings or not. Expose such improvements in advance of the underground construction to allow for changes in alignment as necessary. Where it is necessary to remove and replace or to relocate such improvements in order to prosecute Work, they shall be removed, maintained, and permanently replaced by the Contractor at their expense. Relocation of said improvements shall not be performed without written permission of the County or the Owner of the utility. Unless otherwise noted, existing underground utilities shall be protected in place.
 3. Examine, mark and record location of existing underground utilities, structures and improvements prior to commencing other Work activities.
 4. Repair or replace any underground utilities, structures or improvements which are damaged or destroyed or rendered unusable by actions caused by or arising from the performance of Work by the Contractor or its Subcontractors.
- C. Contractor Responsibilities for Existing Above-Grade Utilities:
1. The Contractor shall be responsible to coordinate its Work activities around existing above-grade utilities, e.g. meters, power poles, light poles, electrical lines, transformers.
 2. In the event the Contractor elects to adjust, move or relocate existing above-grade utilities, the Contractor shall obtain the approval of the County or utility owner, and furnish notification and Work plan information fourteen (14) Calendar Days prior to making such adjustments or relocations.
 3. The Contractor shall be responsible for costs associated with its decision to adjust, move, or relocate existing above-grade utilities.
 4. No additional costs shall be paid by the County if the Contractor elects to make such adjustments or relocations, except those noted to be relocated in the Project Drawings.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting Work.
- B. Promptly notify County of any discrepancies discovered.
- C. Protect survey control points prior to starting site Work; preserve permanent reference points during construction.
- D. Promptly report to County the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written approval from the County.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements, including: pavements, stakes for grading, fill and topsoil placement, utility locations, slopes and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, and ground floor elevations.
- H. See Detailed Provisions Section 01 4320 – Surveying.

3.04 INSTALLATION

- A. General:
 - 1. Provide all attachments, connection devices, and accessory components necessary for the completion and physical attachment and support of the Work.
 - 2. Comply with requirements of Regulatory Agencies and Authorities having jurisdiction for bracing, restraints, supports, and attachments.
 - 3. Install products as specified in individual Detailed Provisions Sections, in accordance with Manufacturer's Instructions and recommendations to avoid waste due to necessity for replacement.
 - 4. Unless otherwise noted, make vertical elements plumb and horizontal elements level.
 - 5. Unless otherwise noted, install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines.
- B. Make neat transitions between different surfaces, maintaining texture and appearance.
- C. Install equipment, products, coatings, materials, and finishes in accordance with the Contract Documents and manufacturer's written installation instructions.
 - 1. In the event there is a conflict or inconsistency between the Contract Documents and manufacturer's written installation instructions, promptly inform the County of such issue through a Request for Information (RFI).

D. Work Results:

1. Install components, products, materials, equipment, and other items, and assemblies, only during appropriate weather conditions for that Work.
2. Coordinate installation activities such that these activities do not subject unfinished Work to adverse weather, cold temperatures, or other conditions detrimental to the Work.

E. Cutting and Patching:

1. Whenever possible, execute the Work by methods that avoid cutting or patching.
2. Execute Work by methods that avoid damage to other Work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
3. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
4. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
5. Restore Work with new products in accordance with requirements of Contract Documents.
6. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
7. Patching:
 - a. Finish patch surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - b. Match color, texture, and appearance.
 - c. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 CONSTRUCTION

- A. All construction means and methods, and any specialized techniques, employed or selected by the Contractor in the performance of the Work are the sole responsibility of the Contractor.
- B. The Contractor's Work shall be coordinated to correctly interface, fit and come together with adjacent surfaces and utility structures, roadway structures, and grades.

3.06 TOLERANCES

A. Substantial Completion Conditions:

1. Earthwork and Paving:
 - a. Conform to the grades and contours indicated on the Project Drawings.
 - b. Deviation from compacted thickness: +/- 1/4-inch.
 - c. Variation from Design Elevation: +/- 1-inch.
 - d. Variation from Design Horizontal Location: 1-inch in any direction.
2. Structures and Structural Elements:
 - a. Deviation for Design Elevation: +/- 1/2-inch.
 - b. Variation from Design Horizontal Location: 1/2-inch in any direction.
 - c. Variation in Plumb: two-tenths of one percent (0.2%).
3. Retaining Walls:
 - a. Deviation for Design Elevation: +/- 1-inch.
 - b. Variation from Design Horizontal Location: 1-inch in any direction.
 - c. Variation in Plumb: one-half of one percent (0.5%).
4. Anchor Bolts, Base Plates and Concrete Embeds:
 - a. Deviation from Design Elevation: +/- 1/2-inch.
 - b. Variation from Design Horizontal Location: 1/16-inch in any direction.
5. Utility Systems:
 - a. Deviation from Design Elevation: +/- 1/2-inch.
 - b. Deviation from Design Horizontal Position: +/- 1-inch.
 - c. Deviation from Design Pipe Slope (gravity lines only): plus 1/2-inch per foot or minus zero (0) inch per foot.
6. Review other individual Detailed Provisions Sections for additional tolerance information. More stringent tolerances in other Detailed Provisions Sections or required by manufacturers of products and equipment being supplied on the Project shall supersede the tolerances above.

3.07 SITE RESTORATION

- A. All areas, items, utilities or structures damaged or destroyed by the Contractor or its Subcontractors and suppliers during the construction of the Project, whether inside or outside of the Construction Limits, shall be restored by the Contractor to the satisfaction of the County, prior to the issuance of the Certificate of Substantial Completion.

3.08 CLEANING

- A. Maintain the Project Location in a neat and orderly condition, removing empty containers, rags and rubbish daily.
- B. Cleaning of Vehicles:
 - 1. Before leaving the Project Location, all vehicles and equipment shall be free of dust, mud, rocks, debris and soils.
- C. Street Cleaning:
 - 1. If Contractor earthwork operations affect landfill and public roadways, all paved roadways used by the Contractor's trucks or any other equipment hauling material to and from the area shall be kept clean by the Contractor and shall be continuously serviced by the Contractor's use of broomed vacuum sweeper trucks to control dust and mud.
 - a. Contractor shall comply with all permit requirements to keep public roadways clean of dust, dirt and debris. Any associated costs shall be borne by the Contractor at no additional cost to the County.
 - 2. Damage to roadway surfaces from the direct or indirect result of the Contractor's operation shall be repaired by the Contractor to the satisfaction of the responsible agency and the County at no additional cost to the County.
 - 3. Do not allow sediment laden or contaminated surface water to enter storm water systems.
- D. Remove rocks, dirt, debris, trash, shavings, filings, and surface dust from limited access spaces, vaults, pull boxes and similar spaces.
- E. Clean Project Location:
 - 1. Sweep paved areas to a broom-clean condition.
 - 2. Remove stains, petrochemical spills, and other foreign deposits.

3.09 PROTECTION

- A. Temporary Protective Coverings:
 - 1. Temporary protective coverings shall include sheet plastic, tarpaulins, sand bags, geotextiles, matting, and accessories as identified in the Contract Documents.
 - 2. Apply temporary protective coverings when, where, and to the degree required by the Contract Documents to ensure continuous protection from damage, deterioration, and prohibited exposures until Substantial Completion of the Work is issued by the County.
 - 3. Apply temporary protective coverings appropriate to the installation.
 - 4. Removal:
 - a. Remove temporary protection devices and facilities when requested by the County.

- b. Do not remove protection when subsequent Work activities including corrective Work could damage surfaces.

B. Limitation of Exposures:

1. Supervise and coordinate construction activities to ensure no part of the construction completed, or in progress, is subject to deleterious exposure during the construction period.
2. Protect against the following exposures:
 - a. Excessive loading, including static and dynamic forces.
 - b. Excessive pressures.
 - c. Excessive high and low temperatures.
 - d. Ice contamination of materials and products.
 - e. Air contamination, pollution, solvents, chemical, including release of volatile organic compounds.
 - f. Construction traffic.
 - g. Soiling, staining.
 - h. Mold, mildew, bacteria, and other organic processes.
 - i. Excessive electrical current or load.
 - j. Inadequate separation and/or isolation between dissimilar metals.
 - k. Improper shipping, handling, packing.
 - l. Unprotected, improper, insufficient storage.

3.10 SYSTEM START-UP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify County seven (7) days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequences, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Execute start-up under supervision of applicable Contractor personnel, County and manufacturer's representative in accordance with Manufacturer's Instructions.
- F. When specified in individual Detailed Provisions Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

3.11 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance and shutdown of each item of equipment at scheduled time, at equipment location.
- B. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of County personnel.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

END OF SECTION 01 7000

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 01 7700: CLOSEOUT PROCEDURES
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SECTION 01 7700 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to:
 - 1. Substantial Completion procedures
 - 2. Final Completion/Final Acceptance procedures.
 - 3. Project Record Documents
 - 4. Warranties.
 - 5. Repair Work.
 - 6. Final Cleaning.
- B. Related Sections:
 - 1. General Provisions.
 - 2. Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

1.02 REFERENCES

- A. Comply with the requirements of Detailed Provisions Section 01 4200 – Reference Standards and Abbreviations and as listed herein.

1.03 DEFINITIONS

- A. Project Record Documents: Various documents that define the constructed facility that are kept current by neat, legible hand annotation of all deviations from what is shown or required by the Contractor during the course of construction to accurately document the “as-built” facility, including, but not limited to:
 - 1. Project Drawings.
 - 2. Shop Drawings.
 - 3. Contract Documents (Administrative Provisions, General Provision, Special Provisions, and Detailed Provisions).
 - 4. Addenda.
 - 5. Change Orders.
 - 6. Request for Information (RFI).
 - 7. Completed Work Verification Survey: electronic copy and one (1) full-size hard copy.

8. Coordinate utility plans.
9. Field Directives.
10. Correspondence.
11. Submittals.

1.04 SUBSTANTIAL COMPLETION

- A. Contractor shall notify the County in writing that the Work is Substantially Complete.
 1. The County shall promptly inspect the Work and, if the County does not agree that the Work is Substantially Complete, the County will prepare a Punch List (list of items to be completed or corrected).
 - a. The County reserves the right to add to, modify, or change the Substantial Completion Punch List as circumstances dictate.
 - b. Failure by the County to include any items on such list does not alter the responsibility of the Contractor to complete or correct the Work in accordance with the Contract.
 2. With the Contractor's Substantially Complete request, the Contractor shall provide the following:
 - a. Provide the Completed Work Verification Survey in accordance with Detailed Provisions Section 01 4320 – Surveying.
 - b. Obtain and submit releases enabling County's full and unencumbered use of the Work, including access to utilities and other administrative approvals.
 - c. Make final changeover of locks, keys, gates, and other access restriction measures consistent with removal of the Contractor's personnel from the area of Work.
 - d. Deliver tools, spare parts, extra stock of materials, and similar physical items to the County in accordance with the requirements of the Contract Documents.
- B. At the Contractor's request, the County may identify those Punch List items that must be completed or corrected in order for the Contractor to achieve Substantial Completion.
 1. When the County determines that those Punch List items have been completed or corrected by the Contractor, the County shall make a determination that the Work is Substantially Complete.
 2. A Certificate of Substantial Completion will be issued by the County, which shall establish the date of Substantial Completion.
 3. The Certificate of Substantial Completion shall state the responsibilities of the County and the Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and the time to complete remaining Punch List Work before Liquidated Damages begin to accrue for the Contractor's failure to achieve Final Completion/Final Acceptance in a timely manner.

4. The County shall assess Liquidated Damages for the Contractor's failure to complete or correct the required Punch List items for Substantial Completion within the Contract Time.

1.05 PUNCH LIST PROCEDURES

- A. The County shall prepare the Punch List (list of incomplete items of Work including discrepancies found in the Completed Work Verification Survey) when notified by the Contractor that the Work is Substantially Complete.
- B. The Contractor shall correct all Punch List items and re-issue the County Punch List, with their initials and date complete, along with a written statement that the entire Project is physically complete and ready to receive the Certificate of Substantial Completion.
- C. Prior to issuance of the Certificate of Substantial Completion, the County shall perform all necessary inspections to verify that all Punch List items of Work are complete.

1.06 FINAL INSPECTION AND FINAL PUNCH LIST

- A. All remaining Punch List items that were not corrected prior to Substantial Completion shall be successfully completed by the Contractor prior to the Contractor's request for Final Acceptance. When the Contractor considers that all Contract Work is ready for final inspection and Final Acceptance, the Contractor shall give written notice to the County.
- B. County shall promptly perform a final inspection of the Work and, if necessary, prepare a Final Punch List (a list of items to be completed or corrected by the Contractor prior to the County granting Final Acceptance).
- C. Final Punch List items may include, but are not limited to: Copies of warranties and guarantees required by the Contract; permit approvals and Certificates of Occupancy/Use; Operation and Maintenance Manuals, Project Record Documents; Right of Way, Easements and Property Releases, and any other documents called for elsewhere in the Contract Documents.
- D. The Contractor shall complete or correct the items identified in the Final Punch List within the time period as required in the Certificate of Substantial Completion. Should the Contractor fail to complete or correct all remaining Final Punch List items within the required time, the County may assess Liquidated Damages against the Contractor for failure to achieve Final Acceptance in a timely manner.
- E. After the Contractor completes all items identified in the Final Punch List(s), the Contractor shall notify the County in writing that the Final Punch List items have been successfully completed. After verification by the County that such completion was satisfactory, the Contractor shall submit a Final Application for Payment.

1.07 REQUIREMENTS FOR FINAL APPLICATION FOR PAYMENT

- A. In addition to any other requirement identified in the Contract Documents, the Final Application for Payment shall include the following documents:
1. Affidavit of Wages Paid for Contractor and all Subcontractors in accordance with state law;
 2. Contractor's release of Claims against the County from all parties who are entitled to Claims against the subject Project, property or improvement pursuant to the provisions of law;
 3. Contractor certification that all Subcontractors and suppliers have been paid and there are no outstanding liens;
 4. Right of Way, Easements and Property Releases;
 5. Final, Project Record Documents ten (10) Working Days following issuance of the Certificate of Substantial Completion.
 - a. One (1) complete full size set of finalized Project Record Drawings on bond.
 - b. One (1) complete set of finalized Project Record Specifications.
 - c. One (1) complete set of Contract documents, including approved Field Work Directives and Change Orders.
 - d. One (1) complete set of Contractor's correspondence, including but not limited to RFIs, memorandums, and e-mails.
 6. Final Application for Payment;
 7. Completed permits and/or Certificates of Occupancy/use ten (10) Working Days following issuance of the Certificate of Substantial Completion; and
 8. Complete the following:
 - a. Complete Final Cleaning and Project Location cleanup.
 - b. Complete all remaining obligations as set forth within this Section.

1.08 FINAL COMPLETION/FINAL ACCEPTANCE

- A. Final Completion/Final Acceptance shall be achieved when all the obligations of the Contract have been successfully performed by the Contractor in accordance with the Contract and accepted by the County.
- B. Neither Final Acceptance, nor Final Payment, shall release Contractor or its Sureties from any obligations under this Contract or the Performance and Payment Bonds, or constitute a waiver of any Claims by the County arising from or related to Contractor's performance or failure to perform the Work and to meet all contractual obligations in accordance with the Contract, including but not limited to:
1. Unsettled liens, security interests or encumbrances;
 2. Damaged, non-conforming, or defective Work discovered by the County;

3. Terms of any warranties or guarantees required by the Contract; and
 4. Payments made in error.
- C. Except for any Claims properly submitted in accordance with the General Provisions, acceptance of Payment on the Final Application for Payment by the Contractor shall, on behalf of itself and its Subcontractors or Sureties, forever and unconditionally release and discharge the County, its officers, agents, employees, from:
1. Any and all disputes or Claims, including but not limited to Claims for damages, fines, interest, taxes, attorney fees, or costs, demands, rights, actions or causes of actions, known or unknown, arising out of or in any way related to the parties' performance under the Contract and/or Project; and
 2. Any and all known and/or unknown liabilities, obligations, demands, actions, suits, debts, charges, causes of action, requests for money and/or payment under the Contract, outstanding invoices, or Claims directly or indirectly arising out of or related to the Contract and/or Project.

1.09 PROJECT RECORD DOCUMENTS

- A. Provide to the County one (1) complete set of the Project Record Documents in accordance with the requirements of this Section.
- B. Store Project Record Documents separate from documents used for construction.
- C. Contractor shall red-line the Project Record Documents on a weekly basis concurrent with construction progress. The Contractor shall supply a red-line of the Project Record Documents that shall document all additions and modifications to the original Contract Documents as follows:
 1. Specifications: Legibly mark and record at each Section description of actual Products installed, including the following:
 - a. Manufacturer's name and product model and number.
 - b. Product substitutions or alternates utilized.
 - c. Changes made by Addenda.
 2. Project Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - a. Measured horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - b. Measure locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - c. Field changes of dimension and detail.
 - d. Details not on original Contract Documents.
 - e. Mark the Project Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- D. Project Record Documents Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up Project Record Documents and prepare a full set of corrected digital data files of the Project Record Documents in PDF format as follows:
 1. Format: Scan Project Record Documents and assemble submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 2. Incorporate changes and additional information previously marked on red-line copies of the Project Record Documents. Delete, redraw, and add details and notations where applicable.
 3. County will furnish Contractor with PDF of Contract Documents for use in recording information.

1.10 WARRANTIES/GUARANTEES

- A. In addition to the two (2) year guarantee applicable to all Work, certain elements of the Project are to be warranted for an extended period following the completion of the initial warranty period.
- B. The Contractor shall execute a two (2) year warranty for the Work as indicated in the sample warranty document forms at the end of this Section:
 1. Do not propose alternative warranty language.
 2. The County will finalize each of the warranty documents by adding the Contractor's logo, name, address, contact information, dates, and other missing information at the time of warranty completion.
- C. Each warranty document lists the Work elements to which the warranty applies.
- D. Provide two (2) executed copies of each warranty document required by the Contract Documents ten (10) Working Days following the issuance of the Certificate of Substantial Completion for the portion of the Work covered by that warranty.

1.11 SCHEDULE OF CONTRACT CLOSEOUT PROCEDURES

- A. The following Closeout Procedures Checklist gives the order and responsibility for the requirements of the Final Contract Closeout. This list may not include all items required by the General Provisions and Detailed Provisions.
- B. Contract Closeout Documents Checklist: Complete the items indicated, and submit this Checklist when directed by the County.

Checklist Item No.	Responsibility	Procedure	Date
1	Contractor	Notify County in writing that the Work is Substantially Complete	
2	County	Inspect the Work, prepare Punch List and identify items requiring completion/correction for Substantial Completion.	
3	Contractor	Complete/correct punch list items required for Substantial Completion.	
4	County	Verify Substantial Completion Punch List items have been completed/corrected and issue Certificate of Substantial Completion.	
5	Contractor	<p>Notify County in writing that the Work is ready for Final Acceptance: Prepare Final Application for Payment that includes the following:</p> <ul style="list-style-type: none"> a. Affidavit of Wages Paid for Contractor and all Subcontractors. b. Contractor release of Claims. c. Release of Liens Certificate from all Subcontractors. d. Project Record Documents. e. Operation and Maintenance Manuals. f. Warranties. g. Permits and Certificates of Occupancy/Use. 	
6	County	Perform Final Inspection and if necessary issue Final Punch List.	
7	Contractor	Complete/correct Final Punch List items.	
8	County	Verify completion/correction of Final Punch List items. Prepare Notice of Completion and Final Payment for County Board of Supervisors Approval.	
9	County	County Board of Supervisor approves Notice of Completion and Final Payment. Notice of Completion is recorded.	
10	County	Release of all retention funds shall be within thirty-five (35) days after the recordation of the Notice of Completion. See General Provisions, Section. 7.7 – Final Payment.	

1.12 SUBMITTALS

A. Warranties:

1. Organize warranty documents into an orderly sequence based on the Detailed Provision Sections:
 - a. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch paper.
 - b. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and name, address, and telephone number of Installer.
 - c. Identify each binder on the front and spine with the typed title "WARRANTIES," Project name, and name of Contractor.
 - d. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
2. Provide additional copies of each warranty to include in Operation and Maintenance Manuals.

B. Final, Project Record Documents:

1. One (1) complete full size set of finalized Project Drawings and Shop Drawings on bond.
2. One (1) complete set of finalized Project Record Specifications.
3. One (1) complete set of Contract Documents, including approved Field Work Directives and Change Orders.
4. One (1) complete set of Contractor's correspondence, including but not limited to: RFIs, memorandums, and e-mails.
5. Project Record Documents Digital Data Files:
 - a. Format: Scan Project Record Documents and assemble submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Affidavit of Wages Paid for Contractor and all Subcontractors in accordance with state law.

D. Contractor's release of Claims against the County from all parties who are entitled to Claims against the subject Project, property or improvement pursuant to the provisions of law.

E. Contractor certification that all Subcontractors and suppliers have been paid and there are no outstanding liens;

F. Final Application for Payment;

G. Completed permits and/or Certificates of Occupancy/use.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 EXECUTION

3.01 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. When damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs and bulbs noticeably dimmed by hours of use to comply with requirements for new fixtures.

3.02 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial/industrial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project:
 - a. Clean Project Location, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project Location.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - j. Remove labels that are not permanent.
 - k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - o. Leave Project Location clean and ready for occupancy.

3.03 PROJECT RECORD DOCUMENTS – RECORDING AND MAINTENANCE

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until the end of the Project.
- B. Maintenance of Project Record Documents and Samples: Store record documents and Samples at the Project Location apart from the documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in organized, clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for County's reference during normal working hours.
- C. Filing and Archiving Requirements:
 - 1. Boxes shall have attached lids.
 - 2. All file folders shall be standard letter size, 8-1/2 x 11 inches.
 - 3. Three ring binders are not acceptable for archiving. Chicago Screws are acceptable for "binding" specifications and correspondence in chronological order.
 - 4. Hanging folders and/or rubber bands are not acceptable. Accordion folders or manila folders are acceptable.
 - 5. Do not return file folders labeled with subject matter(s) that were not used in the Contract.
 - 6. If Contractor did not use County's file code index, a copy of the Contractor's file code index shall be included with the files.
 - 7. Do not separate transmittal cover sheets from the deliverable.
 - 8. Do not include duplicates unless mandated in Contract Documents.

TWO (2) YEAR WARRANTY	
<u>ISSUE TO:</u> Riverside County Department of Waste Resources 14310 Frederick Street Moreno Valley, CA 92553 CONTACT PERSON: Jeff Gow, Principal Engineer (951) 486-3200	<u>INSTALLED AT:</u> Blythe Sanitary Landfill 1000 Midland Rd. Blythe, CA 92225
<u>ISSUE BY:</u> Contractor Address – Line 1 Address – Line 2 Phone Number CA Contractor License No.	<u>CONTACT PERSON:</u> Name, Title Phone Number(s) E-mail Address
Emergency hours (6:00 P.M. – 7:00 A.M.) contact information for operable systems and equipment, including systems with moving parts: CONTACT PERSON: Name, Title Phone Numbers(s)	
We, [CONTRACTOR NAME], certify that the items listed in the attached Table 1.10 – Items Subject to Two (2) Year Warranty were installed at the Blythe Sanitary Landfill, and the Work performed is in strict compliance with the Contract Documents. In compliance with Detailed Provisions Section 01 7700 – 1.10, [CONTRACTOR NAME] shall, in cooperation with Riverside County Department of Waste Resources, promptly repair, replace, or otherwise appropriately correct any such defect or nonconformity discovered during the Warranty Period. [CONTRACTOR NAME] warrants and guarantees that the Work is free from defects and nonconformities in equipment, material, design, or workmanship performed by [CONTRACTOR NAME] and or its Subcontractors and suppliers for a period of two (2) years. [CONTRACTOR NAME] also warrants and guarantees that all Work performed shall remain watertight, free from leaks, and free from installation defects, for a period of two (2) years. The Warranty Period is effective from the Substantial Complete date of [DATE]. The Warranty Period will expire on [DATE].	
[CONTRACTOR NAME] AUTHORIZED OFFICER <div style="display: flex; justify-content: space-between;"> <div>[NAME] PROJECT MANAGER</div> <div>DATE</div> </div>	NOTARY

TABLE 1.10 – ITEMS SUBJECT TO TWO (2) YEAR WARRANTY

SECTION	DESCRIPTION	COMPANY	CONTACT	PHONE
26 0519	Wire and Cable: 600 Volt and Below			
26 0529	Hangers and Supports for Electrical Systems			
26 0533	Raceways and Boxes			
26 0543	Electrical: Exterior Underground			
26 0916	Control Equipment Accessories			
26 2419	Motor Control Centers			
26 2800	Overcurrent and Short Circuit Protective Devices			
26 2816	Safety Switches			
26 4313	Low Voltage Surge Protection Devices			
33 1136	Submersible Well Pump			

END OF SECTION 01 7700

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SPECIFICATIONS – DETAILED PROVISIONS

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SECTION 01 7823 OPERATION AND MAINTENANCE MANUALS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for preparing Operation and Maintenance (O&M) Manuals.

1.02 SCHEDULE

- A. Submit initial draft of the O&M Manual for the portion of the Project covered no later than forty-five (45) Calendar Days prior to the request for issuance of the Substantial Completion Certificate.
 - 1. Submit final draft of the O&M Manual for the portion of the Project covered no later than fourteen (14) Calendar Days prior to the request for issuance of the Substantial Completion Certificate.

1.03 OPERATION AND MAINTENANCE MANUALS

- A. Coordinate, assemble, and submit three (3) final sets of O&M Manuals that include O&M information for each product, material, system and piece of equipment or equipment assembly specified in the Contract Documents for the Project as noted below:

Bid Item No.	Description	Detailed Provisions Section
5	Submersible Vertical Turbine Pump System	33 1114
6	12,000-Gallon Portable Water Tower with Automatic Fill	33 1600

Include any additional equipment or systems in the Detailed Provisions.

- B. All manufacturers' literature in each manual shall be original, not copies.
- C. O&M Manuals, Paper Copies: Submit three (3) sets of manuals bound in a series of D-ring binders with durable plastic covers.
 - 1. The front cover shall be imprinted with the title of the Project, the name of Owner (Riverside County Department of Waste Resources), and the name of the Contractor.
 - 2. The back edge (spine) shall be imprinted with the Project title, Owner (Riverside County Department of Waste Resources), and the year of completion of the Project.
 - 3. Manuals shall be 8-1/2 by 11 inches in size except for oversize drawings, which shall be bound in fold-out fashion or folded and placed inside a bound-in envelope or sheet protector.

4. Multiple, thinner binders are preferred to extra-large and bulky binders where subdivisions of the contents permit.
 5. Manual volumes shall not exceed 3-inches in thickness.
 6. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
 7. Equipment operating instructions and test reports shall be bound in front of maintenance instructions and other materials.
- D. O&M Manuals, Electronic Files: In addition to paper copy binders, Contractor shall submit O&M manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- E. Each O&M manual shall include the following:
1. A title indicating its contents permanently labeled on the outside of the binder.
 2. A cover sheet identifying equipment with the process or assembly in which it is used according to (1) location, (2) Detailed Provisions Section number and title, and (3) Contract Document Drawing number.
 3. Table of contents for each volume, with material, equipment, or system description identified, typed on white paper. Each volume shall have a complete table of contents showing the volume divisions and other information.
 4. System, subsystem, and equipment description.
 5. Performance and design criteria if Contractor is delegated design responsibility.
 6. Operating standards and procedures:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Normal shutdown instructions.

- g. Seasonal and weekend operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Test and inspection instructions.
 - j. Troubleshooting guide.
 - k. Special operating instructions and procedures.
7. Instructions and data prepared by the manufacturer, including the following as applicable:
- a. Equipment operating instructions including startup and shutdown procedures, safety precautions, and instructions on specific controls.
 - b. Electrical test reports, including electrical system and motor test reports.
 - c. A complete set of applicable reviewed approval submittals.
 - 1) A complete set of applicable reviewed product data clearly identifying the system, assembly, material or product using the names or terminology for the system, assembly, material or product in the Contract Documents.
 - d. Assembly Drawings.
 - e. Complete parts lists and list of items recommended to be stocked as spare parts.
 - f. Bill of materials.
 - g. Wiring diagrams.
 - h. Control diagrams.
 - i. Piped system diagrams.
 - j. Maintenance and repair instructions to cover any routine operation required to ensure satisfactory performance and longevity of the product, material or equipment, such as lubrication instructions and list of lubricants, cleaning, adjustment, replacement of parts, etc.
 - k. Maintenance and Service Schedules: Include service and lubrication requirements for equipment and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - l. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturer's maintenance documentation and local sources of maintenance materials and related services.
 - m. Precautions against improper use.
 - n. Maintenance summary forms.
 - o. Copy of manufacturer's warranty.
8. Divide manuals into the following sections:
- a. Part 1: Directory, listing names, addresses, and telephone numbers of Contractor, Subcontractors, and suppliers.

- b. Part 2: Operation and maintenance instructions arranged by system and subdivided by Detailed Provisions Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - 1) Significant design criteria.
 - 2) List of equipment.
 - 3) Parts list for each component.
 - 4) Operating instructions.
 - 5) Maintenance instructions for equipment and systems.
 - 6) Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 7) Summary listing of warranty dates.
- c. Part 3: Project documents and certificates, including the following:
 - 1) Shop Drawings and product data.
 - 2) Certificates and permits.
 - 3) Copies of warranties.
- F. Three (3) unbound copies of each volume shall be submitted to the County for approval. After review by the County, revise content as required by County comments and resubmit for approval.
- G. Three (3) bound paper copies and electronic file of the final approved O&M Manuals shall be submitted. All copies of the final O&M Manuals shall be submitted to the County before final payment is made.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 01 7823



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 02 0100: MAINTENANCE OF EXISTING CONDITIONS
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SECTION 02 0100 MAINTENANCE OF EXISTING CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Identification and field mark out of any and all on-site utility lines to remain in operation during construction.
2. Identification and in-place protection of existing groundwater monitoring wells and gas monitoring probes.
3. Identification and in-place protection of existing drainage features.
4. Identification and in-place protection of existing subgrade sections.
5. Repair of any damage during construction operations.

B. Related Contract Document Sections include, but are not limited to:

1. Detailed Provisions Section 01 1400 – Work Restrictions
2. Detailed Provisions Section 01 5000 – Temporary Facilities and Controls
3. Project Drawings

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 IDENTIFICATION

- A. Locate all existing utilities which are to remain in service during construction as shown on the Project Drawings.
- B. Identify all existing concrete slabs and drainage structures within the project limits as shown on the Project Drawings.
- C. Identify subgrade section where design contours match existing contours as shown on the Project Drawings.

3.02 PROTECTION

- A. Flag, barricade or suitably protect existing utilities during construction operations and equipment movement. Install shoring and bracing as required.
- B. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction.
- C. Existing utility lines that are indicated on the Project Drawings or which are made known to the Contractor prior to grading activities, and all utility lines that are

constructed during grading activities shall be protected from damage during grading activities.

- D. All existing hardscape, which includes, but is not limited to: curb and gutters, drainage driveways, and concrete slabs-on-grade shall be protected in place during construction activities to prevent damage.
- E. Existing subgrade sections that are to remain in-place as shown on Project Drawings shall be identified and marked. Grading activities involving excavation or backfill for anything other than utility trenching and backfilling shall not take place within the existing subgrade section. Contractor shall keep subgrade section marked and protected for the duration of all grading activities.

3.03 REPAIR

- A. Any damage to existing, operational utilities by the Contractor or his/her subcontractors during the ongoing construction operation shall be immediately repaired to operational standards at the Contractor's expense. If the repairs are not immediately addressed by the Contractor, the County shall contract for the repair at the Contractor's expense.
- B. Any and all damage to protected features shall be repaired by the Contractor at his/her own expense. Protected features include, but are not limited to: existing drainage structures, concrete slabs-on-grade, and subgrade sections. In the event the County elects to make necessary repairs with their own workforce, the Contractor shall reimburse the County for the cost of repairs. Contractor shall repair or replace any and all damaged features as required to return it to its original state before final payment shall be issued by the County.

END OF SECTION 02 0100

SPECIFICATIONS – DETAILED PROVISIONS

SECTION 02 4100: DEMOLITION

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SECTION 02 4100

DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Deconstruction, removal, abandonment, and salvage, recycle, or disposal of various existing improvements including, but not limited to: reinforced concrete slabs and foundations, concrete and asphalt drainage structures, utilities, asphalt and concrete pavement, fencing, signs, poles, reinforced concrete or CMU walls, structure mechanical and electrical systems, and other incidental items necessary for the completion of the Project.
2. Furnish all labor, materials, tools, equipment, and services for demolition, as indicated, in accordance with provisions of the Contract Documents.
3. Completely coordinate Work with other trades.

B. Related Specification Sections include, but are not limited to:

1. Section 01 1400 – Work Restrictions
2. Section 01 3300 – Submittal Procedures
3. Section 26 0500 – Basic Electrical Requirements
4. Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities

1.02 QUALITY ASSURANCE

- A. Conduct Work in accordance with Cal-OSHA and EPA requirements.**
- B. Comply with American National Standards Institute (ANSI) /American Society of Safety Engineers (ASSE) A10.6 – Safety and Health Program Requirements for Demolition Operations.**
- C. Comply with National Fire Protection Agency (NFPA) 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations.**
- D. Use only firms or individual trades qualified to perform Work required under this Section.**

1.03 DEFINITIONS

- A. Abandon:** Cut, cap, and fill a feature, as approved by County, and leave in place.
- B. Cal-OSHA:** California Department of Industrial Relations – Division of Occupational Safety and Health.
- C. EPA:** United States Environmental Protection Agency.

- D. Relocate: Preserve a feature and the functionality of a feature. Move the feature to a designated location on the Site.
- E. Remove: Take appropriate action to eliminate a feature from the Project Site. Removal may include disposal, recycling, or salvage.
- F. Salvage: Preserve and protect a feature and the functionality of the feature. Move the feature to the designated location and turn over custody to the County.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
 - 1. Demolition Plan not later than thirty (30) Calendar Days prior to the intended start of demolition work. Demolition Plan shall include, but is not limited to:
 - a. Sequencing of the Work.
 - b. Protection of workers and the public.
 - c. Traffic control, where demolition is adjacent to existing operations or as required in public right-of-way.
 - d. Environmental protection.
 - e. Means and methods to minimize disposal and maximize salvage and recycling.
 - f. Demolition disposal procedures.
 - g. Salvaged items to be delivered to County.
 - h. Disposal of demolition debris.

1.05 DESCRIPTION

- A. Work includes:
 - 1. Demolition of structures, utilities, and other site features as indicated.
 - 2. Removal of demolition debris.
 - 3. Protection of existing structures to remain, including:
 - a. Utilities.
 - b. Other items, as indicated.
- B. Condition of existing structures to be demolished:
 - 1. County assumes no responsibility for actual condition of structures to be demolished.
 - 2. Conditions existing at time of inspection for bidding purposes will be maintained by County insofar as practicable.
 - 3. Hazardous Waste Assessment – Does not apply.

1.06 JOB CONDITIONS

- A. Perform preliminary investigations as required to ascertain extent of Work.
 - 1. Conditions which would be apparent by such investigation will not be allowed as cause for Claims for extra costs.
- B. Before start of Work, obtain and pay for permits required by Authorities having Jurisdiction and notify interested utility companies.
- C. Observe safety precautions in all phases of the Work. Included shall be: trench shoring, bracing, lighting, and barricades as dictated by reason and by Safety Orders of the Division of Industrial Safety, State of California (Cal-OSHA). Shoring is required for all trench portions greater than 4-feet in depth. Trenches greater than 20-feet in depth require protection systems designed by a Professional Structural Engineer licensed in the state of California.
- D. Hazardous Materials and Dangerous Wastes – If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the County. Hazardous materials will be removed by County under a separate Contract or negotiated with the Contractor via a Change Order.
- E. When performing underground work, the Contractor shall call Underground Service Alert of Southern California (USA/SC) at 811, the one-call underground facility locating service, two (2) Working Days prior to making an excavation. Contractor shall be responsible for such notification of Subcontractor's Work, or shall require Subcontractor to assume this responsibility.
- F. On-site storage or sale of removed items or materials is not permitted.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 PREPARATION

- A. Identification:
 - 1. Field locate and mark all structures to be removed.
 - 2. Existing Utilities:
 - a. Locate utilities within or adjacent to the Site.
 - b. Take all necessary precautionary measures to protect utilities.
 - c. Provide adequate means of support and protection during removal operations for utilities that are to remain in service.

- d. Do not interrupt existing utility services, except when permitted in writing by the County, and then only after acceptable temporary utility services have been provided if required by the County and utility owner.

- 1) Provide minimum seven (7) Calendar Days notice to County and utility owner, and receive written notice to proceed before interrupting any utility.

B. Protection:

- 1. Maintain facility operations and traffic for the duration of the Work in accordance with Detailed Provisions Section 01 1400 – Work Restrictions.
- 2. Take all necessary precautionary measures to protect all utilities, structures and surrounding areas.

C. Comply with all requirements of ANSI/ASSE A10.6 and NFPA 241.

3.02 POLLUTION CONTROLS

- A. Provide erosion and sediment controls in accordance with Detailed Provisions Section 01 5600 – Project Environmental Controls prior to initiating Work.
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations.
- C. Alleviate dust and provide dust control measures as needed.
- D. Return adjacent areas to condition existing prior to start of Work.

3.03 ITEMS TO BE SALVAGED FOR COUNTY

- A. Unless determined as unsalvageable by the County, all items designated for salvage shall be removed with care to prevent damage.
- B. If, in the opinion of the County, salvageable features were unnecessarily damaged, damaged salvageable features shall be replaced or repaired, to the satisfaction of the County, by the Contractor at no additional cost to the County.
- C. Remove salvage items at appropriate stage of demolition, but early enough to prevent damage to them by demolition operations.
- D. Coordinate with County on items the County wants to salvage or relocate.

3.04 ITEMS SALVAGED FOR CONTRACTOR

- A. Items of salvage value to Contractor not designated in Contract Documents as items to salvage or relocate may be removed from the Site as Work progresses.
- B. Transport salvaged items from Site as they are removed. Storage or sale or removed items are not permitted on the Site.

3.05 ITEMS TO BE REMOVED FOR RE-INSTALLATION IN PROJECT

A. Remove items designated for re-use:

1. Tag, protect from damage, store, if required, and deliver to designated locations.

3.06 GENERAL DEMOLITION PROCEDURES

A. Remove features/structures as indicated on the Project Drawings and as necessary to complete the Project.

B. Comply with all requirements of ANSI/ASSE A10.6 and NFPA 241.

C. Keep elements of the deconstructed features/structures that are designated as contaminated and not suitable for recycling, such as contaminated concrete and asphalt separate from similar materials that are recyclable.

D. Demolition of entire features/structures:

1. Demolish completely and remove from site.
2. Use such methods as required to complete Work within limitations of governing regulations.

E. Demolition of portions of features/structures:

1. Cut, cap, sawcut, or otherwise provide clean break between the portion of the feature to be demolished and portion to remain.
2. Protect portion of feature to remain in place from damage during demolition.

F. Start and complete Work as established by approved schedule; operational procedures and sequence of Work are optional provided schedule is maintained.

G. Protect property to remain:

1. Promptly repair damage caused by demolition, as directed by the County, at no cost to the County.
2. Conduct operations to prevent damage by falling debris or other cause to adjacent structures or features as well as persons.
3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures.

H. Conduct operations to ensure minimum interference with roads, walkways, entrances, exits, and other adjacent occupied facilities.

1. Do not close or obstruct public thoroughfares or walkways unless approved by Authorities having Jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways.

I. Provide covered passageways where necessary to ensure safe passage of persons in or near areas of Work.

J. Provide barricades and safety lights as required.

K. Abandon utilities that are indicated to be abandoned.

- L. If suspected, hazardous materials or unexpected structures such as underground storage tanks are encountered, Contractor shall stop Work and notify the County immediately for further direction.
- M. Structural Demolition:
 - 1. Demolish concrete and masonry in small sections.
 - 2. Perform removal to avoid excessive loads on supporting walls, floor, or framing.
- N. Contractor is responsible for all disposal fees.

3.07 SAWCUTTING

- A. Make a neat vertical saw cut at the boundaries of the asphalt and/or concrete area to be removed.
 - 1. Care shall be taken when saw cutting so as not to damage any of the existing asphalt concrete pavement to remain in place.
 - 2. Sawcutting shall extend through the full slab/pavement depth, or to a maximum depth of 12-inches, whichever is less.
 - 3. Any slab/pavement damaged by Contractor due to its operations shall be repaired or replaced at no cost to the County.
 - 4. Contractor is responsible for ensuring that special precautions are taken so that no concrete or concrete by-products, or products and by-products used in the sawcut of asphalt or concrete, are discharged into any storm water drainage system or surface waters.
- B. Wastewater from Cutting Operations:
 - 1. Wastewater from Portland Cement Concrete, masonry, and asphalt concrete cutting operations shall not be discharged to storm water drainage system or surface waters.
 - 2. Cutting operations typically increase the pH of wastewater, therefore, just filtering of wastewater at treatment prior to discharge is not acceptable.
 - 3. To thoroughly clean saw cuts where necessary, use high pressure water (high pressure water is considered greater than 1400 psi).
 - 4. All wastewater shall be collected using a wet-dry vacuum or pumped into appropriate storage containers for proper disposal.
 - 5. Impervious surfaces contaminated with sediment and grit from cutting or pulverizing operations shall be cleaned by sweepers to prevent contaminants from entering the storm water drainage system or surface waters.

3.08 REMOVAL OF PAVEMENT AND CURBS

- A. Pavement and curbs shall be sawcut in such a fashion to form a neat break line.
- B. All transitions to existing asphalt or cement concrete roadways and curb and gutter shall be vertically sawcut the full depth with straight, uniform edges.
- C. Removing Asphalt Concrete Pavement:
 - 1. Existing asphalt concrete pavement shall be removed at the locations indicated in the Project Drawings or as designated by the County.
 - a. Concrete and asphalt pavement that have been exposed to solid waste, leachate and wastewater are not recyclable.
 - 2. Removal shall be accomplished by making a neat longitudinal vertical cut along the boundaries of the area to be removed.
 - 3. Sawcutting shall be accomplished with a self-propelled machine capable of cutting to a depth of 12-inches. The use of pneumatic hammers or punches will not be permitted.
 - 4. Care shall be taken in removing the pavement not to damage any of the existing pavement that is to remain in place.
 - 5. Any remaining pavement damaged due to Contractor operations shall be replaced by the Contractor, to the satisfaction of the County, at Contractor's expense.
- D. Removing Cement Concrete Curb and Gutter:
 - 1. Existing cement concrete curb and gutter shall be removed at the locations indicated in the Project Drawings or as designated by the County.
 - 2. Removal shall be accomplished by making a neat longitudinal vertical cut along the boundaries of the area to be removed or closest expansion/construction joint.
 - 3. Care shall be taken in removing the curb and gutter such as not to damage any curb and gutter or pavement that is to remain in place.
 - 4. Any remaining curb and gutter damaged due to Contractor operations shall be replaced by the Contractor, to the satisfaction of the County, at Contractor's expense.
- E. Removing Pavement Markings:
 - 1. Existing pavement markings including plastic stop bars and traffic arrows, and lane markers shall be removed at all locations indicated on the Project Drawings and as required for revisions to traffic lanes.
 - 2. Removal of existing pavement markings shall be conducted using such methods to prevent damage to the remaining pavement. Do not use chemicals that may be harmful to the pavement.
 - 3. Damaged pavement shall be replaced at Contractor's expense.

4. Painted and thermoplastic pavement markings shall be removed by sandblasting, grinding, or other method approved by the County. All markers to be removed shall be done without damaging the pavement section.

3.09 REMOVAL OF EXISTING UTILITY STRUCTURES

A. Vaults and Catch Basins:

1. All existing concrete vaults and catch basins shall be removed and disposed of off the Site.
 - a. Concrete vaults and catch basins that have been exposed to leachate and wastewater are not recyclable.

3.10 EXISTING PIPE ABANDONMENT

A. Clean interior contact surfaces of all pipes to be cut off and abandoned.

B. Construct concrete plug in ends of pipes.

1. Minimum length of plug shall be equal to two (2) diameters of the pipe.

C. Concrete shall completely fill the pipe opening.

3.11 REMOVAL AND/OR RESETTING OF MISCELLANEOUS ITEMS

- A. Remove and/or reset miscellaneous items as described in the Project Drawings and as necessary to satisfactorily complete the Project.
- B. Items requiring resetting shall be protected from damage during removal. If, in the opinion of the County, an item requires replacement due to the Contractor's operations it shall be replaced at Contractor's expense.
- C. Fencing and signs identified for removal shall be properly disposed of by Contractor. Post holes shall be filled with approved excavated material from elsewhere on-site.
- D. Lighting fixtures identified for removal shall be disconnected and removed, including foundations and associated wiring.

3.12 CLEAN-UP AND DISPOSAL OF DEMOLITION MATERIALS

- A. Materials, except those identified as salvage, resulting from the removal of structures and obstructions shall be hauled to an approved waste disposal site, secured by the Contractor, and shall be disposed of in such a manner as to meet the requirements of federal, state, county, and municipal regulations regarding health, safety, and public welfare.
- B. Clean up other debris resulting from this Work.

END OF SECTION 02 4100



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 03 0505: CONCRETE TESTING
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SECTION 03 0505 CONCRETE TESTING

PART 1 GENERAL

1.01 SUMMARY

A. Description:

1. This Work consists of testing concrete and grout where required by the Contract Documents or where designated by the County.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Section 01 4300 – Quality Assurance and Control
2. Section 03 2100 – Concrete Reinforcement
3. Section 03 3100 – Cast-in-Place Structural Concrete
4. Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing

1.02 RESPONSIBILITY AND PAYMENT

A. County may hire a Testing/Inspection Provider to perform the following testing and inspection services and provide test results to the County and Contractor.

1. Testing and inspection of concrete, grout, and concrete reinforcement produced for incorporation into the Work during the construction of the Project for compliance with the Contract Documents.
2. Additional testing or retesting of materials occasioned by their failure, re-test or inspection, to meet requirements of the Contract Documents.
3. Strength testing on concrete required by the County or Special Inspector when the water-cement ratio exceeds the water-cement ratio of the typical test cylinders.
4. In-place testing of concrete as may be required by County when strength of structure is considered potentially deficient.
5. Other testing services needed or required by Contractor such as field curing of test specimens and testing of additional specimens for determining when forms, form shoring or reshoring may be removed.
6. County will pay for services defined in Paragraph 1.02A.1.
7. See Detailed Provisions Section 01 4300 – Quality Assurance and Control.

B. Contactor shall hire a qualified testing agency to perform the following testing and provide test results to the County.

1. Testing of materials and mixes proposed by the Contractor for compliance with the Contract Documents and retesting in the event of changes.
2. Additional testing and inspection required because of changes in materials or proportions requested by Contractor.

3. Contractor shall pay for services defined in Paragraphs 1.02B.1. and 1.02B.2.
 4. Contractor shall reimburse County for testing services defined in Paragraphs 1.02A.2., 1.02A.3., 1.02A.4., and 1.02A.5.
 5. See Detailed Provisions Section 01 4300 – Quality Assurance and Control.
- C. Duties and Authorities of Testing/Inspection Provider:
1. Any Testing/Inspection Provider or agencies and their representatives retained by Contractor or County for any reason are not authorized to revoke, alter, relax, enlarge, or release any requirement of Contract Documents, nor to reject, approve or accept any portion of the Work.
 2. Testing/Inspection Provider shall inform the Contractor and County regarding acceptability of or deficiencies in the Work including materials furnished and Work performed by Contractor that fails to fulfill requirements of the Contract Documents.
 3. Testing/Inspection Provider shall submit test reports and inspection reports to the County and Contractor immediately after they are performed.
 - a. All test reports shall include exact location in the Work at which batch represented by a test was placed.
 - b. Reports of strength tests shall include detailed information on storage and curing of specimens prior to testing.
 4. County retains the responsibility for ultimate rejection or approval of any portion of the Work.

1.03 QUALITY ASSURANCE

A. Referenced Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. AASHTO T260 – Standard Method of Test for Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials.
2. American Concrete Institute (ACI):
 - a. ACI 318 – Building Code Requirements for Structural Concrete.
3. American Society for Testing and Materials (ASTM):
 - a. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - b. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - c. ASTM C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - d. ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars

- e. ASTM C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
 - f. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - g. ASTM C157 – Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete.
 - h. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.
 - i. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by Volumetric Method.
 - j. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - k. ASTM C311 – Standard Test Method for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete.
 - l. ASTM C596 – Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.
 - m. ASTM C827 – Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
 - n. ASTM C939 – Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
 - o. ASTM C1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
 - p. ASTM C1090 – Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout.
 - q. ASTM C1218 – Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
 - r. ASTM C1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method).
 - s. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
4. National Bureau of Standards (NBS):
- a. Cement and Concrete Reference Laboratory (CCRL).
- B. Qualifications:
- 1. Contractor's testing agency:
 - a. Meeting requirements of ASTM E329.
 - b. Provide evidence of recent inspection by CCRL of NBS, and correction of deficiencies noted.

1.04 DEFINITIONS

- A. Testing/Inspection Provider: A professional testing/inspection firm or service hired by the County to perform testing, inspection or analysis services as directed, and as provided in the Contract Documents.

1.05 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
 - 1. Product technical data, including, but not limited to:
 - a. Concrete materials and concrete mix designs proposed for use.
 - 1) Include results of all testing performed to qualify materials and to establish mix designs.
 - 2) Place no concrete until approval of mix designs has been received in writing.
 - 3) Submittal for each concrete mix design to include:
 - (a) Sieve analysis and source of fine and coarse aggregates.
 - (b) Test for aggregate organic impurities.
 - (c) Proportioning of all materials.
 - (d) Type of cement with mill certificate for the cement.
 - (e) Brand, quantity and class of fly ash proposed for use along with other submittal data as required for fly ash by Detailed Provisions Section 03 3100 – Cast-In-Place Structural Concrete.
 - (f) Slump.
 - (g) Brand, type and quantity of air entrainment and any other proposed admixtures.
 - (h) Shrinkage test results in accordance with ASTM C157.
 - (i) Total chloride ion content per cubic yard of concrete determined in accordance with AASHTO T260.
 - (j) 28-day compression test results and any other data required by Detailed Provisions Section 03 3100 – Cast-In-Place Structural Concrete to establish concrete mix design.
- C. Quality Assurance Submittals: Testing agency qualifications.

PART 2 PRODUCTS – (NOT APPLICABLE TO THIS SECTION)

PART 3 EXECUTION

3.01 TESTING SERVICES TO BE PERFORMED BY COUNTY

A. The following concrete testing will be performed by the County's Testing/Inspection Provider:

1. Concrete strength testing:

- a. Secure concrete samples in accordance with ASTM C172.
 - 1) Obtain each sample from a different batch of concrete on a random basis, avoiding selection of test batch other than by a number selected at random before commencement of concrete placement.
- b. For each strength test, mold and cure five (5) cylinders from each sample in accordance with ASTM C31. Samples shall be formed in 6" x 12" long non-absorbent cylindrical molds.
 - 1) Record any deviations from requirements on test report.
 - 2) Cylinder size: Per ASTM C31.
- c. Field cure one cylinder for the seven (7) day test.
 - 1) Laboratory cure the remaining cylinders.
- d. Test cylinders in accordance with ASTM C39.
 - 1) Test one (1) cylinder at seven (7) days.
 - 2) Test one (1) cylinder at fourteen (14) days.
 - 3) Test two (2) cylinders at twenty-eight (28) days.
 - 4) Hold remaining cylinder in reserve.
- e. Strength test result:
 - 1) Average of strengths of two (2) cylinders from the same sample tested at twenty-eight (28) days.
 - 2) If one (1) cylinder in a test manifests evidence of improper sampling, molding, handling, curing, or testing, discard and test reserve cylinder; average strength of remaining cylinders shall be considered strength test result.
 - 3) Should all cylinders in a test show any of above defects, discard entire test.
- f. Frequency of tests:
 - 1) Concrete sand cement grout: One (1) strength test for each four (4) hour period of grout placement or fraction thereof.
 - 2) Precast concrete, concrete topping, concrete fill and lean concrete: One (1) strength test for each ten cubic yards (10 CY) or fraction thereof placed in any one (1) day.

- 3) All other concrete:
 - (a) One (1) strength test consisting to be taken not less than once a day, nor less than once for each sixty cubic yards (60 CY) or fraction thereof placed in any one (1) day.
 - (b) If total volume of concrete on the Project is such that frequency of testing required in above paragraph will provide less than five (5) strength tests for each concrete mix, tests shall then be made from at least five (5) randomly selected batches or from each batch if fewer than five (5) batches are provided.
2. Slump testing:
 - a. Determine slump of concrete sample for each strength test.
 - 1) Determine slump in accordance with ASTM C143.
 - b. If consistency of concrete appears to vary, the County shall be authorized to require a slump test for each concrete truck.
 - 1) This practice shall continue until the County deems it no longer necessary.
3. Air content testing: Determine air content of concrete sample for each strength test in accordance with either ASTM C231 or ASTM C173.
4. Fly ash testing in compliance with ASTM C311 with a minimum of one (1) sample weighing four pounds (4 lbs.) taken from each two hundred (200) tons of fly ash supplied for the Project.
5. Temperature testing: One (1) test hourly when air temperature is 40 Deg F and below and when 80 Deg F and above and one (1) test for each composite sample per ASTM C1064.
6. In-place concrete testing (if required).

3.02 SAMPLING ASSISTANCE AND NOTIFICATION FOR COUNTY

- A. To facilitate testing and inspection, perform the following:
 1. Furnish any necessary labor to assist Testing/Inspection Provider in obtaining and handling samples on-site.
 2. Provide and maintain for sole use of Testing/Inspection Provider adequate facilities for safe storage and proper curing of test specimens on-site for first 24 hours as required by ASTM C31.
- B. Notify County sufficiently in advance of operations (minimum of 48 hours) to allow completion of quality tests for assignment of personnel and for scheduled completion of quality tests.

3.03 ACCEPTANCE

- A. Completed concrete work which meets applicable requirements will be accepted without qualification.

- B. Completed concrete work which fails to meet one or more requirements, but which has been repaired to bring it into compliance will be accepted without qualification.
- C. Completed concrete work which fails to meet one or more requirements and which cannot be brought into compliance may be accepted or rejected as provided in these Contract Documents.
 - 1. In this event, modifications may be required to assure that concrete work complies with requirements.
 - 2. Modifications, as directed by County, to be made at no additional cost to County.
- D. Dimensional Tolerances:
 - 1. Formed surfaces resulting in concrete outlines smaller than permitted by tolerances shall be considered potentially deficient in strength and subject to modifications required by the County.
 - 2. Formed surfaces resulting in concrete outlines larger than permitted by tolerances may be rejected and excess material subject to removal.
 - a. If removal of excess material is permitted, accomplish in such a manner as to maintain strength of section and to meet all other applicable requirements of function and appearance.
 - 3. Concrete members cast in the wrong location may be rejected if strength, appearance or function of structure is adversely affected or misplaced items interfere with other construction.
 - 4. Inaccurately formed concrete surfaces exceeding limits of tolerances and which are exposed to view, may be rejected.
 - a. Repair or remove and replace if required.
 - 5. Finished slabs exceeding tolerances may be required to be repaired provided that strength or appearance is not adversely affected.
 - a. High spots may be removed with a grinder, low spots filled with a patching compound, or other remedial measures performed as permitted or required.
- E. Appearance:
 - 1. Concrete surfaces exposed to view with defects which, in opinion of County, adversely affect appearance as required by specified finish shall be repaired by approved methods.
 - 2. Concrete not exposed to view is not subject to rejection for defective appearance unless, in the opinion of the County, the defects impair the strength or function of the member.
- F. High Water-Cement Ratio:
 - 1. Concrete with water in excess of the specified maximum water-cement ratio will be considered potentially deficient in durability.
 - 2. Remove and replace concrete with high water-cement ratio or make other corrections as directed by County.

G. Strength of Structure:

1. Strength of structure in place will be considered potentially deficient if it fails to comply with any requirements which control strength of structure, including but not limited to the following:
 - a. Low concrete strength:
 - 1) Test results for standard molded and cured test cylinders to be evaluated separately for each mix design.
 - (a) Such evaluation shall be valid only if tests have been conducted in accordance with specified quality standards.
 - (b) For evaluation of potential strength and uniformity, each mix design shall be represented by at least three (3) strength tests.
 - (c) A strength test shall be the average of two (2) cylinders from the same sample tested at twenty-eight (28) days.
 - 2) Acceptance:
 - (a) Strength level of each specified compressive strength shall be considered satisfactory if both of the following requirements are met:
 - i. Average of all sets of three (3) consecutive strength tests equal or exceed the required specified twenty-eight (28) day compressive strength.
 - ii. If an individual strength tests falls below sixty percent (60%) or the required minimum twenty-eight (28) day strength, the concrete shall be immediately rejected and shall be removed and replaced at no additional cost to the County.
 - b. Reinforcing steel size, configuration, quantity, strength, position, or arrangement at variance with requirements in Detailed Provisions Section 03 2100 – Concrete Reinforcement or requirements of the Project Drawings or approved Shop Drawings.
 - c. Concrete which differs from required dimensions or location in such a manner as to reduce strength.
 - d. Curing time and procedure not meeting requirements of this Detailed Provisions Section.
 - e. Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.
 - f. Mechanical injury, construction fires, accidents or premature removal of formwork likely to result in deficient strength.
 - g. Concrete defects such as voids, honeycomb, cold joints, spalling, cracking, etc., likely to result in deficient strength or durability.
2. Structural analysis and/or additional testing may be required when strength of structure is considered potentially deficient.

3. In-place testing of concrete may be required when strength of concrete in place is considered potentially deficient.
 - a. Testing by impact hammer, sonoscope, or other nondestructive device may be permitted by the County to determine relative strengths at various locations in structure or for selecting areas to be cored.
 - 1) Such tests shall not be used as a basis for acceptance or rejection.
 - b. Core tests:
 - 1) Where required, test cores will be obtained in accordance with ASTM C42.
 - (a) If concrete in structure will be dry under service conditions, air dry cores (temperature 60 to 80 Deg F, relative humidity less than sixty percent (60%)) for seven (7) days before test then test dry.
 - (b) If concrete in structure will be wet or subjected to high moisture atmosphere under service conditions, test cores after immersion in water for at least forty (40) hours and test wet.
 - (c) Testing wet or dry to be determined by County.
 - 2) Three (3) representative cores may be taken from each member or area of concrete in place that is considered potentially deficient.
 - (a) Location of cores shall be determined by the County so as least to impair strength of structure.
 - (b) If, before testing, one (1) or more of cores shows evidence of having been damaged subsequent to or during removal from structure, damaged core shall be replaced.
 - 3) Concrete in area represented by a core test will be considered adequate if average strength of three (3) cores is equal to at least eighty-five percent (85%) of specified strength and no single core is less than seventy-five percent (75%) of specified strength.
 - 4) Fill core holes with nonshrink grout and finish to match surrounding surface when exposed in a finished area.
4. If core tests are inconclusive or impractical to obtain or if structural analysis does not confirm safety of structure, load tests may be required and their results evaluated in accordance with ACI 318, Chapter 20.
5. Correct or replace concrete work judged inadequate by structural analysis or by results of core tests or load tests with additional construction, as directed by County, at Contractor's expense.
6. Contractor to pay all costs incurred in providing additional testing and/or structural analysis required.
7. Should test samples fail strength testing, the County may require changes in proportions or materials, or both, to apply to the remainder of the Work. Furthermore, the County may require additional curing on those portions of the structure represented by the test samples which fall below the specified values. The cost of such additional curing shall be at no additional cost to the County. In the event that such additional curing does not give the strength required, as evidenced

by core and/or load tests, the County may require strengthening or replacement of those portions of the structure which fail to develop the required strength. Coring and testing and/or load tests and any strengthening or concrete replacement required because of strengths or test samples are below specified values, shall be at no additional cost to the County. In such cases of failure to meet strength requirements the Contractor and County shall confer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the Contractor.

END OF SECTION 03 0505

SPECIFICATIONS – DETAILED PROVISIONS
SECTION 03 1113: FORMWORK – STRUCTURAL CAST-IN-PLACE
CONCRETE
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SECTION 03 1113

FORMWORK – STRUCTURAL CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Formwork requirements for concrete construction.
 - 1. This work includes but is not limited to:
 - a. Structural foundations/footings.
 - b. Structural slabs, girders, beams, and columns.
 - c. Structural walls, stem walls, and curbs.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Section 03 2100 – Concrete Reinforcement
 - 2. Section 03 0505 – Concrete Testing
 - 3. Section 03 3100 – Cast-In-Place Structural Concrete
 - 4. Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing
 - 5. Section 03 3132 – Concrete Finishing and Repair of Surface Defects

1.02 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. ACI CT – Concrete Terminology.
 - b. ACI 301 – Specifications for Structural Concrete.
 - c. ACI 347R – Guide to Formwork for Concrete.
 - 2. California Building Code (CBC):
 - a. 2016 CBC, referred to herein as Building Code.
 - 3. APA – Engineered Wood Association (APA)
- B. Qualifications:
 - 1. Formwork, shoring and reshoring to be designed by a Professional Structural Engineer currently registered in California and having a minimum of three (3) years experience in this type of design work.
 - a. Above qualification applies to slabs and beams not cast on the ground, wall and column pours over 15 feet high.

C. Miscellaneous:

1. Design and engineering of formwork, shoring and reshoring as well as its construction is the responsibility of the Contractor.
2. Design requirements:
 - a. Design formwork for loads, lateral pressures and allowable stresses outlined in ACI 347R and for design considerations, wind loads, allowable stresses and other applicable requirements of the CBC.
 - 1) Where conflicts occur between the above two (2) standards, the more stringent requirements shall govern.
 - b. Design formwork to limit maximum deflection of form facing materials reflected in concrete surfaces exposed to view to 1/240 of span between structural members.
 - c. Conform to all requirements of CBC 2016.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
 1. Product technical data, including, but not limited to:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Manufacturer and type of proposed form materials.
 - d. Manufacturer and type of proposed form ties.
 - e. Manufacturer and type of proposed form coating and release agent materials.
 - f. Manufacturer and type of void forms including compressive strength.
 2. Samples:
 - a. A 12-inch square of each form finish.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Void Forms:
 1. SureVoid Products, Inc.; www.surevoid.com
 2. Deslauriers, Inc.; www.deslinc.com
 3. Or approved equal.

B. Stay-In-Place Forms:

1. AMICO a part of Gibraltar Industries Company; www.amicoglobal.com/
2. Nuform Building Technologies Inc.; www.nuformdirect.com
3. Or approved equal.

C. Tubular Fiber Forms:

1. Sonoco Products Company, plastic lined; www.sonotube.com
2. Or approved equal.

2.02 MATERIALS

A. Forms for Surfaces Exposed to View:

1. Wood forms:
 - a. New $\frac{5}{8}$ or $\frac{3}{4}$ -inch 5-ply structural APA plywood of concrete form grade.
 - b. Built-in-place or prefabricated type panel.
 - c. 4 x 8-foot sheets for built-in-place type except where smaller pieces will cover entire area.
 - d. When approved by County, plywood may be reused.
2. Metal forms:
 - a. Metal forms excluding aluminum may be used.
 - b. Forms to be tight to prevent leakage, free of rust and straight without dents to provide members of uniform thickness.

B. Forms for Surfaces Not Exposed to View:

1. Wood or metal sufficiently tight to prevent leakage.
2. Do not use aluminum forms.

C. Tubular Fiber Forms:

1. Tubular column forms spirally constructed of laminated piles of fiber. Piles shall be laminated using a non-water sensitive adhesive and surface wax impregnated for moisture protection. Forms shall give a smooth and seamless appearance to the cast concrete. Provide reveals, as shown on the Project Drawings, as supplied by the form manufacturer.

2.03 ACCESSORIES

A. Form Ties:

1. Commercially fabricated for use in form construction.
 - a. Do not use wire ties.

2. Constructed so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete.
3. $\frac{3}{4}$ -inch minimum to 1-inch maximum diameter cones on both ends.
4. Embedded portion of ties to be not less than 1½-inch from face of concrete after ends have been removed.
5. Provide ties with built-in waterstops in all walls that will be in contact with liquid.
6. Through-wall ties that are designed to be entirely removed are not allowed in all walls that will be in contact with liquid.

B. Form Coating:

1. Non-grain and non-staining types of form coating that will not leave residual matter on the face of the concrete or adversely affect proper bonding of any subsequent paint or other surface applications.
 - a. Form coating containing mineral oils or other non-drying materials will not be permitted for any concrete work.
 - b. For project pursuing sustainable design, provide a concrete form release agent with a volatile organic compound (VOC) content less than one hundred (100) grams per liter.

C. Void Forms:

1. Continuous void forms.
2. Specially designed and manufactured for the purpose of creating a void area directly under concrete members which will allow a space for soil vertical upward movement.
3. Able to support the weight of concrete and construction loads to be placed thereon with no decrease in required void form depth.
4. Constructed from double-faced corrugated cardboard or fiberboard which is impregnated and laminated with moisture-resistant adhesive.
5. Capable of resisting moisture with no loss or load carrying strength or change in depth or configuration.

D. Stay-In-Place Forms:

1. Ribbed, expanded, leave-in-place metal concrete forms commercially fabricated to provide an intentionally rougher surface.
2. Hot-dipped galvanized.

PART 3 EXECUTION

3.01 PREPARATION

A. Form Surface Treatment:

1. Before placing of either reinforcing steel or concrete, cover surfaces of forms with an approved coating material that will effectively prevent absorption of moisture and prevent bond with concrete, will not stain concrete or prevent bonding of future finishes.
 - a. A field applied form release agent or sealer of approved type or a factory applied non-absorptive liner may be used.
2. Do not allow excess form coating material to stand in puddles in forms nor in contact with hardened concrete against which fresh concrete is to be placed.

B. Provide temporary openings at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed, and to limit height of free fall of concrete to prevent aggregate segregation.

1. Temporary openings to limit height of free fall of concrete shall be spaced no more than eight (8) feet apart.

C. Clean surfaces of forms, reinforcing steel and other embedded materials of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed.

3.02 ERECTION

A. Install products in accordance with manufacturer's instructions. Construct substantial forms to the shapes, lines, grades and elevations necessary to complete Work.

B. Tolerances:

1. Variation from plumb:

- a. In lines and surfaces of columns, piers, walls, and in risers.
 - 1) Maximum in any ten (10) feet of height: 1/4-inch.
 - 2) Maximum for entire height: 1/2-inch.
- b. For exposed corner columns, control-joint grooves, and other exposed to view lines:
 - 1) Maximum in any twenty (20) feet length: 1/4-inch.
 - 2) Maximum for entire length: 1/2-inch.

2. Variation from level or from grades specified:

- a. In slab soffits, ceilings, beam soffits and in arises, measured before removal of supporting shores:
 - 1) Maximum in any ten (10) feet of length: 1/4-inch.

- 2) Maximum in any bay or in any twenty (20) feet of length: $\frac{3}{8}$ -inch.
- 3) Maximum for entire length: $\frac{3}{4}$ -inch.
- b. In exposed lintels, sills, parapets, horizontal grooves, and other exposed to view lines:
 - 1) Maximum in any bay or in twenty (20) feet of length: $\frac{1}{4}$ -inch.
 - 2) Maximum for entire length: $\frac{1}{2}$ -inch.
3. Variation of linear structure lines from established position in plan and related position of columns, walls, and partitions:
 - a. Maximum in any bay: $\frac{1}{2}$ -inch.
 - b. Maximum in any twenty (20) feet of length: $\frac{1}{2}$ -inch.
 - c. Maximum for entire length: 1-inch.
4. Variation in sizes and location of sleeves, floor openings, and wall openings: Maximum of $+\frac{1}{2}$ -inch.
5. Variation in horizontal plan location of beam, column and wall centerlines from required location: Maximum of $+\frac{1}{2}$ -inch.
6. Variation in cross sectional dimensions of columns and beams and in thickness of slabs and walls: Maximum of $-\frac{1}{4}$ -inch, $+\frac{1}{2}$ -inch.
7. Footings and foundations:
 - a. Variations in concrete dimensions in plan: $-\frac{1}{2}$ -inch, $+2$ -inch.
 - b. Misplacement or eccentricity:
 - 1) Two percent (2%) of footing width in direction of misplacement but not more than 2-inches.
 - c. Thickness:
 - 1) Decrease in specified thickness: five percent (5%).
 - 2) Increase in specified thickness: No limit except that which may interfere with other construction.
8. Variation in steps:
 - a. In a flight of stairs:
 - 1) Rise: $+\frac{1}{8}$ -inch.
 - 2) Tread: $+\frac{1}{4}$ -inch.
 - b. In consecutive steps:
 - 1) Rise: $+\frac{1}{16}$ -inch.
 - 2) Tread: $+\frac{1}{8}$ -inch.

9. Establish and maintain in an undisturbed condition and until Final Completion and Acceptance of the Project, sufficient control points and benchmarks to be used for reference purposes to check tolerances.
 10. Regardless of tolerances listed allow no portion of structure to extend beyond legal boundary of the Project.
 11. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete.
- C. Plywood joints shall be square and tight; plywood shall be arranged in such manner as to minimize number of joints and to provide a smooth, attractive finished concrete surface.
 - D. Make forms sufficiently tight to prevent loss of mortar from concrete. Forms shall be tied, clamped and braced to prevent spreading, shifting or settling.
 - E. Place $\frac{3}{4}$ -inch chamfer strips in exposed to view corners of forms to produce $\frac{3}{4}$ -inch wide beveled edges.
 - F. At construction joints, overlap contact surface of form sheathing for flush surfaces exposed to view over hardened concrete in previous placement by at least 1-inch.
 1. Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain a true surface.
 2. Where possible, locate juncture of built-in-place wood or metal forms at architectural lines, control joints or at construction joints.
 - G. Where circular walls are to be formed and forms made up of straight sections are proposed for use, provide straight lengths not exceeding two (2) feet wide.
 1. Brace and tie formwork to maintain correct position and shape of members.
 - H. Construct wood forms for wall openings to facilitate loosening, if necessary, to counteract swelling.
 - I. Anchor formwork to shores or other supporting surfaces or members so that movement of any part of formwork system is prevented during concrete placement.
 - J. Provide runways for moving equipment with struts or legs, supported directly on formwork or structural member without resting on reinforcing steel.
 - K. Provide positive means of adjustment (wedges or jacks) of shores and struts and take up all settlement during concrete placing operation.
 1. Securely brace forms against lateral deflection.
 2. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check.
 - L. After void forms are in place and before concrete is placed thereon, cover joints between abutting form sections and cover ends of forms to prevent intrusion of soil, concrete or any other materials.
 1. Install void forms in accordance with manufacturer's instructions.

M. Stay-In-Place Forms:

1. Support stay-in-place forms as required to maintain the formwork in proper position.
2. Hold the edge of stay-in-place forms back a minimum of 2-inches from all smooth formed concrete surfaces.
3. Stay-in place forms may be used at the Contractor's option at:
 - a. Surfaces that will be backfilled with soil.
 - 1) Maintain a minimum of 3-inches of concrete cover over all reinforcing.
 - b. Roughened construction joints.
 - c. Other locations as approved by the County.

3.03 REMOVAL OF FORMS

- A. Do not remove forms before the concrete has attained a strength of at least seventy percent (70%) of its specified design strength for beams and slabs and at least thirty percent (30%) of its specified design strength for walls and vertical surfaces, nor before reaching the following number of day-degrees of curing (whichever is the longer):

<u>Forms for</u>	<u>Degree Days</u>
Elevated beams and elevated slabs	500
Walls and vertical surfaces	100
Foundation footings and slabs-on-grade	100

Degree-days are defined as the total number of 24-hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g. two (2) days at an average 50 Deg F = 100 degree-days).

- B. When required for concrete curing in hot weather, required for repair of surface defects or when finishing is required at an early age, remove forms as soon as concrete has hardened sufficiently to resist damage from removal operations or lack of support.
- C. In cold weather, when temperature of concrete exceeds ambient air temperature by 20 Deg F. at the end of the protection period, loosen forms and leave in place for at least 24-hours to allow concrete to cool gradually to ambient air temperature.
- D. Remove top forms on sloping surfaces of concrete as soon as concrete has attained sufficient stiffness to prevent sagging.
1. Perform any needed repairs or treatment required on such sloping surfaces at once, followed by curing specified in Section 03 3131 – Concrete Mixing, Placing, Jointing and Curing.
- E. Loosen wood forms for wall openings as soon as this can be accomplished without damage to concrete.

- F. Formwork for columns, walls, sides of beams, and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal.
- G. Where no reshoring is planned, leave forms and shoring used to support weight of concrete in place until concrete has attained its specified twenty-eight (28) day compressive strength.
 - 1. Where a reshoring procedure is planned, supporting formwork may be removed when concrete has reached the concrete strength required by the formwork designer's structural calculations.
- H. When shores and other vertical supports are so arranged that non-load carrying form facing material may be removed without loosening or disturbing shores and supports, facing material may be removed when concrete has sufficiently hardened to resist damage from removal.

3.04 RESHORING

- A. No construction loads shall be supported on, nor any shoring removed from, any part of the structure under construction except when that portion of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its weight and loads placed thereon.
- B. While reshoring is underway, no superimposed dead or live loads shall be permitted on the new construction.
- C. During reshoring, do not subject concrete in structural members to combined dead and construction loads in excess of loads that structural members can adequately support.
- D. Place reshores as soon as practicable after stripping operations are complete but in no case later than end of working day on which stripping occurs.
- E. Tighten reshores to carry their required loads without overstressing.
- F. Shoring, reshoring and supporting formwork may be removed when concrete has reached the concrete strength required by the formwork designer's structural calculations.
- G. For floors supporting shores under newly placed concrete leave original supporting shores in place or reshore.
 - 1. Reshoring system shall have a capacity sufficient to resist anticipated loads.
 - 2. Locate reshores directly under a shore position above.
- H. In multi-story buildings, extend reshoring over a sufficient number of stories to distribute weight of newly placed concrete, forms, and construction live loads in such a manner that design superimposed loads of floors supporting shores are not exceeded.

END OF SECTION 03 1113

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 03 2100: CONCRETE REINFORCEMENT
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SECTION 03 2100 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Reinforcing bar requirements for concrete construction. Furnish and install reinforcing for all concrete, including dowels, bars, chairs, spacers, stirrups, ties, bolsters, etc., necessary for supporting and fastening reinforcement in place as shown on the Project Drawings and specified herein.
 - 1. This Work includes but is not limited to:
 - a. Structural foundations/footings.
 - b. Structural slabs, girders, beams, and columns.
 - c. Structural walls, stem walls, and curbs.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Section 03 0505 – Concrete Testing
 - 2. Section 03 1113 – Formwork – Structural Cast-In-Place Concrete
 - 3. Section 03 3100 – Cast-In-Place Structural Concrete
 - 4. Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing

1.02 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. ACI MNL 66 – ACI Detailing Manual.
 - b. ACI SP-66 – ACI Detailing Manual.
 - c. ACI 301 – Specifications for Structural Concrete for Buildings.
 - d. ACI 318 - Building Code Requirements for Structural Concrete.
 - 2. American Society for Testing and Materials (ASTM):
 - a. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - b. ASTM A706 – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - c. ASTM A775 – Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - d. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

3. American Welding Society (AWS);
 - a. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
 4. California Building Code (CBC)
 5. Concrete Reinforcing Steel Institute (CRSI):
 - a. Manual of Standard Practice.
 6. Federal Specifications (FS)
- B. Qualifications:
1. Welding operators, processes and procedures to be qualified in accordance with AWS D1.4.
 - a. Welders whose work fails to pass inspection shall be re-qualified before performing welding.
 2. Welding operators to have been qualified during the previous twelve (12) months prior to commencement of welding.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
1. Product technical data, including, but not limited to:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Mill certificates for all reinforcing indicating chemical and physical analysis. Tensile and bend tests shall be performed by the mill in accordance with ASTM A615.
 - d. Manufacturer and type of proprietary rebar mechanical splices.
 - e. Manufacturer and type of rebar adhesive anchor including installation instructions.
 2. Qualifications of welding operators, welding processes and procedures.
 3. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. Drawings shall be prepared in accordance with ACI SP-66.
 - a. Shop Drawings shall not be prepared by reproducing the plans and details indicated on the Project Drawings, but shall consist of completely redrawn plans and details as necessary to indicate complete fabrication and installation

of all reinforcing steel.

- b. Sufficient rebar details to permit installation of reinforcing. Areas of high congestion, including member joints and embedded locations shall be fully detailed to verify clearances and assembly parameters and coordination with other trades.
- c. Rebar details in accordance with ACI SP 66.
- d. No reinforcing steel shall be fabricated without approved Shop Drawings.
- e. Locations where proprietary rebar mechanical splices are required or proposed for use.
- f. Shop Drawings shall be in sufficient detail to permit installation of reinforcing without reference to Project Drawings.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Support and store all reinforcing above ground.
- B. Ship to jobsite in bundles with attached plastic or metal tags with permanent mark numbers which match the Shop Drawing mark numbers and indicate bar size/length.
- C. Deliver and store welding electrodes in accordance with AWS D1.4.
- D. Handling of Epoxy-Coated Rebar:
 - 1. Use padded or nonmetallic slings and padded straps to protect coated reinforcement from damage.
 - 2. Handle bundled bars to prevent sagging that could damage the coating.
 - 3. Do not drop or drag rebar.
 - 4. Store on wooden cribbing.
 - 5. Coated rebar subject to rejection by County if rebar coating has been damaged.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Reinforcing steel bar and welded wire fabric:
 - 1. Manufacturer regularly engaged in the production of steel bar and welded wire fabric reinforcement.
- B. Rebar adhesive anchors:
 - 1. HIT-HY 200 System by Hilti Fastening Systems, Inc.; www.us.hilti.com
 - 2. HIT-RE 500 V3 System by Hilti Fastening Systems, Inc.; www.us.hilti.com
 - 3. SET-XP Adhesive Anchor System by Simpson Strong-Tie Company, Inc.; www.strongtie.com
 - 4. Or approved equal.

C. Rebar mechanical splices:

1. Lenton Rebar Splicing by ERICO, Inc.; www.erico.com/lenton.asp
2. Bar-Grip Systems by Barsplice Products, Inc.; www.barsplice.com
3. Or approved equal.

2.02 MATERIALS

A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

B. Reinforcing Bars to be Welded:

1. ASTM A706, Grade 60.
2. ASTM A615, with supplemental reports as required.

C. Welded Wire Reinforcement: ASTM A1064.

D. Smooth Dowel Bars: ASTM A615, grade 60 with metal end cap to allow longitudinal movement equal to joint width plus 1-inch.

E. Stirrups and Ties: ASTM A615, Grade 60.

F. Epoxy-Coated Rebar: ASTM A775 and ASTM A615, grade 60, meeting Annex A1 for epoxy coating.

G. Epoxy-Coated Rebar Patching Material:

1. Compatible with the coating material.
2. Inert in concrete.
3. Meet requirements of Annex A1 or ASTM A775.
4. Obtained from the manufacturer of the epoxy resin that was used to originally coat the rebar.

H. Proprietary Rebar Mechanical Splices: To develop in tension and compression a minimum of one hundred and twenty-five percent (125%) of the yield strength of the rebar being spliced. Must be approved by the County and be in compliance with latest ICC-ES evaluation reports and ACI 318.

I. Welding Electrodes: Low hydrogen, E70 or E90 meeting requirements of AWS D1.4.

J. Rebar Adhesive Anchors:

1. Manufactured for the specific purpose of embedding and developing the yield strength of rebar in hardened concrete.

2.03 ACCESSORIES

A. Metal Chairs, Runners, Bolsters, Spacers, Hangers, and Other Rebar Supports:

1. Unless noted otherwise, CRSI Class 2 wire supports.
2. Plastic-coated tips in contact with forms.

- 3. Plastic coating meeting requirements of CRSI Manual of Standard Practice.
- B. Tie Wires: FS-QQ-W-461, annealed steel, black, 16 gauge minimum.
- C. Protective plastic caps at mechanical splices.

2.04 FABRICATION AND SOURCE QUALITY CONTROL

- A. Shop fabricate reinforcement to meet requirements of Project Drawings. Fabricate reinforcement in accordance with the requirements of ACI SP-66 where specific details are not shown or where Project Drawings and Detailed Provisions are not more demanding.
- B. Tolerances:
 - 1. Sheared lengths: +1-inch.
 - 2. Overall dimensions of stirrups, ties, and spirals: +½-inch.
 - 3. All other bends: +0-inch, -½-inch.
- C. Minimum diameter of bends measured on the inside of the rebar to be as indicated in ACI 318, Paragraph 7.2.
- D. Steel reinforcement shall not be bent or straightened in a manner that will degrade the material. Bars with kinks or bends not shown on the Shop Drawings shall not be used. Heating of bars for bending will not be permitted.
- E. Ship rebar to jobsite with attached plastic or metal tags.
 - 1. Place on each tag the mark number of the rebar corresponding to the mark number indicated on the Shop Drawings.
 - 2. Mark numbers on tags to be so placed that the numbers cannot be removed.
 - 3. Mark bar size and length on tags.
 - 4. For epoxy-coated rebar, use only plastic tags secured to rebar by nylon or plastic ties.
- F. Make completed reinforcement available for inspection at manufacturer's shop prior to packaging for shipment. Notify County at least seven (7) Calendar Days before inspection is allowed.
- G. Fabricator shall perform one tensile and one bend test for each 2½ tons of steel or fraction thereof in accordance with ASTM A615. Contractor shall be responsible for costs associated with fabricator testing.
- H. When fabricator is approved by authority having jurisdiction, submit Certificate of Compliance indicating Work performed at manufacturer's facility conforms to the Contract Documents.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All reinforcement shall be accurately set in place, lapped, spliced, spaced, rigidly and securely held in place and tied with specified wire at all splices and crossing points. All wire tie ends shall point away from the form. Carefully locate all dowel steel to align with wall and column steel.
- B. Tolerances:
 - 1. Rebar placement:
 - a. Clear distance to formed surfaces: + ¼-inch.
 - b. Minimum spacing between bars: - ¼-inch.
 - c. Top bars in slabs and beams:
 - 1) Members 8-inch deep or less: +¼-inch.
 - 2) Members between 8-inch and 2-feet deep: -¼-inch, +½-inch.
 - 3) Members more than 2-feet deep: -¼-inch, +1-inch.
 - d. Crosswise of members: Spaced evenly within +1-inch.
 - e. Lengthwise of members: +2-inch.
 - 2. Minimum clear distances between rebar:
 - a. Beams, walls and slabs: Distance equal to rebar diameter or 1-inch, whichever is greater.
 - b. Columns: Distance equal to 1½ times the rebar diameter or 1½-inch, whichever is greater.
 - c. Beam and slab rebar shall be threaded through the column vertical rebar without displacing the column vertical rebar and still maintaining the clear distances required for the beam and slab rebar.
- C. Minimum concrete protective covering for reinforcement, unless otherwise shown on the Project Drawings:
 - 1. Concrete against and permanently exposed to earth: 3-inch.
 - 2. Concrete exposed to earth or weather:
 - a. No. 6 bars and larger: 2-inch.
 - b. No. 5, W31 or D31 wire, and smaller: 1½-inch.
 - 3. Concrete not exposed to weather or in contact with earth:
 - a. Slabs, walls and joists (No. 11 rebar and smaller): ¾-inch.
 - b. Slabs, walls and joists (No. 11 rebar and larger): 1½-inch.
 - c. Beams and columns: 1½-inch.

4. Slabs-on-grade:
 - a. Top reinforcement: 2-inches.
 - b. Bottom reinforcement: 3-inches.
- D. Unless indicated otherwise, provide splice lengths for reinforcing as follows:
 1. For rebar: Class B splice meeting the requirements of Paragraph 12.15 of ACI 318.
 2. For welded wire reinforcement:
 - a. Splice lap length measured between outermost cross wires of each fabric sheet shall not be less than one (1) spacing of cross wires plus 2-inches, nor less than 1.5 x development length nor less than 6-inches.
 - b. Development length shall be as required for the yield strength of the welded wire reinforcement in accordance with Paragraph 12.8 of ACI 318.
 3. Provide splices of reinforcing not specifically indicated or specified subject to approval by the County.
 - a. Mechanical proprietary splice connectors may only be used when approved by the County and shall be in compliance with current ICC-ES evaluation reports.
- E. Welding:
 1. Welding is not permitted unless specifically detailed on Drawings or approved by the County prior to welding reinforcement.
 2. Perform welding of rebar in accordance with requirements of AWS D1.4.
 3. Welding shall not be done within two bar diameters of any bent portion of a bar which has been bent cold.
 4. Welding of crossing bars is not permitted.
 5. Have each welder place an approved identifying mark near each completed weld.
- F. Placing Rebar:
 1. Assure that reinforcement at time concrete is placed is free of mud, oil or other materials that may affect or reduce bond.
 2. Reinforcement with rust, mill scale or a combination of both will be accepted as being satisfactory without cleaning or brushing provided dimensions and weights including heights of deformations on a cleaned sample is not less than required by applicable ASTM Specification that governs for the rebar supplied.
 3. Rebar support:
 - a. Uncoated rebar:
 - 1) Support rebar and fasten together to prevent displacement by construction loads or placing of concrete.
 - (a) Locate and support reinforcement with bar supports to maintain minimum concrete cover.

- (b) Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- 2) On ground, provide supporting concrete blocks or metal bar supports with bottom plate.
 - (a) Do not use concrete blocks to support slab-on-grade reinforcing.
- 3) Over formwork, provide plastic-coated metal chairs, runners, bolsters, spacers, hangers and other rebar support.
 - (a) Only tips in contact with the forms need to be plastic coated.
- b. Coated rebar:
 - 1) Support coated rebar and fasten together to prevent displacement.
 - 2) Use plastic or nylon ties to hold rebar rigidly in place.
 - 3) Support rebar by use of plastic or plastic-coated chairs, runners, bolsters, spacers, hangers and rebar supports as required.
- 4. Support rebar over cardboard void forms by means of concrete supports which will not puncture or damage the void forms during construction nor impair the strength of the concrete members in any way.
- 5. Where parallel horizontal reinforcement in beams is indicated to be placed in two or more layers, rebar in the upper layers shall be placed directly above rebar in the bottom layer with clear distance between layers to be 1-inch.
 - a. Place spacer rebar at 3-foot maximum centers to maintain the required 1-inch clear distance between layers.
- 6. Extend reinforcement to within 2-inches of concrete perimeter edges.
 - a. If perimeter edge is formed by earth or stay-in-place forms, extend reinforcement to within 3-inches of the edge.
- 7. To assure proper placement, furnish templates for all column vertical bars and dowels.
- 8. Do not bend reinforcement after embedding in hardened concrete unless approved by County.
 - a. Do not bend reinforcing by means of heat.
- 9. Do not tack weld reinforcement.
- 10. Embed rebar into hardened concrete utilizing adhesive anchor system specifically manufactured for such installation:
 - a. Drill hole in concrete with diameter and depth as indicated on Shop and/or Project Drawings and per manufacturer's instructions.
 - b. Clean holes per manufacturer's recommendations.
 - c. Place adhesive in drilled hole.
 - d. Insert rebar into hole and adhesive in accordance with manufacturer's instructions.

3.02 FIELD QUALITY CONTROL

- A. County and/or Testing/Inspection Provider retained by the County shall perform field inspection in accordance with CBC requirements. When required, County shall procure services of a Special Inspector to inspect reinforcing placement per CBC Section 1704.
- B. All reinforcing steel whose properties are not identifiable by mill test reports shall be tested in accordance with ASTM A615. One series of tests for each missing report, costs to be borne by the Contractor.
- C. Reinforcement Congestion and Interferences:
 - 1. Notify County whenever the specified clearances between rebar cannot be met.
 - 2. Do not place any concrete until the County approves a solution to rebar congestion problem.
 - 3. Rebar may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items.
 - 4. If rebar are moved more than one (1) bar diameter, obtain County approval of resulting arrangement of rebar.
 - 5. No cutting of rebar shall be done without written approval from the County.
- D. Inspection of Epoxy-Coated Rebar:
 - 1. Coated rebar will be inspected on the jobsite for handling defects, coating abrasion, coating thickness and continuity of coating.
 - 2. County may defer final inspection of rebar coating integrity and repairs until the rebar have been erected and all handling is completed.
 - 3. Repair coated areas as directed by the County.
 - a. Do not place concrete until all repairs to coatings have been completed.
- E. Patching of Epoxy-Coated Rebar:
 - 1. Patching and repair to be performed in accordance with the instructions of patching material manufacturer.
 - 2. Patching material to provide a minimum film thickness of 5 mils over the bare area.
 - a. Thickness of area adjacent to patched area not to exceed 15 mils.
 - 3. Areas to be patched to be clean and free of surface contaminants.
 - a. Treat areas in accordance with patching material manufacturer's instructions before oxidation occurs.
 - 4. Total surface area covered by patching material not to exceed two percent (2%) of total surface area of the rebar.
 - 5. Rebar welds and adjacent bare rebar areas to also be patched after welding is completed.

F. Welding:

1. County's Testing/Inspection Provider shall:
 - a. Review and approve Contractor proposed welding procedures and processes for conformance with AWS D1.4.
 - b. Qualify welders in accordance with AWS D1.4.
 - c. Test three (3) samples of each bar size and each type of weld in accordance with AWS D1.4.
 - d. The tensile strength of each test shall be not less than one hundred and twenty-five percent (125%) of the required yield strength of the rebar tested.
 - e. Conduct nondestructive field tests (radiographic or magnetic particle) on not less than one (1) random sample for each ten (10) welds.
 - f. In addition, if any welds are found defective, test five (5) previous welds performed by same welder.
 - g. Visually inspect each weld for presence of cracks, undercuts, inadequate size and other visible defects.
2. With the exception of re-tests associated with Contractor's workmanship, costs associated with welding qualification, observation, and testing shall be borne by the County. Contractor shall reimburse the County for all costs associated with re-testing.

END OF SECTION 03 2100

SPECIFICATIONS – DETAILED PROVISIONS

SECTION 03 3100: CAST-IN-PLACE STRUCTURAL CONCRETE

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SECTION 03 3100 CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Furnish concrete materials in the proportions and strengths necessary to complete the Work specified.
2. This Work includes but is not limited to:
 - a. Structural foundations/footings.
 - b. Structural slabs, girders, beams, and columns.
 - c. Structural walls, stem walls, and curbs.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Section 03 0505 – Concrete Testing
2. Section 03 2100 – Concrete Reinforcement
3. Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing
4. Section 03 3132 – Concrete Finishing and Repair of Surface Defects

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. American Concrete Institute (ACI):
 - a. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 - b. ACI 212.3R – Chemical Admixtures for Concrete.
 - c. ACI 232.2R – Use of Fly Ash in Concrete.
 - d. ACI 301 – Specification for Structural Concrete.
 - e. ACI 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - f. ACI 305R – Hot Weather Concreting.
 - g. ACI 306R – Cold Weather Concreting.
 - h. ACI 318 - Building Code Requirements for Structural Concrete.
 - i. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures.
 - j. ACI CT – Concrete Terminology.

2. American Society for Testing and Materials (ASTM):
 - a. ASTM C33 – Standard Specification for Concrete Aggregates.
 - b. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - c. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
 - d. ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
 - e. ASTM C150 – Standard Specification for Portland Cement.
 - f. ASTM C157 – Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete.
 - g. ASTM C192 – Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
 - h. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - i. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.
 - j. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.
 - k. ASTM C595 – Standard Specification for Blended Hydraulic Cements.
 - l. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - m. ASTM C685 – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
 - n. ASTM C827 – Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
 - o. ASTM C939 – Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete.
 - p. ASTM C1017 – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - q. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
 - r. ASTM C1090 – Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout.
 - s. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
3. National Bureau of Standards (NBS):
 - a. NBS Handbook No. 44

4. National Ready Mixed Concrete Association (NRMCA)
 - a. Quality Control Manual, Section 3 – Certification of Ready Mixed Concrete Production Facilities.
5. Truck Mixer Manufacturers Bureau (TMMB)
 - a. TMMB 100 – Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards.

1.03 DEFINITIONS

- A. Words and terms used in these Detailed Provisions are defined in ACI CT.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
 1. Product technical data, including, but not limited to:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's instructions.
 - c. Concrete mix designs as required by Detailed Provisions Section 03 0505 – Concrete Testing.
 - d. Manufacturer and type of proposed admixtures.
 - e. Manufacturer and type of proposed non-shrink grout and grout cure/seal compound.
- C. Quality Assurance Submittals:
 1. Certifications:
 - a. Certification of standard deviation data for each proposed concrete mix based on statistical records. Provide the following for each strength data point used in the calculation of the standard deviation for determination of the minimum required average strength:
 - 1) Date of sampling and name of testing laboratory.
 - 2) Name of concrete batch plant.
 - 3) Water cementitious ratio.
 - 4) Slump of batch.
 - 5) Air content of batch.
 - 6) 28-day compression test results.

7) If available, temperature and unit weight of batch.

Provide data from projects not more strictly controlled than outlined in these Detailed Provisions. Provide summary sheet showing all pertinent data and the computation of the standard deviation.

- b. Certification that the fly ash meets the quality requirements of ASTM C618, and fly ash supplier's certified test reports for each shipment of fly ash delivered to concrete supplier.
 - c. Certification that the class of coarse aggregate meets the requirements of ASTM C33 for type and location of concrete construction.
 - d. Certification of aggregate gradation.
2. Test reports:
- a. Cement mill reports for all cement to be supplied.
3. Delivery Tickets:
- a. Furnish a delivery ticket for ready mixed concrete to the County as each truck arrives. Provide a printed record of the weight of cement and each aggregate as batched individually on each ticket. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Indicate for each batch the weight of fine and coarse aggregate, cement, fly ash, and water, moisture content of fine and coarse aggregate at time of batching, and types, brand and quantity of each admixture, the quantity of concrete delivered, the time any water is added and the amount, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of transit mix truck.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery, Storage, and Handling shall be made in accordance with the following:

- 1. Store cement and pozzolan in weathertight buildings, bins, or silos which will exclude moisture and contaminants.
- 2. Arrange aggregate stockpiles and use in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of like aggregates.
- 3. Allow natural sand to drain until it has reached a relatively uniform moisture content before use.
- 4. Store admixtures in such a manner as to avoid contamination, evaporation, or damage.
 - a. For those used in form of suspensions or non-stable solutions, provide agitating equipment to assure thorough distribution of ingredients.
 - b. Protect liquid admixtures from freezing and temperature changes which would adversely affect their characteristics and performance.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Sections below are acceptable.
- B. Submit request for substitution in accordance with Detailed Provisions Section 01 6000 – Product Requirements.

2.02 MATERIALS

A. General:

- 1. The County and Testing/Inspection Provider shall have access to and have the right to inspect all batch plants, cement mills and supply facilities providing products under these Detailed Provisions. Batch plants shall have current certificates that all scales have been tested and are certified within the tolerances as set forth in the National Bureau of Standards Handbook No. 44.

B. Portland Cement:

- 1. ASTM C150, Type II, Low Alkali.
- 2. Cement type used shall correspond to that upon which selection of concrete proportions was based in the mix design.

C. Fly Ash:

- 1. ASTM C618, Class F, including the requirements of Section 2.8 but with the Loss of Ignition (LOI) limited to three percent (3%) maximum and the optional physical requirements of Table 3.
- 2. Non-staining.
- 3. Suited to provide hardened concrete of uniform light gray color.
- 4. Maximum loss on ignition: three percent (3%).
- 5. Compatible with other concrete ingredients and having no deleterious effects on the hardened concrete.
- 6. Cement and fly ash type used shall correspond to that upon which selection of concrete proportions was based in the mix design.

D. Admixtures:

- 1. Air entraining: ASTM C260.
- 2. Water reducing, retarding, and accelerating: Conform to ASTM C494, Types A through E, and provisions of ACI 212.3R. Follow manufacturer's instructions.
- 3. High range water reducers (superplasticizers): Conform to ASTM C494, Types F or G.

4. Admixtures to be chloride free.
 - a. Do not use calcium chloride or admixtures containing calcium chloride.
 5. Do not use admixtures causing retarded or accelerated setting of concrete without written approval from the County.
 6. Provide admixtures of same type, manufacturer and quantity as used in establishing required concrete proportions in the mix design.
- E. Water:
1. ASTM C94 and potable.
 2. Clean and free from deleterious substances.
 3. Free of oils, acids, and organic matter.
- F. Aggregates for Normal Weight Concrete:
1. ASTM C33, graded.
 2. All concrete aggregates shall be obtained from sources acceptable to the County, shall be non-reactive, sound, uniformly graded and free of deleterious material.
 3. Fine and coarse aggregates to be regarded as separate ingredients.
 4. Coarse aggregate shall consist of gravel, crushed gravel or crushed stone made up of clean, hard, durable particles free from coatings, organic matter or other foreign substances. Thin or elongated pieces having a length greater than four (4) times the average thickness shall not exceed fifteen percent (15%) by weight.
 5. Fine aggregates for concrete or mortar shall consist of clean, natural sand or combination of natural and manufactured sands that are hard and durable. Fine aggregates shall be free of materials with deleterious reactivity to alkali in cement.
 6. Coarse aggregate sieve analysis:
 - a. For lean concrete, concrete topping, and integral wearing course: ASTM C33, size number 7 (maximum ½-inch).
 - b. For foundations: ASTM C33, 1-inch nominal maximum.
 - c. For slabs on grade, walls, and all other concrete: ASTM C33, ¾-inch nominal maximum.
- G. Maximum total chloride ion content for concrete mix including all ingredients measured as a weight percent of cement:
1. Prestressed concrete: 0.06.
 2. All other concrete: 0.10.

H. Sand Cement Grout:

1. Approximately three (3) parts sand, one (1) part Portland cement, 6 +/- 1 percent entrained air and water to produce a slump which allows grout to completely fill required areas and surround adjacent reinforcing.
 - a. Provide sand in accordance with requirements for fine aggregate for concrete.
2. Minimum 28-day compressive strength: 3,000 psi.

I. Non-shrink Grout:

1. Non-shrink, non-metallic, non-corrosive, and non-staining conforming to ASTM C1107.
2. Premixed with only water to be added in accordance with manufacturer's instructions at jobsite.
3. Shrinkage: 0% at 28 days when tested in accordance with ASTM C827 and ASTM C1090.
4. Expansion: 0.4% maximum at 28 days when tested in accordance with ASTM C157.
5. Minimum 28-day compressive strength: 5,000 psi when tested in accordance with ASTM C109.
6. Add the minimum amount of water necessary to produce the desired flow not exceeding a flow of twenty (20) seconds per ASTM C939.
7. Acceptable manufacturers:
 - a. Euclid Chemical Company "NS Grout"; www.euclidchemical.com
 - b. L&M Construction Chemicals a part of LATICRETE International, Inc., "Crystex"; www.lmcc.com
 - c. Master Builders Solutions by BASF "MasterFlow, 713"; www.master-builders-solutions.basf.us
 - d. Sauereisen Cements "F-100 Level Fill Grout"; www.sauereisen.com
 - e. Sika Corporation "Sika Grout 212"; www.usa.sika.com
 - f. U.S. Grout, LLC. "Five Star Grout"; www.usgrout.com
 - g. Or approved equal.

J. Epoxy Grout:

1. Three-component epoxy resin system:
 - a. Two (2) liquid epoxy components.
 - b. One (1) inert aggregate filler component.
2. Adhesive acceptable manufacturers:
 - a. Euclid Chemical Company "E3-FLOWABLE"; www.euclidchemical.com

- b. Master Builders Solutions by BASF “MasterFlow 648”; www.master-builders-solutions.basf.us
 - c. Sika Corporation “Sikadur-32 Hi-Mod”; www.usa.sika.com
 - d. U.S. Grout, LLC. “Five Star Epoxy Grout”; www.usgrout.com
 - e. Or approved equal.
3. Aggregate acceptable manufacturers:
- a. Euclid Chemical Company “Euclid aggregate”; www.euclidchemical.com
 - b. Master Builders Solutions by BASF “MasterFlow 648”; www.master-builders-solutions.basf.us
 - c. Sika Corporation “Sika aggregate”; www.usa.sika.com
 - d. U.S. Grout, LLC. “U.S. Grout aggregate”; www.usgrout.com
 - e. Or approved equal.
4. Aggregate manufacturer shall be the same as the adhesive manufacturer.
5. The aggregate shall be compatible with the adhesive.
6. Each component furnished in separate package for mixing at jobsite.

2.03 MIXES

- A. General: Mixing of concrete shall be done in accordance with:
- 1. Provide concrete capable of being placed without aggregate segregation and, when cured, of developing all properties specified.
 - 2. Ready-mixed concrete shall conform to ASTM C94.
 - 3. All concrete to be normal weight concrete, weighing approximately 145 to 150 lbs. per cu. ft. at 28 days after placement.
- B. Minimum 28-Day Compressive Strengths: As indicated on Project Drawings.
- C. Air Entrainment:
- 1. Provide air entrainment in all concrete resulting in a total air content percent by volume as follows:
 - a. 1½-inch maximum aggregate size: 4½ to 6½ percent total air content.
 - b. 1-inch maximum aggregate size: 5 to 7 percent total air content.
 - c. ¾-inch maximum aggregate size: 5 to 7 percent total air content.
 - d. ½-inch maximum aggregate size: 5½ to 8 percent total air content.
 - e. Interior slabs and mats with power trowel finish: Maximum 3 percent total air content.

D. Slump:

1. 4-inch maximum, 1-inch minimum measured at point of discharge into the concrete construction member.
2. Concrete of lower than minimum slump may be used provided it can be properly placed and consolidated.
3. Provide additional water or water reducing admixture at ready mix plant for concrete that is to be pumped to allow for slump loss due to pumping.
 - a. Provide only enough additional water so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified and the maximum specified water-cement ratio is not exceeded.

E. Proportioning:

1. General:
 - a. Proportion ingredients to produce a mixture which will work readily into corners and angles of forms and around reinforcement by methods of placement and consolidation employed without permitting materials to segregate or excessive free water to collect on surface.
 - b. Proportion ingredients to produce proper placability, durability, strength, maximum specified allowable shrinkage and other required properties.
2. Minimum Compressive Strength: As indicated on Project Drawings.
3. Maximum Water-Cementitious Materials Ratio: 0.45.
4. Specific mix for 4,000 psi concrete indicated on Project Drawings proportioned as follows:
 - a. Minimum Compressive Strength: 4,000 psi at 28 days.
 - b. Maximum Water-Cementitious Material Ratio: 0.45
 - c. Minimum Cement per cubic yard (94 lb. sacks): 6.0
 - d. Slump Limit: 3-inches, plus or minus 1-inch or 8-inches for concrete with verified slump of 2 to 4-inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1-inch.
 - e. Air Content: Refer to Section 2.03.C.1.
5. Maximum concrete shrinkage shall comply with ASTM C157 for testing indicated.
6. Fly ash:
 - a. For cast-in-place concrete only.
 - b. If fly ash is used, the water to fly ash plus cement ratio not to exceed the maximum water cement ratio specified in this Detailed Provisions Section.
7. Water reducing, retarding, and accelerating admixtures:
 - a. Use in accordance with manufacturer's instructions.

- b. Do not use unless required by these Detailed Provisions or approved for use by the County.
- 8. High range water reducers (superplasticizers):
 - a. Use in accordance with manufacturer's instructions.
 - b. Do not use unless required by these Detailed Provisions or approved for use by the County.
- 9. Trial Batch and Laboratory Tests:
 - a. Before placing any concrete, the Contractor shall submit certified trial batch results of each class of concrete having a 28-day strength of 4,000 psi or higher, based on the preliminary concrete mixes submitted by the Contractor. All concrete shall conform to the requirements of this Section, whether the aggregate proportions are from the Contractor's preliminary mix design, or whether the proportions have been adjusted during the trial batch process. The trial batch shall be prepared using aggregates, cement and admixture proposed for the project. The cost for the trial batch tests shall be borne by the Contractor.
 - b. The determination of compressive strength will be made by testing 6-inch diameter by 12-inch high cylinders; made, cured and tested in accordance with ASTM C192 and ASTM C39. Three (3) compression test cylinders will be tested at 7-days and three (3) at 28 days. The average compressive strength for the three (3) cylinders tested at 28-days for any given trial batch shall not be less than one hundred and twenty-five percent (125%) of the specified compressive strength.
 - c. A standard sieve analysis of the combined aggregate for each trial batch shall be performed according to the requirements for ASTM C136. Values shall be given for percent passing each sieve.
 - d. In lieu of trial batches, field test records for concrete made with similar ingredients may be used in accordance with ACI 301.
 - 1) Use of proposed concrete mix proportions based on field test records subject to approval by County based on information contained in field test records and demonstrated ability to provide the required average strength and meet allowable shrinkage requirements.
 - 2) Test records shall represent materials, proportions and conditions similar to those specified.

2.04 SOURCE QUALITY CONTROL

- A. To assure stockpiles are not contaminated or materials are segregated, perform any test for determining conformance to requirements for cleanliness and grading on samples secured from aggregates at point of batching.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Perform concrete tests per this Section and Detailed Provisions Section 03 0505 – Concrete Testing.
- B. Perform strength test on any concrete to which water has been added at the jobsite.

END OF SECTION 03 3100

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 03 3131: CONCRETE MIXING, PLACING, JOINTING, AND CURING

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SECTION 03 3131 CONCRETE MIXING, PLACING, JOINTING, AND CURING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Mixing, placing, jointing, and curing of concrete construction.
 - 1. This Work includes but is not limited to:
 - a. Structural foundations/footings.
 - b. Structural slabs, girders, beams, and columns.
 - c. Structural walls, stem walls, and curbs.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Section 03 0505 – Concrete Testing
 - 2. Section 03 2100 – Concrete Reinforcement
 - 3. Section 03 3100 – Cast-In-Place Structural Concrete
 - 4. Section 03 3132 – Concrete Finishing and Repair of Surface Defects

1.02 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. ACI 301 – Specification for Structural Concrete.
 - b. ACI 302.1R – Guide for Concrete Floor and Slab Construction.
 - c. ACI 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - d. ACI 305R – Hot Weather Concreting.
 - e. ACI 306R – Cold Weather Concreting.
 - f. ACI 308R – Guide to Curing Concrete.
 - g. ACI 309R – Guide for Consolidation of Concrete.
 - h. ACI CT – Concrete Terminology.
 - 2. American Society for Testing and Materials (ASTM):
 - a. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
 - b. ASTM C156 – Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid Membrane-Forming Curing Compounds for Concrete.
 - c. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
 - d. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

- e. ASTM D994/D994M – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- f. ASTM D1056 – Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
- g. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- 3. National Bureau of Standards (NBS):
 - a. NBS Handbook No. 44
- 4. Truck Mixer Manufacturers Bureau (TMMB)
 - b. TMMB 100 – Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards.
- 5. National Ready Mixed Concrete Association (NRMCA):
 - a. Checklist for Certification of Ready Mixed Concrete Production Facilities.
- 6. NSF International (NSF)
- B. Qualifications:
 - 1. Ready Mixed Concrete Batch Plant: Certified by NRMCA.

1.03 DEFINITIONS

- A. Words and terms used in these Detailed Provisions are defined in ACI CT.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
 - 1. Shop Drawings:
 - a. Complete drawings with details and dimensions showing proposed location of all construction joints and joint keyways. Drawings shall be scaled, minimum $\frac{1}{8}$ -inch = 1 foot.
 - 2. Product technical data, including, but not limited to:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - 1) Procedure for adding high-range water reducer at the jobsite.

- c. Manufacturer and types:
 - 1) Joint fillers.
 - 2) Curing agents.
 - 3) Construction joint bonding adhesive.
 - 3. Cold Weather Plan.
 - 4. Hot Weather Plan.
- C. Quality Assurance Submittals:
 - 1. Certifications:
 - a. Ready mix concrete plant certification.
- D. Closeout Submittals: Copies of concrete delivery tickets.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Concrete:
 - a. Prepare a delivery ticket for each load ready mixed concrete.
 - b. Truck operator shall hand ticket to Contractor at the time of delivery.
 - c. Provide a printed record of the weight of cement and each aggregate as batched individually on each ticket. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Indicate for each batch the weight of fine and coarse aggregate, cement, fly ash, and water, moisture content of fine and coarse aggregate at time of batching, and types, brand and quantity of each admixture, the quantity of concrete delivered, the time any water is added and the amount, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of transit mix truck.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Sections below are acceptable. Placement shall be in accordance with manufacturer's written instructions.
- B. Submit request for substitution in accordance with Detailed Provisions Section 01 6000 – Product Requirements.

2.02 COMPONENTS

A. Neoprene Expansion Joint Fillers:

1. Acceptable manufacturers:
 - a. Euclid Chemical Company; www.euclidchemical.com
 - b. Master Builders Solutions by BASF; www.master-builders-solutions.basf.us
 - c. Rubatex a part of GCP Industrial Products; www.rubatexusa.com
 - d. W.R. Meadows, Inc.; www.wrmeadows.com
 - e. Or approved equal.
2. Materials:
 - a. Closed cell neoprene.
 - b. ASTM D1056, Class SC.
 - c. Compression deflection: As required to limit deflection to fifty percent (50%) of joint thickness under pressure from concrete pour height.

B. Epoxy Joint Fillers:

1. Comply with requirements of ACI 302.1R.
2. Acceptable manufacturers:
 - a. Euclid Chemical Company; www.euclidchemical.com
 - b. Master Builders Solutions by BASF; www.master-builders-solutions.basf.us
 - c. W.R. Meadows, Inc.; www.wrmeadows.com
 - d. Or approved equal.

C. Polyurea Joint Fillers:

1. Comply with requirements of ACI 302.1R.
2. Acceptable manufacturers:
 - a. Euclid Chemical Company, Euco QWIKjoint UVR; www.euclidchemical.com
 - b. Master Builders Solutions by BASF, MasterSeal CR 100; www.master-builders-solutions.basf.us
 - c. W.R. Meadows, Inc.; www.wrmeadows.com
 - d. Or approved equal.

D. Sheet Vapor Retarder:

1. Conforms to ASTM E1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
2. Provide under floor slabs.

3. Sheet vapor retarder acceptable manufacturers:
 - a. Sheet Vapor Retarder: Polyethylene sheet, ASTM D4397, not less than 10-mils thick.
 - b. Raven Industries; Vaporblock VB10; www.ravenefd.com
 - c. Reef Industries, Inc.; Griffolyn 10-mil; www.reefindustries.com
 - d. W.R. Meadows, Inc.; Perminator 10-mil; www.wrmeadows.com
 - e. Or approved equal.
- E. Sand cement grout, non-shrink grout and epoxy grout: See Detailed Provisions Section 03 3100 – Cast-In-Place Structural Concrete.
- F. Curing Materials:
 1. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 2. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
 3. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet. The loss of moisture, when determined in accordance with the requirements of ASTM C156, shall not exceed 0.055 grams per square centimeter of surface.
 4. Polyethylene sheet for use as concrete curing blanket shall be white and shall have a normal thickness of 6 mils.
 5. Water: Potable.
 6. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B, dissipating. The curing compound shall contain a fugitive dye so that areas of application will be readily distinguishable. Compound shall contain no wax, paraffin, or oil. Curing compound shall be non-yellowing and have a unit moisture loss no greater than 0.039 gm/ square centimeter at 72 hours as measured by ASTM C156. Curing compound shall not prevent bonding of floor finishes and comply with Federal, State, and local VOC limits.
 - a. Acceptable manufacturers:
 - 1) Euclid Chemical Company; www.euclidchemical.com
 - 2) W.R. Meadows, Inc.; www.wrmeadows.com
 - 3) Or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. General:

1. Complete formwork.
 - a. See Detailed Provisions Section 03 1113 – Formwork – Structural Cast-In-Place Concrete.
2. Remove earth, water, ice, and other foreign materials from areas that will receive concrete.
3. Secure reinforcement in place.
 - a. See Detailed Provisions Section 03 2100 – Concrete Reinforcement.
4. Position expansion joint material, anchors and other embedded items. Pipe, conduit, dowels, sleeves and other ferrous items required to be embedded in concrete construction shall be adequately positioned and supported prior to placement of concrete. There shall be a minimum of 2-inches clearance between embedded items and any of the concrete reinforcement. Securing embedments in position by wiring or welding them to the reinforcement will not be permitted. Embedded items shall be clean and free of rust, mud, dirt, grease, oil, ice, or other contaminants which would reduce or prevent bonding with concrete. Close open ends of piping, conduits, and sleeves embedded in concrete with caps or plugs prior to placing concrete. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Obtain approval of reinforcement erection and placement prior to placing concrete.
6. Do not place concrete during rain, sleet, or snow, unless adequate protection is provided and County approval is obtained.
 - a. Plan size of crews with due regard for effects of concrete temperature and atmospheric conditions on rate of hardening of concrete as required to obtain good surfaces and avoid unplanned cold joints.
 - b. Do not allow rainwater to increase mixing water nor to damage surface finish.
7. Prepare all construction joints for proper bond per Paragraph 3.04.C of this Detailed Provisions Section.
8. Where concrete is to be cast against old existing concrete, the old concrete shall be thoroughly roughened to expose hard aggregate by sandblasting or chipping. Any additional surface preparation shall be as called for in the Drawings.
9. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or diverted out of the forms and clear of the Work. No concrete shall be deposited under water or allowed to rise on any concrete until the concrete has attained its initial set. Pumping or other necessary

dewatering operations for removing groundwater, if required, shall be the responsibility of the Contractor and will be subject to review by the County.

10. Remove hardened concrete and foreign materials from inner surfaces of conveying equipment and formwork.
11. Provide slabs and beams of minimum indicated required depth when sloping structural foundation base slabs and elevated slabs to drains.
 - a. For floor slabs on grade, slope top of subgrade to provide slab of required uniform thickness.

B. Preparation of Subgrade for Slabs on Ground:

1. Subgrade drained and of adequate and uniform load-bearing nature.
2. Obtain approval of subgrade compaction density prior to placing slabs on ground.
3. Maintain subgrade at a temperature above 32 Deg F before concrete placing begins for a sufficient amount of time to remove frost.
4. Moisten subgrade to eliminate absorption.
 - a. Keep subgrade moist at time of concreting.
 - b. Allow no free-standing water on subgrade or soft or muddy spots when concrete is placed.
5. Furnish, place, protect, and repair sheet vapor retarder according to ASTM E1643 and manufacturer's written instructions.
 - a. Lap joints 6-inches and seal with manufacturer's recommended tape.

C. Edge Forms and Screeds:

1. Set accurately to produce designated elevations and contours of finished surface.
2. Sufficiently strong to support vibrating screeds or roller pipe screeds, if required.
3. Use strike off templates, or approved vibrating type screeds, to align concrete surfaces to contours of screed strips.

D. Concrete Washout Area:

1. The Contractor shall provide a temporary concrete washout area at a location approved by the County within the project limits. The concrete washout area shall be identified as a BMP in the Contractor's SWPPP, see Detailed Provisions Section 01 5600 – Project Environmental Controls.

3.02 CONCRETE MIXING

A. General:

1. Provide all concrete from a central plant conforming to Checklist for Certification of Ready Mixed Concrete Production Facilities of the NRMCA.
2. Comply with ACI 318, ASTM C94, and TMMB 100 for all central plant and rolling stock equipment and methods.

3. Measure, batch, mix, and transport in accordance with ASTM C94 and furnish batch ticket information.
 - a. When air temperature is between 85 and 90 Deg F, reduce mixing and delivery time from 1½ hours to seventy-five (75) minutes; when air temperature is above 90 Deg F, reduce mixing and delivery time to sixty (60) minutes.
4. Mixing equipment shall be subject to the County's approval. Mixers shall be of the stationary plant or truck mixer type. Adequate equipment and facilities shall be provided for accurate measurement and control of all materials and for readily changing the proportions of the material. The mixing equipment shall be maintained in good working order and shall be capable of combining the aggregates, cement and water within the specified time into a thoroughly mixed and uniform mass and of discharging the mixture without segregation. Cement and aggregate shall be proportioned by weight.
5. Select equipment of size and design to provide continuous flow of concrete at the delivery end. Use metal or metal-lined non-aluminum discharge chutes with slopes not exceeding one (1) vertical to two (2) horizontal and not less than one (1) vertical to three (3) horizontal. Chutes more than 20-foot long and chutes not meeting slope requirements may be used if concrete is discharged into a hopper before distribution.
6. The batch plant shall be capable of controlling and delivering of all material to within one percent (1%) by weight of the individual material. If bulk cement is used, it shall be weighed on a separate visible scale which will accurately register the scale load at any stage of the weighing operation from zero to full capacity.
7. Cement shall not come in contact with aggregate or with water until the materials are in the mixer ready for complete mixing with all mixing water. The procedure of mixing cement with sand or with sand and coarse aggregate for delivery to the jobsite for final mixing and an addition of mixing water will not be permitted. Retempering of concrete will not be permitted. The entire batch shall be discharged before recharging. The volume of the mixed material per batch shall not exceed the manufacturers rated capacity of the mixer.
8. Each mixer shall be equipped with a device for accurately measuring and indicating the quantity of water entering the concrete, and the operating mechanism shall be such that leakage will not occur when the valves are closed. Each mixer shall be equipped with a device for automatically measuring, indicating and controlling the time required for mixing. This device shall be interlocked to prevent the discharge of concrete from the mixer before the expiration of the mixing period.
9. Transit-mixed concrete shall be mixed and delivered in accordance with ASTM C94. After the drum is once started, it shall be revolved continuously until it has completely discharged its batch. Water shall not be admitted to the mix until the drum has started revolving. The right is reserved to increase the required minimum number of revolutions allowed, if necessary, to obtain satisfactory mixing, and the Contractor will not be entitled to additional compensation because of such an increase or decrease.

10. Mixed concrete shall be delivered to the site of the Work and discharge shall be completed within one (1) hour after the addition of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 Deg F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed forty-five (45) minutes. The use of non-agitating equipment for transporting concrete will not be permitted.
11. Truck mixers shall be equipped with counters so that the number of revolutions of the drum may be readily verified. The counter shall be resettable type and shall be actuated at the time of starting mixers at mixing speeds. Concrete shall be mixed in a truck mixer for not less than seventy (70) revolutions of the drum or blades at the rate of rotation designated by the manufacturer of the equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.
12. Truck mixers and their operation shall be such that the concrete throughout the mixed batch as discharged is within acceptable limits of uniformity with respect to consistency, mix, and grading. If slump tests taken at approximately the $\frac{1}{4}$ and $\frac{3}{4}$ points of the load during discharge give slumps differing by more than one (1) inch when the specified slump is more than three (3) inches, the mixer shall not be used on the work unless the causing condition is corrected and satisfactory performance is verified by additional slump test. All mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit, and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.

B. Control of Admixtures:

1. Charge admixtures into mixer as solutions.
 - a. Measure by means of an approved mechanical dispensing device.
 - b. Liquid considered a part of mixing water.
 - c. Admixtures that cannot be added in solution may be weighed or measured by volume if so recommended by manufacturer.
2. Add separately, when two or more admixtures are used in concrete, to avoid possible interaction that might interfere with efficiency of either admixture, or adversely affect concrete.
3. Complete addition of retarding admixtures within one (1) minute after addition of water to cement has been completed, or prior to beginning of last three quarters of required mixing, whichever occurs first.

C. Tempering and Control of Mixing Water:

1. Mix concrete only in quantities for immediate use.
2. Discard concrete which has set.

3. Discharge concrete from ready mix trucks within time limit and drum revolutions stated in ASTM C94.
4. Addition of water at the jobsite:
 - a. See Detailed Provisions Section 03 3100 – Cast-In-Place Structural Concrete for specified water cement ratio and slump.
 - b. Do not exceed maximum specified water cement ratio or slump.
 - c. Incorporate water by additional mixing equal to at least half of total mixing required.
 - d. Perform strength test on any concrete to which water has been added at the jobsite.
 - 1) See Detailed Provisions Section 03 0505 – Concrete Testing.

3.03 PLACING OF CONCRETE

A. General:

1. Comply with ACI 301, 304R, 304.2R and 318.
2. No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel and preparation of surfaces involved in the placing have been completed and accepted by the County at least four (4) hours before placement of concrete. All reinforcement, anchor bolts, sleeves, inserts and similar items shall be set and secured in the forms where shown on Drawings and shall be acceptable to the County before any concrete is placed.
3. Deposit concrete:
 - a. Continuously to avoid cold joints.
 - b. In horizontal layers not to exceed 24-inches in depth.
 - c. Uniformly distributed during the placing process and in no case after depositing shall any portion be displaced in the forms more than 2-feet in horizontal direction.
4. Locate construction joints at locations approved by the County.
 - a. Plan size of crews with due regard for effects of concrete temperature and atmosphere conditions to avoid unplanned cold joints.
5. Place concrete at such a rate that concrete, which is being integrated with fresh concrete, is still workable.
6. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials.
7. Spreaders:
 - a. Temporary: Remove as soon as concrete placing renders their function unnecessary.

- b. Embedded:
 - 1) Obtain County approval.
 - 2) Materials: Concrete or metal.
 - 3) Ends of metal spreaders coated with plastic coating 2-inches from each end.
- 8. Deposit concrete as nearly as practicable in its final position to avoid segregation.
 - a. Maximum free fall: 4 feet.
 - b. Free fall exceeding 4 feet: Place concrete by means of hopper, elephant trunk or tremie pipe extending down to within 4 feet of surface placed upon.
- 9. Perform the following operations before bleeding water has an opportunity to collect on surface:
 - a. Spread.
 - b. Consolidate.
 - c. Straightedge.
 - d. Darby or bull float.

B. Admixtures:

- 1. All admixtures to be introduced at the batch plant in accordance with manufacturer's recommendations.

C. Cold Weather Concrete Placement:

- 1. For this Detailed Provision Section, "cold weather" is defined as a period when for more than three (3) successive days, the average daily outdoor temperature drops below 40 Deg F. Calculate average daily temperature as the average of the highest and the lowest temperature during the period from midnight to midnight.
- 2. Batch, deliver, place, cure and protect concrete during cold weather in compliance with the recommendations of ACI 306R and the additional requirements of this Section.
- 3. Review the cold weather concreting plan at the preconstruction meeting. Include the methods and procedures for use during cold weather including the production, transportation, placement, protection, curing and temperature monitoring of the concrete and the procedures to be implemented upon abrupt changes in weather conditions or equipment failures.
- 4. Do not place concrete or substrates that are below 32 Deg F or contain frozen material.
- 5. Maintain all materials, forms, reinforcement, subgrade and any other items which concrete will come in contact with free of frost, ice or snow at time of concrete placement.

6. The minimum temperature of concrete immediately after placement and during the protection periods shall be:

Minimum Concrete Temperature for Sections with Dimension Less than 12-inches (Deg F)	Minimum Concrete Temperature for Sections with Dimension 12-inches to 36-inches (Deg F)
55	50

The temperature of the concrete in place and during the protection period shall not exceed these values by more than 20 Deg F. Prevent overheating and non-uniform heating of the concrete.

7. Protect concrete during periods of cold weather to provide continuous warm, moist curing (with supplementary heat when required by weather conditions) for a total of at least 350 degree-days of curing.
- Degree-days are defined as the total number of twenty-four (24) hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g. 7 days at an average 50 Deg F = 350 degree-days).
 - To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 Deg F as 0 Deg F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.
8. Do not use salt, manure or other chemicals for protection.
9. At the end of the protection period, allow the concrete to cool gradually to the ambient temperature. If water curing has been used, do not expose concrete to temperatures below those listed in this Section until at least twenty-four (24) hours after water curing has been terminated and air dry concrete for at least three (3) days prior to first exposure to freezing temperatures.
10. Heat subgrade, forms, and reinforcement so the temperature of the subgrade, forms, and reinforcement will be between 45 and 70 Deg F, when temperature of surrounding air is 40 Deg F or below at time concrete is placed.
- Remove all frost from subgrade, forms and reinforcement before concrete is placed.
11. Do not place slabs on ground if temperature is below 40 Deg F or if temperature surrounding the slab will be below 40 Deg F before structure is enclosed and heated.
12. During periods not defined as cold weather, but when freezing temperatures are expected or occur, protect concrete surfaces from freezing for the first seventy-two (72) hours.

D. Hot Weather Concrete Placement:

1. For this Detailed Provision Section, “hot weather” is defined as any combination of high air temperatures, low relative humidity and wind velocity which produces a rate of evaporation as estimated in ACI 305R, approaching or exceeding 0.2 pounds per square foot per hour (lb/sq ft/hr).
2. Batch, deliver, place, cure and protect concrete during hot weather in compliance with the recommendations of ACI 305R and the additional requirements of this Section.
 - a. Temperature of concrete being placed shall not exceed 90 Deg F. Maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall not cause loss of slump, flash set or cold joints.
 - b. Promptly deliver concrete to the site and promptly place the concrete upon its arrival at the site, not exceeding the maximum time interval specified in Paragraph 3.02.A.10. Provide vibration immediately after placement.
 - c. The County may direct the Contractor to immediately cover concrete with sheet curing material.
3. Review the hot weather concreting plan at the preconstruction meeting. Include the methods and procedures for use during hot weather including production, placement, and curing.
4. Cool ingredients before mixing, or add flake ice or well crushed ice of a size that will melt completely during mixing for all or part of mixing water if high temperature, low slump, flash set, cold joints, or shrinkage cracks are encountered.
5. Temperature of concrete when placed:
 - a. Not to exceed 90 Deg F.
 - b. Not so high to cause:
 - 1) Shrinkage cracks.
 - 2) Difficulty in placement due to loss of slump.
 - 3) Flash set.
6. Temperature of forms and reinforcing when placing concrete:
 - a. Not to exceed 90 Deg F.
 - b. May be reduced by spraying with water to cool below 90 Deg F.
 - 1) Leave no standing water to contact concrete being placed.

E. Consolidating:

1. Consolidate in accordance with ACI 309R except as modified herein.

2. Consolidate by vibration so that concrete is thoroughly worked around reinforcement, embedded items and into corners of forms.
 - a. Eliminate:
 - 1) Air or stone pockets.
 - 2) Honeycombing or pitting.
 - 3) Planes of weakness.
 3. Internal vibrators:
 - a. Minimum frequency of 8,000 vibrations per minute.
 - b. Insert and withdraw at points approximately 18-inches apart.
 - 1) Allow sufficient duration at each insertion to consolidate concrete but not to cause segregation.
 - c. Use in:
 - 1) Beams and girders of framed slabs.
 - 2) Columns and walls.
 - d. Size of vibrators shall be in accordance with ACI 309R, Table 5.1.5.
 4. Obtain consolidation of slabs with internal vibrators, vibrating screeds, roller pipe screeds, or other approved means.
 5. Do not use vibrators to transport concrete within forms.
 6. Provide spare vibrators on jobsite during all concrete placing operations.
 7. Bring a full surface of mortar against form by vibration supplemented if necessary by spading to work coarse aggregate back from formed surface, where concrete is to have an as-cast finish.
 8. Use suitable form vibrators located just below top surface of concrete, where internal vibrators cannot be used in areas of congested reinforcing.
 9. Prevent construction equipment, construction operations, and personnel from introducing vibrations into freshly placed concrete after the concrete has been placed and consolidated.
- F. Handle concrete from mixer to place of final deposit by methods which will prevent segregation of loss of ingredients and in a manner which will assure that required quality of concrete is maintained.
1. Use truck mixers, agitators, and non-agitating units in accordance with ASTM C94.
 2. Horizontal belt conveyors:
 - a. Mount at a slope which will not cause segregation or loss of ingredients.
 - b. Protect concrete against undue drying or rise in temperature.
 - c. Use an arrangement at discharge end to prevent segregation.
 - d. Do not allow mortar to adhere to return length of belt.

- e. Discharge conveyor runs into equipment specially designed for spreading concrete.
- 3. Metal or metal line chutes:
 - a. Slope not exceeding 1 vertical to 2 horizontal (1V:2H) and not less than 1 vertical to 3 horizontal (1V:3H).
 - b. Chutes more than 20 feet long and chutes not meeting slope requirements may be used provided they discharge into a hopper before distribution.
 - c. Provide end of each chute with a device to prevent segregation.
- 4. Pumping or pneumatic conveying equipment:
 - a. Designed for concrete application and having adequate pumping capacity.
 - b. Control pneumatic placement so segregation is avoided in discharged concrete.
 - c. Loss of slump in pumping or pneumatic conveying equipment shall not exceed 1½-inch.
 - d. Do not convey concrete through pipe made of aluminum or aluminum alloy.
 - e. Provide pumping equipment without Y sections.

3.04 JOINTS AND EMBEDDED ITEMS

A. Construction Joints – General:

1. Locate joints as indicated on Contract Drawings or as shown on approved Shop Drawings.
 - a. Where construction joint spacing shown on Drawings exceeds the joint spacing indicated in Paragraph B. below, submit proposed construction joint location in conformance with this Detailed Provisions Section.
2. Unplanned construction joints will not be allowed.
 - a. If concrete cannot be completely placed between planned construction joints, then it must be removed.
3. In general, locate joints near middle of spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case, offset joint in girder a distance equal to twice the width of the beam.
4. Locate joints in walls and columns at underside of floors, slabs, beams, or girders, and at tops of foundations or floor slabs, unless shown otherwise.
 - a. At Contractor's option, beam pockets may be formed into concrete walls.
 - b. Size pockets to allow beam reinforcing to be placed as detailed on Drawings.
5. Place beams, girders, column capitals and drop panels at same time as slabs.
6. Make joints perpendicular to main reinforcement with all reinforcement continuous across joints.

7. Provide roughened construction joints at all construction joints unless indicated otherwise.
 - a. Clean the previously hardened concrete interface and remove all laitance.
 - b. Intentionally roughen the interface to a full amplitude of ¼-inch.
 - c. Provide recessed flat surface as required to install strip type waterstops.
 8. Provide continuous keyways only where indicated.
 - a. Construction joint keyways in walls, as indicated on Drawings.
 - b. Construction joint keyways in footings, foundations, base slabs, and structural or elevated slabs as indicated.
 9. Allow a minimum of forty-eight (48) hours before placement of adjoining concrete construction.
- B. Construction Joints – Spacing:
1. Structures not intended to contain liquid:
 - c. Base slab, floor, and roof slab construction joints as indicated on Drawings.
- C. Construction Joints – Bonding:
1. Obtain bond between concrete pours at construction joints by thoroughly cleaning and removing all laitance from construction joints.
 - a. Before new concrete is placed, all construction joints shall be coated with cement grout, or dampened.
 - 1) General: Use cement grout or dampening for all construction joints.
 2. Roughened construction joints:
 - a. Roughen the surface of the concrete to expose the aggregate uniformly.
 - b. Remove laitance, loosened particles of aggregate or damaged concrete at the surface, or at the Contractor's option, use an approved chemical retarder which delays but does not prevent setting of the surface of the mortar in accordance with the manufacturer's recommendations.
 - 1) Retarded mortar shall be removed within twenty-four (24) hours after placing to produce a clean exposed aggregate bonding surface.
 - c. Cover the hardened concrete of horizontal joints with a coat of cement grout of similar proportions to the concrete, except substitute fine aggregate for coarse aggregate.
 - d. Place 1-inch layer of grout in bottoms of wall or column lifts immediately before placing concrete.
 - 1) Vibrate grout and first layer of concrete simultaneously.
 - e. Place fresh concrete before the grout has attained its initial set.

3. Other keyed construction joints:
 - a. Thoroughly clean construction joints and remove all laitance.
 - b. Dampen the hardened concrete (but do not saturate) immediately prior to placing of fresh concrete.
- D. Locate control joints in slabs on grade as indicated on Drawings.
 1. Time cutting properly with set of concrete, if saw cut joints are required or permitted.
 - a. Start cutting as soon as concrete has hardened sufficiently to prevent aggregates being dislodged by saw.
 - b. Complete before shrinkage stresses become sufficient to produce cracking.
 2. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - a. Grooved Joints: Form joints after initial floating by grooving and finishing each edge of joint to a radius of $\frac{1}{8}$ -inch. Repeat grooving of joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - b. Sawed Joints: Form joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut $\frac{1}{8}$ -inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random cracks. Seal all sawed joints with polyurea joint filler.
- E. Isolation Joints in Slabs on Grade:
 1. After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
- F. Expansion Joints:
 1. Do not permit reinforcement or other embedded metal items bonded to concrete (except smooth dowels bonded on only one (1) side of joint) to extend continuously through an expansion joint.
 2. Use neoprene expansion joint fillers, unless noted otherwise.
 3. Seal expansion joints with sealant backer rod and/or compressible filler as shown on the Drawings.
- G. Other Embedded Items:
 1. Place sleeves, inserts, anchors, and embedded items required for adjoining Work or for its support, prior to initiating concreting.
 2. Do not place electrical conduit, drains, or pipes in or thru concrete slabs, walls, columns, foundations, beams or other structural members unless approved by the County.
- H. Placing Embedded Items:
 1. Position expansion joint material and other embedded items accurately.

2. Support against displacement.
3. Fill voids in sleeves, inserts and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.

3.05 FINISHING

- A. See Detailed Provisions Section 03 3132 – Concrete Finishing and Repair of Surface Defects.
- B. Coordinate mixing and placing with finishing.

3.06 INSTALLATION OF GROUT

- A. Grout Schedule of Use:
 1. Sand cement grout:
 - a. General use.
 2. Non-shrinking, non-metallic grout:
 - a. Filling form tie holes.
 - b. Under column and beam base plates.
 - c. Other uses indicated on the Drawings.
 3. Epoxy grout:
 - a. Patching cavities in concrete.
 - b. Other uses indicated on the Drawings.
- B. Grout Installation:
 1. Sand cement grout:
 - a. Cure grout by one (1) of methods specified.
 2. Non-shrink, non-metallic grout:
 - a. Clean concrete surface to receive grout.
 - b. Saturate concrete with water for twenty-four (24) hours prior to grouting.
 - c. Mix in a mechanical mixer.
 - d. Use no more water than necessary to produce flowable grout.
 - e. Place in accordance with manufacturer's instructions.
 - f. Provide under beam, column, and equipment base plates, in joints between precast concrete filter slabs, and in other locations indicated on the Drawings.
 - g. Completely fill all spaces and cavities below the top of base plates.
 - h. Provide forms where base plates and bed plates do not confine grout.
 - i. Where exposed to view, finish grout edges smooth.

- j. Except where a slope is indicated on the Drawings, finish edges flush at the base plate, bed plate, member or piece of equipment.
 - k. Coat exposed edges of grout with cure or seal compound recommended by the grout manufacturer.
3. Epoxy grout:
- a. Mix and place in accordance with manufacturer's instructions.
 - b. Apply only to clean, dry, sound surface.
 - c. Obtain manufacturer's field technical assistance as required to assure proper placement.

3.07 CURING AND PROTECTION

- A. Protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury immediately after placement, and maintain with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement, hardening, and compressive strength gain.
- 1. Comply with ACI 306R for cold-weather protection during curing.
 - 2. Comply with ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lbs/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. In accordance with ACI 308.1, apply one of the following curing procedures immediately after completion of placement and finishing, for concrete surfaces not in contact with forms.
- 1. Moisture Curing: Keep surfaces continuously moist for not less than seven (7) days.
 - 2. Moisture-Retaining Cover Curing: Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12-inches, and sealed by waterproof tape or adhesive. Cure for not less than seven (7) days. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Application of waterproof sheet materials, conforming to ASTM C171.
 - 3. Curing Compound: Application of a curing compound conforming to ASTM C309.
 - a. Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's recommendations immediately after any water sheen which may develop after finishing has disappeared from concrete surface.
 - b. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.

- c. Do not use on any surface against which additional concrete or other material is to be bonded unless it is proven that curing compound will not prevent bond.
- d. Where a vertical surface is cured with a curing compound, the vertical surface shall be covered with a minimum of two (2) coats of the curing compound.
 - 1) Apply the first coat of curing compound to a vertical surface immediately after form removal.
 - 2) The vertical concrete surface at the time of receiving the first coat shall be damp with no free water on the surface.
 - 3) Allow the preceding coat to completely dry prior to applying the next coat.
 - 4) A vertical surface: Any surface steeper than 1 vertical to 4 horizontal (1V:4H).

D. Curing Concrete in Contact with Forms:

- 1. Minimize moisture loss from and temperature gain of concrete placed in forms exposed to heating by sun by keeping forms wet and cool until they can be safely removed.
- 2. After form removal, cure concrete until end of time prescribed.
 - a. Use one (1) of methods listed above.
- 3. Forms left in place shall not be used as a method of curing in hot weather.
- 4. In hot weather, remove forms from vertical surfaces as soon as concrete has gained sufficient strength so that the formwork is no longer required to support the concrete.

E. Continue curing for at least seven (7) days for all concrete except high early strength concrete for which period shall be at least three (3) days.

- 1. If one of curing procedures indicated above is used initially, it may be replaced by one of other procedures indicated any time after concrete is one (1) day old, provided concrete is not permitted to become surface dry during transition.

F. Cold Weather:

- 1. Follow recommendations of ACI 306R.
- 2. Maintain temperature of concrete between 50 and 70 Deg F for required curing period, when outdoor temperature is 40 Deg F, or less.
- 3. Use heating, covering, insulating, or housing of the concrete work to maintain required temperature without injury due to concentration of heat.
- 4. Do not use combustion heaters unless precautions are taken to prevent exposure of concrete to exhaust gases which contain carbon dioxide.
- 5. Interior slabs in areas intended to be heated shall be adequately protected so that frost does not develop in the supporting subgrade.

G. Hot Weather:

1. Follow recommendations of ACI 301.
2. Make provision for cooling forms, reinforcement and concrete, windbreaks, shading, fog spraying, sprinkling, ponding, or wet covering with a light colored material.
3. Provide protective measures as quickly as concrete hardening and finishing operations will allow.

H. Rate of Temperature Change:

1. Keep changes in temperature of air immediately adjacent to concrete as uniform as possible, during and immediately following curing period.
2. Do not exceed a temperature change of 5 Deg F in any one (1) hour or 50 Deg F in any twenty-four (24) hour period.

I. Protection from Mechanical Injury:

1. Protect concrete from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration.
2. Protect finished concrete surfaces from damage by construction equipment, materials, or methods, and by rain or running water.
3. Do not load self-supporting structures in such a way as to overstress concrete.

3.08 CLEAN UP

- A. Upon completion of all concrete work and before Substantial Completion, the Contractor shall remove all tools, surplus materials, apparatus, debris, etc., from the site and the site shall be left in a clean, neat, and acceptable condition to the County.
- B. Hardened concrete material accumulated in the designated washout area for the Project shall be recycled by the Contractor, using a “no charge” account, at the Blythe Sanitary Landfill. The Contractor shall break-up material to the County’s satisfaction, load, and haul the material through the Blythe Sanitary Landfill fee booth/scale and unload material in an area within the landfill unit designated for construction and demolition (C&D) debris recycling. The material shall be accepted by the County as “beneficial reuse” material for future use at the landfill for soil stabilization projects.

3.09 FIELD QUALITY CONTROL

- A. Tests in accordance with Detailed Provisions Section 03 0505 – Concrete Testing.
 1. Perform a strength test on all concrete to which water or superplasticizer, above the amount stated in the approved concrete mix design, has been added.
 - a. Perform sampling after water or superplasticizer has been added and additional mixing has been performed.

- B. All cracks wider than $\frac{1}{64}$ -inch in new concrete appearing within six (6) months of concrete placement shall be repaired using epoxy adhesive injection by the Contractor at no cost to the County.

END OF SECTION 03 3131

SPECIFICATIONS – DETAILED PROVISIONS

SECTION 03 3132: CONCRETE FINISHING AND REPAIR OF SURFACE DEFECTS

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SECTION 03 3132

CONCRETE FINISHING AND REPAIR OF SURFACE DEFECTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: This Work consists of providing concrete surface finishes and repairing surface finishes of all defects.
 - 1. This Work includes but is not limited to:
 - a. Structural Foundations/Footings.
 - b. Structural Slabs, girders, beams, and columns.
 - c. Structural walls, stem walls, and curbs.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Section 03 1113 – Formwork – Structural Cast-In-Place Concrete
 - 2. Section 03 3100 – Cast-In-Place Structural Concrete
 - 3. Section 03 3131 – Concrete Mixing, Placing, Jointing and Curing

1.02 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. ACI 301 – Specification for Structural Concrete.
 - b. ACI CT – Concrete Terminology.
 - 2. American Society for Testing and Materials (ASTM):
 - a. ASTM C150 – Standard Specification for Portland Cement.
 - b. ASTM D4258 – Standard Practice for Surface Cleaning Concrete for Coating.
 - c. ASTM D4259 – Standard Specification for Abrading Concrete.
 - 3. The Society for Protective Coatings/NACE International (SSPC/NACE):
 - a. SSPC/NACE No. 6 – Surface Preparation of Concrete
- B. Qualifications:
 - 1. Manufacturer of acrylic epoxy surface/filler shall have minimum of five (5) years of experience in manufacturing of same with documented performance history for similar installations.
 - 2. Installer/applicator of acrylic epoxy surfacer/filler shall have minimum of three (3) years of experience installing similar materials and shall be licensed or approved in writing by manufacturer to install/apply this product.

1.03 DEFINITIONS

A. Vertical Surface Defects:

1. Any void in the face of the concrete deeper than 1/8-inch, such as:
 - a. Tie holes.
 - b. Air pockets (bug holes).
 - c. Honeycombs.
 - d. Rock holes.
2. Scabbing:
 - a. Scabbing is defect in which parts of the form face, including release agent, adhere to concrete.
3. Foreign material embedded in face of concrete.
4. Fins 1/16-inch or more in height.

B. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project Location.
2. Installer or applicator are synonymous.

C. Other words and terms used in this Detailed Provisions Section are defined in ACI CT.

1.04 SUBMITTALS

A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.

B. Approval Submittals:

1. Product technical data, including, but not limited to:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.

C. Quality Assurance Submittals:

1. Certifications:
 - a. Certification of aggregate gradation.
 - b. Certification that products being used will not interfere with bonding of future floor or wall finishes.

1.05 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's recommendations and requirements for materials used.

- B. Materials shall be delivered to the jobsite in sealed, undamaged containers. Each container shall be clearly marked with manufacturer's label showing type of material, color and lot number.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Bonding agents:
 - a. Euclid Chemical Company; www.euclidchemical.com
 - a. L&M Construction Chemicals a part of LATICRETE, Inc.; www.lmcc.com
 - b. Master Builders Solutions by BASF; www.master-builders-solutions.basf.us
 - c. Or approved equal.
- B. Submit request for substitution in accordance with Detailed Provisions Section 01 6000 – Product Requirements.

2.02 MATERIALS

- A. Bonding Agent:
 - 1. For use only on concrete surfaces not receiving liquid water repellent coating:
 - a. High solids acrylic latex base liquid for interior or exterior application as a bonding agent to improve adhesion and mechanical properties of concrete patching mortars.
 - 2. For use only on concrete surface receiving liquid water repellent:
 - a. Non-acrylic base liquid for interior or exterior application as a bonding agent to improve adhesion and mechanical properties of concrete patching mortars.
- B. Cement:
 - 1. ASTM C150, Type II Portland.
- C. Aggregate:
 - 1. Sand: Maximum size #30 mesh sieve.
 - 2. For exposed aggregate finish surfaces: Same as surrounding floor and/or wall.
- D. Water: Potable.
- E. Non-Shrink Grout: See Detailed Provisions Section 03 3100 – Cast-In-Place Structural Concrete and Detailed Provisions Section 03 3131 – Concrete Mixing, Placing, Jointing and Curing.

2.03 MIXES

- A. Bonding Grout: One (1) part cement to one (1) part aggregate.
- B. Patching Mortar:
 - 1. One (1) part cement to two and one-half (2½) parts aggregate by damp loose volume.
 - a. Substitute white Portland cement for a part of gray Portland cement to produce color matching surrounding concrete.

PART 3 EXECUTION

3.01 PREPARATION

- A. For methods of curing, see Detailed Provisions Section 03 3131 – Concrete Mixing, Placing, Jointing and Curing.
- B. Preparation of Bonding Grout Mixture:
 - 1. Mix cement and aggregate.
 - 2. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions.
 - 3. Add bonding agent/water mixture to cement/aggregate mixture.
 - 4. Mix to consistency of thick cream.
 - 5. Bonding agent itself may be used as bonding grout if approved by manufacturer and County.
- C. Preparation of Patching Mortar Mixture:
 - 1. Mix cement and aggregate.
 - 2. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions.
 - 3. Add only enough bonding agent/water mixture to cement/aggregate mixture to allow handling and placing.
 - 4. Let stand with frequent manipulation with a trowel, until mix has reached stiffest consistency to allow placement.
- D. Clean surfaces in accordance with ASTM D4258 to remove dust, dirt, form oil, grease, or other contaminants prior to abrasive blasting, chipping, grinding or wire brushing.
 - 1. Abrasive blast surfaces in accordance with ASTM D4259 and SSPC/NACE No. 6 to completely open defects down to sound concrete and remove laitance.
 - a. If additional chipping or wire brushing is necessary, make edges perpendicular to surface or slightly undercut.
 - b. No feathered edges will be permitted.

2. Rinse surface with clean water and allow surface water to evaporate prior to repairing surface defects.

E. Repairing Surface Defects:

1. Fill and repair using patching mortar mix specified in Section 2.03.
 - a. Use non-shrink grout to fill tie-holes as outlined in this Detailed Provisions Section.
2. If required by bonding agent manufacturer, etch surfaces with a muriatic acid solution followed by a thorough rinse with clean water.
 - a. Test concrete to determine pH level and continue flushing with clean water until surface pH is within acceptable limits.
3. Dampen area to be patched and an area at least 6-inches wide surrounding it prior to application of bonding grout.
4. Brush bonding grout into the surface after the surface water has evaporated.
5. Allow bonding grout to set for period of time required by bonding agent manufacturer before applying premixed patching mortar.
6. Fill tie-holes with non-shrink nonmetallic grout.
 - a. Where exposed to view and scheduled to receive concrete Finish #2 or #5, hold grout below surface of concrete and fill with patching mortar to match surrounding concrete.
7. Fill all other defects with patching mortar.
 - a. Match color of surrounding floor and/or wall.
 - b. Do not use acrylic bonding agent in patching mortar for filling defects in surfaces to be treated with liquid water repellent.
8. Consolidate grout or mortar in place and strike off so as to leave patch slightly higher than surrounding surface.
9. Leave undisturbed for at least sixty (60) minutes before finishing level with surrounding surface.
 - a. Do not use metal tools in finishing a patch in a formed wall which will be exposed or coated with other materials.
10. Keep areas damp in accordance with grout manufacturer or bonding agent manufacturer's directions.

3.02 INSTALLATION AND APPLICATION

- A. Do not repair surface defects or apply wall or floor finishes when temperature is or is expected to be below 50 Deg F.
 - 1. If necessary, enclose and heat area to between 50 and 70 Deg F during repair of surface defects and curing of patching material.
 - a. Use only clean fuel, indirect fired heating apparatus.
- B. Concrete Finishes for Vertical Wall Surfaces:
 - 1. General: Give concrete surfaces finish as specified below after removal of formwork and repair of surface defects.
 - 2. Finish #1 – As cast rough form finish:
 - a. Selected forming materials are not required.
 - b. Prepare surface in accordance with Section 3.01 and repair the following surface defects:
 - 1) Tie holes.
 - 2) Honeycombs deeper than 1/4-inch.
 - 3) Air pockets deeper than 1/4-inch.
 - 4) Rock holes deeper than 1/4-inch.
 - c. Chip or rub off fins exceeding 1/4-inch in height.
 - d. Use at unexposed surfaces such as foundations and backfilled surfaces of walls not to be waterproofed.
 - 3. Finish #2 – As cast form finish:
 - a. Form facing material shall produce a smooth, hard, uniform texture.
 - 1) Use forms specified for surfaces exposed to view in accordance with Detailed Provisions Section 03 11 13 – Formwork – Structural Cast-In-Place Concrete.
 - b. Prepare surface in accordance with Section 3.01 and repair the following surface defects.
 - 1) Tie holes.
 - 2) Honeycombs deeper than 1/4-inch or larger than 1/4-inch diameter.
 - 3) Air pockets deeper than 1/4-inch or larger than 1/4-inch diameter.
 - 4) Rock holes deeper than 1/4-inch or larger than 1/4-inch diameter.
 - 5) Scabbing.
 - c. Chip or rub off fins exceeding 1/8-inch in height.
 - 1) Finish shall provide uniform color and texture.

d. Provide this finish for:

- 1) Inside walls of wet walls, basins, secondary containment, maintenance vaults, and pipe trenches.
- 2) Walls being waterproofed and coated with some other material.
- 3) Exposed surfaces not specified to receive another finish.

C. Related Unformed Surfaces (Except Slabs)

1. Strike smooth and level tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces after concrete is placed.
2. Float surface to a texture consistent with that of formed surfaces.
 - a. If more than one (1) finish occurs immediately adjacent to unformed surface, provide surface with most stringent formed surface requirement.
3. Continue treatment uniformly across unformed surfaces.

D. Concrete Finishes for Horizontal Slab Surfaces:

1. General:

- a. Tamp concrete to force coarse aggregate down from surface.
- b. Screed with straightedge, eliminate high and low places, bring surface to required finish elevations; slope uniformly to drains.
- c. Dusting of surface with dry cement or sand during finishing processes not permitted.

2. Unspecified slab finish:

- a. When type of finish is not indicated, use following finishes as applicable:
 - 1) Floors: Broom, belt or trowled finish.
 - 2) Maintenance areas floors and ramps: Broom or belt finish.
 - 3) Exterior slabs, sidewalks, platforms, steps and landings, and ramps, not covered by other finish materials: Broom or belt finish.
 - 4) All slabs to receive a floated finish before final finishing.

3. Scratched slab finish: After concrete has been placed, consolidated, struck off, and leveled to a Class B tolerance, roughen surface with stiff brushes or rakes before final set.

4. Floated finish:

- a. After concrete has been placed, consolidated, struck off, and leveled, do no further work until ready for floating.
- b. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operations.
 - 1) Use wood or cork float.

- c. During or after first floating, check planeness of entire surface with a 10-foot straightedge applied at not less than two (2) different angles.
 - d. Cut down all high spots and fill all low spots to produce a surface with Class B tolerance throughout.
 - e. Refloat slab immediately to a uniform texture.
5. Troweled finish:
- a. Float finish surface to true, even plane.
 - b. Power trowel, and finally hand trowel.
 - c. First troweling after power troweling shall produce a smooth surface which is relatively free of defects, but which may still show some trowel marks.
 - d. Perform additional trowelings by hand after surface has hardened sufficiently.
 - e. Final trowel when a ringing sound is produced as trowel is moved over surface.
 - f. Thoroughly consolidate surface by hand troweling.
 - g. Leave finished surface essentially free of trowel marks, uniform in texture and appearance and plane to a Class A tolerance.
 - h. On surfaces intended to support floor coverings, remove any defects that would show through floor covering by grinding.
6. Broom or belt finish: Immediately after concrete has received a float finish as specified, give it a transverse scored texture by drawing a broom or burlap belt across surface.
7. Underside of concrete slab finish:
- a. Match finish as specified for adjacent vertical surfaces.
 - b. If more than one (1) finish occurs immediately adjacent to underside of slab surface, provide surface with most stringent formed surface requirement.

3.03 FIELD QUALITY CONTROL

- A. Horizontal slab finishes will be accepted provided:
- 1. Applicable specification requirements are satisfied.
 - 2. Water does not pond in areas sloped to drain.
 - 3. Gap between a 10-foot straightedge placed anywhere and the finished surface does not exceed:
 - a. Class A tolerance: $\frac{1}{8}$ -inch.
 - b. Class B tolerance: $\frac{1}{4}$ -inch.
 - c. Class C tolerance: $\frac{1}{2}$ -inch.
 - 4. Accumulated deviation from intended true plane of finished surface does not exceed $\frac{1}{2}$ -inch.

5. Accuracy of floor finish does not adversely affect installation and operation of movable equipment, floor supported items, or items fitted to floor (doors, tracks, etc.).
- B. Unacceptable finishes shall be replaced or, if approved in writing by County, may be corrected provided strength and appearance are not adversely affected.
 1. High spots to be removed by grinding and/or low spots filled with a patching compound or other remedial measures to match adjacent surfaces.

END OF SECTION 03 3132

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 26 0500: BASIC ELECTRICAL REQUIREMENTS
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SECTION 26 0500

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Requirements of this Detailed Provisions Section apply to all electrical systems provided on the Project including those found in other Divisions even if not specifically referenced in individual Articles of those Detailed Provisions Sections.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements.
2. Division 26 – Electrical.

1.02 QUALITY ASSURANCE

A. Qualifications of Manufacturers

1. Furnish manufacturer's electrical equipment of type specified which has successfully operated for not less than the past two (2) years except where specific types are named by manufacturer and catalog or designation under other sections of Division 26.

B. Factory Tests

1. Factory tests are required for all electrical equipment and assemblies, i.e. applicable to the specific Project. Perform factory tests in accordance with the codes and standards specified as applicable to the equipment. Items to be factory tested shall include, but not limited to:
 - a. Solid State Starters
 - b. Induction Motors
 - c. Variable Frequency Drives (VFDs)
 - d. Motor Control Centers
 - e. Service and Distribution Boards
 - f. Programmable Logic Controllers (PLCs)
 - g. Referenced Codes and Standards
2. Provide electrical equipment and materials, including installation, conforming to the following latest codes and standards, as applicable. The equipment and materials shall bear labels to indicate manufacturing conformance to the specified standards or equal. Where two (2) codes or standards are at variance, conform to the more restrictive requirement:
 - a. Aluminum Association (AA)

- b. American National Standards Institute (ANSI)
- c. American Society for Testing and Materials (ASTM)
- d. California Building Code (CBC), Title 24, Parts 1 and 2
- e. California Code of Regulations (CCR), Title 8, Subchapter 5
- f. California Electrical Code (CEC), Title 24, Part 3
- g. California Fire Code (CFC), Title 24, Part 9
- h. California Occupational Safety and Health Administration (CalOSHA)
- i. California State Fire Marshall
- j. Certified Ballast Manufacturers Standards
- k. Illuminating Engineering Society Handbook Standards
- l. Institute of Electrical and Electronic Engineers (IEEE)
- m. Insulated Power Cable Engineers Association Standards
- n. International Electrotechnical Commission (IEC)
- o. National Electrical Code (NEC)
- p. National Electrical Manufacturers' Association (NEMA)
- q. National Electrical Safety Code
- r. National Electrical Testing Association (NETA)
- s. National Fire Protection Association (NFPA)
- t. Underwriters Laboratories (UL)

1.03 DEFINITIONS

- A. For the purposes of providing materials and installing electrical work the following definitions shall be used.
 - 1. Outdoor area: Exterior locations where the equipment is normally exposed to the weather and including below-grade structures, such as handholes, pull boxes, and vaults. This also includes structures that are not completely enclosed on all sides and are not provided with a climate control system.
 - 2. Architecturally finished interior area: Areas within enclosed buildings that are occupied workspaces such as offices, conference rooms, and other similar occupied spaces.
 - 3. Non-architecturally finished interior area: Electrical rooms, communication rooms, maintenance facilities, garage, shed, warehouses, and other similar process type rooms.
 - 4. Corrosive area: Areas identified in the Project Drawings where there is a varying degree of spillage or splashing of corrosive materials such as water, wastewater or chemical solutions; or chronic exposure to corrosive, caustic or acidic agents,

chemicals, chemical fumes or chemical mixtures.

5. Hazardous areas: Class I, II, or III areas as defined in NFPA 70.

1.04 UTILITY COMPANY REQUIREMENTS

- A. Contractor shall comply with utility standards and coordinate installations with SCE as necessary. Contractor shall coordinate utility approval of switchboard Shop Drawings prior to ordering equipment.
- B. The serving utility for the Project is Southern California Edison (SCE).
- C. Comply with all SCE requirements for utility service as follows:
 1. SCE Electrical Service Requirements,
www.sce.com/nrc/aboutsce/regulatory/distributionmanuals/esr.pdf
 2. SCE Underground Structures Standards,
www.sce.com/nrc/aboutsce/regulatory/distributionmanuals/ugs.pdf

1.05 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. General Requirements:
 1. Provide manufacturer's technical information on products to be used, including product descriptive bulletin.
 2. Include data sheets that include manufacturer's name and product model number. Clearly identify all optional accessories.
 3. Acknowledgement that products are UL listed or constructed utilizing UL recognized components.
 4. Manufacturer's delivery, storage, handling, and installation instructions.
 5. Product schematic wiring diagrams and connection wiring diagram.
 6. See individual Detailed Provisions Sections for any additional requirements.
- C. Shop Drawings
 1. Time Schedules for Submission and Ordering: The Contractor shall prepare, review and coordinate their schedule of submissions carefully, determining the necessary lead time for preparing, submitting, checking, ordering and delivery of materials and equipment for timely arrival. The Contractor shall be responsible for conformance with the overall construction schedule. The Contractor shall not deliver any equipment or material before completion of submittal review and approval by the County.
 2. Submit, for County approval, Shop Drawings to the extent required in the Contract Documents. Submit Shop Drawings for the following:
 - a. Switchboards/Panelboards

- b. Induction Motors
 - c. Nameplates for Equipment
 - d. Pull Boxes (24-inches square and larger)
 - e. Solid State Starters
 - f. Programmable Logic Controllers (PLCs)
 - g. Transfer Switches
 - h. Variable Frequency Drives (VFDs)
3. Submittals will be checked for general compliance with specifications. The Contractor shall be responsible for deviations from the Drawings and/or Specifications and for errors or omissions of any sort in submittals
 4. Submit data for earthquake design and restraint with the Shop Drawing submittals for all switchgear and motor control centers. Include details for anchoring of same. Calculations and details shall be stamped by a California registered “Civil” or “Structural” engineer.
 5. Submit a complete list of materials and equipment proposed for the job, including manufacturer’s names and catalog numbers. Complete equipment description, operation, and installation data shall be submitted with Shop Drawings. Shop Drawings shall include, but are not limited to the following:
 - a. Dimensions and weights of equipment.
 - b. Nameplate data including the nameplate material, heights of letters and inscriptions.
 - c. Details showing enlarged views of small parts when required.
 - d. Plans showing the equipment assembly, space requirements, clearances, and locations for conduits and anchor bolts.
 - e. Elevations showing the vertical components, positions and arrangement of equipment.
 6. Shop Drawings shall be submitted in completed groups of materials (i.e. switchgear).
 7. Bind catalog cuts, plate numbers, descriptive bulletins and drawings, 11” x 17” or smaller, in sets with covers neatly showing titles. In addition to hard copies, provide digital copies of all Shop Drawings in Adobe Acrobat PDF format.
 8. Where current limiting devices are specified, submit technical data to substantiate adequate protection of equipment cascaded downstream. Submittals shall not be reviewed unless supporting calculations and data are submitted.
 9. For any material specified to meet UL of trade standards, furnish the manufacturer’s or vendor’s certification that the material furnished for the Work does in fact equal or exceed such Specifications.

D. Protective Device Coordination Study

1. Submit a protective device coordination study in accordance with IEEE Standard 242 (Buff Book).
2. Provide time-current curves graphically indicating the coordination proposed for the system, centered on conventional, full-size log-log forms. Include with each curve sheet a complete title and one-line diagram with legend identifying the specific portion of the system covered by that particular curve sheet. Include a detailed description of each protective device, identifying its type, function, manufacturer, and time-current characteristics. Tabulate recommended device tap, time dial, pickup, instantaneous, and time delay settings.
3. Include on curve sheet, power company relay and fuse characteristics, system medium-voltage equipment relay and fuse characteristics, low-voltage equipment circuit breaker trip device characteristics, pertinent transformer characteristics, pertinent motor and generator characteristics, and characteristics of other system load protective devices, include at least all devices down to largest branch circuit and largest feeder circuit breaker in each motor control center. Include all adjustable setting ground fault protective devices. Include manufacturing tolerance and damage bands in plotted fuse characteristics. Show transformer full load and 150%, 400%, or 600% currents, transformer magnetizing inrush, ANSI transformer withstand parameters, and symmetrical and asymmetrical fault currents at each switchgear and panel board. Terminate device characteristic curves at a point reflecting the maximum symmetrical or asymmetrical fault current to which the device is exposed.
4. Arc Flash Hazard Analysis Study
 - a. Submit an Arc Flash Hazard Analysis Study per requirement set forth in NFPA 70E – Standard for Electrical Safety in Workplace. The Arc Flash Hazard Analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA 70E Annex D.
5. See Detailed Provisions Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.

E. Record As-Built Drawings

1. Prepare and submit for all Work included in Divisions 26, 32, and 33.

F. Materials List

1. Submit material lists for County review prior to purchase. The material lists shall include all products described in Divisions 26, 32, and 33, including the equipment that shall have Shop Drawings.

G. Technical Data

1. Submit descriptive and instruction manuals to the extent required under this Section and other Sections of Division 26.

H. Manufacturers Certified Reports

1. The equipment manufacturer or their authorized representative shall submit a notarized written report with respect to their equipment certifying that:
 - a. The equipment has been properly installed, wired, and connected under their supervision;
 - b. The equipment is in accurate alignment;
 - c. Manufacturer was present when equipment was placed in operation;
 - d. Manufacturer checked, inspected, and adjusted the equipment as necessary;
 - e. The equipment has been operated under full load conditions and operated satisfactorily; and
 - f. The equipment is fully covered under the terms of the warranty. Copies of all warranties shall be submitted to the County.

I. Operation and Maintenance Manuals

1. Submit complete and at one time, prior to acceptance of installation, three (3) copies of manufacturer's instructions for operation and maintenance of electrical equipment, including replacement parts lists. In addition to hard copies, provide digital copies of all data in Adobe Acrobat PDF format.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver electrical materials and equipment in manufacturer's original cartons or containers with seals intact, as applicable. Unless otherwise specified, deliver conductors in sealed cartons or on sealed reels, ends of reeled conductors factory sealed. Deliver large multicomponent assemblies in sections that facilitate field handling and installation.
- B. Unless designed for outdoor exposure, store electrical materials off the ground and under cover to prevent corrosion, contamination, or deterioration.
- C. Handle materials and equipment in accordance with manufacturer's recommendations. Lift large or heavy items only at points designated by the manufacturer. Use padded slings and hooks for lifting as necessary to prevent damage.
- D. Protect electrical materials and equipment until Final Acceptance. Protect factory painted surfaces from impact, abrasion, discoloration, and other damage. Keep electrical equipment, materials, and insulation dry at all times. Maintain heaters in equipment connected and operating until equipment is placed in operation. If partial dismantling of equipment is required for installation, box or wrap the removed parts until reinstalled. Repair or replace damaged Work as directed, at no additional cost to the County.
- E. Notify County in writing if any equipment or material is damaged. Do not repair damaged products without prior written approval from the County.
- F. All equipment handled by the Contractor shall be delivered, staged, and installed so as to avoid interference with the landfill's daily operation.

1.07 JOB CONDITIONS

- A. Project Drawings are diagrammatic and indicate the general layout of the complete Work. Locations of equipment, inserts, anchors, motors, panels, pull boxes, conduits, stub-ups, fittings, and outlets are approximate. Exercise care to secure approved headroom and clearances, and to overcome structural interference. Verify scaled dimensions, field dimensions, and conditions of the jobsite.
- B. Underground electrical lines shown on the Project Drawings are, to a degree, symbolic. When the lines are installed, they shall follow as close as possible the locations shown on the Project Drawings; however, they shall be relocated if necessary to avoid interference with other underground utilities either existing or new. The difference between the actual location and the location shown on the Project Drawings shall be kept to a minimum. All deviations from the alignments shown on the Project Drawings must be approved in writing by the County.
- C. When performing underground work, the Contractor shall call Underground Service Alert of Southern California (USA/SC) at 811, the one-call underground facility locating service two (2) Working Days prior to making an excavation. Contractor shall be responsible for such notification of Subcontractor's work, or shall require Subcontractor to assume this responsibility.
- D. Before proceeding with trenching, the Contractor shall investigate the proposed location to determine subsurface conditions or the existence of foreign pipes or ducts. If foreign substructures are found in or along the trenching path, trenching will be stopped until their purpose and ownership is investigated for proper installation of underground conduits. It may be necessary to utilize an electronic locating device or dig test holes to locate any underground obstacles.
- E. Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Excavation made with power-driven equipment is not permitted within five (5) feet of any known utility or subsurface construction. For Work immediately adjacent to or for excavations exposing a utility or other buried obstruction, the Contractor shall use hand labor or light equipment excavation. The Contractor shall start hand labor or light equipment excavation on each side of the encountered obstruction and continue until the obstruction is uncovered or until adequate clearance for the new proposed conduits are assured. The Contractor shall support uncovered substructures or other existing elements affected by the excavation until approval for backfill is granted by the County or its representative. The Contractor shall report damage to utility lines or subsurface construction immediately to the County.
- F. The Contractor shall provide temporary steel plating and shoring support for the plates, to completely cover the excavation created across roadways. Temporary steel plating must be provided by the Contractor for areas which will remain open overnight. The temporary plating shall be a minimum of 0.75-inch thickness steel, but in no case shall the thickness be less than that required to support AASHTO-H20 traffic loading. Provide a visible barrier along the excavation path on each side of the roadway with a combination of highly visible "Caution Tape" and construction cones.

- G. The Contractor shall protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion, settlement, or any other damage. The Contractor shall repair and re-establish damaged or eroded grades and slopes and restore surface conditions prior to final acceptance by the County.
- H. Coordinate electrical work with all trades, code authorities, public utilities, and County. Where two (2) or more trades interface in an area, verify that no electrical work is omitted.
- I. Keep power shutdown periods to the minimum time feasible, and only for such times and durations as approved by the County. Submit written request for outage approval at least ten (10) Working Days in advance of need, stating date, time and probable duration of the outage. Contractor shall bear all overtime costs for outages required to be performed during non-working hours.
- J. Installation areas for electrical equipment, materials, and wiring are classified as “Non-Hazardous” unless otherwise indicated or specified.

1.08 GUARANTEE AND WARRANTY

- A. Contractor shall guarantee all Work indicated in the Contract Documents. With respect to equipment, condition guarantee to cover:
 - 1. Faulty or inadequate design;
 - 2. Improper assembly or erection;
 - 3. Defective workmanship or materials; and
 - 4. Incorrect or inadequate operation or other failure.

For materials and equipment bearing a manufacturer’s warranty in excess of two (2) years, furnish a copy of the warranty to the County, who shall be named as beneficiary. Warranties shall provide for timely repair and/or replacement of any components or systems found to not be functioning within their intended parameters as specified in the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Provide new materials and equipment as required to complete all indicated and specified electrical work, including incidental items inferable from the Contract Documents that are necessary to complete the Work. Provide materials and equipment of latest design, standard products or established manufacturers. For uniformity, only one (1) manufacturer is acceptable for each type of product. Manufacture individual parts to standard sizes and gages so repair parts can be installed in the field. Make like parts of duplicate units interchangeable. Do not place equipment in service at any time prior to delivery except as required for factory or shop tests. Notify County in writing if any equipment or material is damaged. Do not repair damaged products without written approval from the County.

- B. All electrical materials and equipment shall be listed by UL and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom-made equipment must have complete test data submitted by the manufacturer attesting to its safety.
- C. All switchboards, distribution boards, panel boards and circuit breakers shall be of the same manufacturer.
- D. All wiring devices such as switches and receptacles shall be of the same manufacturer.
- E. Outdoor electrical equipment shall be weatherproof, NEMA 3R unless indicated or specified otherwise.
- F. Unless specified otherwise, the sheet metal surfaces of equipment enclosures shall be phosphatized and coated with a rust resisting primer. Over the primer, apply a corrosion resistant baked enamel finish on the interior and exterior metal surfaces. The exterior color shall be ASA No. 49 medium light gray. The interior color shall be white. Hardware shall have a corrosion resistant finish.
- G. Aluminum conductors are not acceptable unless approved by the County for each use and location.

PART 3 EXECUTION

3.01 GENERAL

- A. Install electrical work in accordance with the codes and standards specified, except where more stringent requirements are indicated or specified. Verify that materials and equipment properly fit the installation space with clearances conforming to the codes and standards specified except where greater clearance is indicated. Perform Work as required to correct improper installations, at no additional cost to the County.
- B. Location of Openings
 - 1. Locate chases, shafts and openings required for the installation of the electrical work during framing of the structure. Do any additional cutting and patching required. Wherever conduit extends through roof, install flashings. Cutting or drilling in any structural member is prohibited without County approval. Furnish all access panels to make all boxes, connections and devices accessible as required by County.
- C. Location of Sleeves
 - 1. Where conduits pass through concrete walls, slabs or metal deck floors, install sleeves of adequate size to permit installation of conduit. Sleeves shall be installed prior to pouring of concrete and shall have ends flush with wall or extend 2-inches above floor surfaces.

3.02 SUPERVISION

- A. Assign a competent representative to supervise the electrical construction work from beginning to completion and Final Acceptance.

3.03 WORKMANSHIP

- A. Employ skilled craftsmen experienced in installation of the types of electrical materials and equipment specified. Use specialized installation tools and equipment as applicable. Produce acceptable installations free of defects.

3.04 PREPARATION AND CLEAN UP

- A. Prior to installing electrical work, ensure the installation areas are clean. Maintain areas in a broom-clean condition during installation operations. Clean, condition, and service equipment in accordance with the manufacturer's instructions, approved submittals, and other requirements indicated or specified.
- B. Upon completion of the Work and at various times during the progress of the Work, remove from the building all surplus materials, rubbish and debris.
- C. Thoroughly clean switchgear including busses, apparatus, exposed conduit, metal work including exterior and interior, and accessories for the Work of this Division, of cement, plaster and other deleterious materials; remove grease and oil spots with cleaning solvent; carefully wipe surfaces and scrape cracks and clean corners. Thoroughly polish chromium or plated work.

3.05 PROTECTIVE DEVICE ADJUSTMENTS

- A. Adjust all protective devices in accordance with tabulated settings listed in the approved coordination study. Adjustments shall conform to the serving utilities requirements 81 IEEE Standard 242. No equipment shall be operated prior to said adjustments being properly completed and verified/tested.

3.06 INSPECTION AND TESTING

- A. Inspect each item of material and equipment for damage, defects, completeness, and correct operation before installing. Inspect previously installed related Work and verify that it is ready for installation of electrical work.
- B. Where specified, electrical equipment manufacturer shall furnish the services of an authorized representative especially trained and experienced in the installation of their equipment to:
 - 1. Supervise the equipment installation in accordance with the approved submittals and manufacturer's instructions;
 - 2. Be present when the equipment is first put into operation;
 - 3. Inspect, check, adjust as necessary, and approve the installation;
 - 4. Repeat the inspection, checking, and adjusting until, all troubles or defects are corrected and the equipment installation and operation, are acceptable; and
 - 5. Prepare and submit the specified Manufacturer's Certified Report.

C. Operational Demonstration

1. Demonstrate that performance of installed electrical materials and equipment complies with requirements specified in Division 26. Operate equipment through entire no-load to full-load range for not less than twenty-four (24) hours unless a larger period is specified elsewhere. Immediately correct defects and malfunctions with approved methods and materials in each case, and repeat the demonstration.

D. Final Operation Tests

1. Test all electrical systems for not less than eighty (80) hours, with no interruptions except for normal maintenance or corrective work.

E. Testing Materials

1. Furnish labor, instruments, recorders, gages, materials, and power for tests as required.

F. Testing Methods

1. Operate systems continuously twenty-four (24) hours a day under constant inspection of trained operators. Cause variable speed equipment to cycle through the applicable speed range at a steady rate of change. Induce simulated alarm and distressed operating conditions, and test controls and protective devices for correct operation in adjusting system functions or causing system shutdown. Perform other final operation tests as may be required under other Sections of Division 26, and under the Special Conditions.

G. Defects

1. Immediately correct all defects and malfunctions disclosed by tests. Use new parts and materials as required and approved. Add the interruption time for corrective work to the specified total test period.

3.07 COMPLETION

A. Work will not be reviewed for Final Acceptance until operating and maintenance data, manufacturer's literature, panel directories and nameplates specified herein have been approved and properly posted or installed and final cleaning of equipment and premises has been completed.

B. Prior to Final Completion of operating electrical systems, the Contractor shall:

1. Provide the required manufacturer's certified reports, instructions, Shop Drawings, and replacement parts lists.
2. Satisfactorily completed required inspections and testing
3. Provide Operations and Maintenance (O&M) Manuals
4. Provide the necessary training programs and instructions to County staff. Number of hours shall be a minimum of four (4) hours for each system or days as required under separate Sections of these Detailed Provisions. Complete O&M manuals shall be provided at least two (2) weeks prior to scheduled training.

5. Submitted warranties and guarantees.
6. All deficiencies and adjustments have been completed.
7. Jobsite has been cleaned up to the satisfaction of the County.

END OF SECTION 26 0500

SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 0519: WIRE AND CABLE: 600 VOLT AND BELOW CONTENTS

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SECTION 26 0519

WIRE AND CABLE: 600 VOLT AND BELOW

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Single conductor building wire.
 - b. Power cable for 600 volts and less.
 - c. Control cable.
 - d. Instrumentation cable.
 - e. Fiber optic cable.
 - f. Wiring connectors.
 - g. Insulating tape.
 - h. Pulling lubricant.

B. Related Detailed Provisions Sections include but are not limited to:

1. Division 01 - General Requirements.
2. Section 26 0500 - Electrical: Basic Requirements.
3. Section 26 0533 – Raceways and Boxes.
4. Section 26 0553 – Identification for Electrical Systems.

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
2. ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
3. ASTM B33 – Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
4. ASTM B787/B787M – Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation

B. National Electrical Contractors Association (NECA):

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

C. National Electrical Manufacturers Association (NEMA):

1. ICS 4 – Industrial Control and Systems

2. NEMA WC 57 – Control Cables
 3. NEMA WC 70 – Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- D. International Electrical Testing Association (NETA):
1. NETA ATS – Acceptance Testing Specifications for Electrical Power Equipment and Systems
- E. National Fire Protection Association (NFPA):
1. NFPA 70 – National Electrical Code
 2. NFPA 262 – Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
- F. Telecommunications Industry Association/Electronic Industries Alliance/American National Standards Institute (TIA/EIA/ANSI):
1. TIA/EIA/ANSI 568 SET – Commercial Building Telecommunications Cabling Standard SET
 2. TIA/EIA/ANSI 598 – Optical Fiber Cable Color Coding
- G. Underwriters Laboratories (UL):
1. UL 13 – Power-Limited Circuit Cables
 2. UL 44 – Thermoset-Insulated Wires and Cables
 3. UL 83 – Thermoplastic-Insulated Wires and Cables
 4. UL 486A-486B – Wire Connectors
 5. UL 486C – Splicing Wire Connectors
 6. UL 486D – Sealed Wire Connector Systems
 7. UL 510 – Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
 8. UL 1277 – Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.
 9. UL 1581 – Electrical Wires, Cables, and Flexible Cords.
 10. UL 1666 – Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.
 11. UL 2250 - Instrumentation Tray Cable.

1.03 DEFINITIONS

- A. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.
- B. Instrumentation Cable:
1. Multiple conductor, insulated, twisted or untwisted, with outer sheath.

2. The following are specific types of instrumentation cables:
 - a. Analog signal cable:
 - 1) Used for the transmission of low current (e.g., 4-20mA DC) or low voltage (e.g., 0-10 Vdc) signals, using No. 16 AWG and smaller conductors.
 - 2) Commonly used types are defined in the following:
 - (a) TSP: Twisted shielded pair.
 - (b) TST: Twisted shielded triad.
 - b. Digital signal cable: Used for the transmission of digital signals between computers, PLC's, RTU's, etc.
- C. Power Cable: Multi-conductor, insulated, with outer sheath containing building wire, No. 8 AWG and larger.
- D. Shielded VFD Cable: Multi-conductor, insulated, with shield, drain wire and building wires, No. 12 and larger.
- E. Control Cable: Multi-conductor, insulated, with outer sheath containing building wires, No. 14, No. 12 or No. 10 AWG.
- F. Building Wire: Single conductor, insulated, with or without outer jacket depending upon type.

1.04 SUBMITTALS

- A. Submittal Procedures: Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 1. Provide manufacturer's standard catalog pages and data sheets for conductors and cables, wire connectors, insulating tape, cable lubricant, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Quality Assurance Submittals:
 1. Field test reports for NETA ATS testing.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is not permitted.
- H. Aluminum conductors are not permitted.

2.02 ACCEPTABLE MANUFACTURERS

- A. Conductors and cables shall be manufactured by one of the following or approved equal:
 - 1. Building Wire, Power, and Control cable:
 - a. Cerro Wire LLC.; www.cerrowire.com
 - b. Encore Wire Corporation; www.encorewire.com
 - c. General Cable Technologies Corporation; www.generalcable.com
 - d. Okonite Company; www.okonite.com
 - e. Southwire Company, LLC.; www.southwire.com
 - 2. Shielded VFD Cable:
 - a. Belden, Inc.; www.belden.com
 - b. Encore Wire Corporation; www.encorewire.com
 - c. General Cable Technologies Corporation; www.generalcable.com
 - d. Okonite Company; www.okonite.com
 - e. Priority Wire and Cable, Inc.; www.prioritywire.com
 - f. Rockbestos-Surprenant Cable Corporation; www.r-scc.com
 - g. Southwire Company, LLC.; www.southwire.com
 - 3. Instrumentation Cable (analog):
 - a. Alpha Wire Corporation
 - b. Belden, Inc.; www.belden.com
 - c. Encore Wire Corporation; www.encorewire.com
 - d. General Cable Technologies Corporation; www.generalcable.com
 - e. Okonite Company; www.okonite.com
 - f. Southwire Company, LLC.; www.southwire.com

4. Wire Connectors:
 - g. 3M Company; www.3m.com/3M/en_US/company-us
 - a. Burndy a part of Hubbell, Inc.; www.burndy.com
 - b. Ideal Industries, Inc.; www.idealind.com
 - c. IlSCO; www.ilsco.com
 - d. Penn Union Corporation; www.penn-union.com
 - e. Phoenix Contact; www.phoenixcontact.com
 - f. Thomas and Betts a part of ABB Group; www.tnb.com
5. Insulating and Color Coding Tape:
 - a. 3M Company; www.3m.com/3M/en_US/company-us
 - b. Red Seal Electric Company; www.redseal.com

2.03 GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70 and NEMA WC 70.
- B. Provide products listed and classified by UL as suitable for the purpose indicated.
- C. Provide new conductors and cables manufactured not more than one (1) year prior to installation.
- D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors and other appurtenances necessary to complete operating system.
- E. Thermoplastic-Insulated Conductors and Cables – Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables – Listed and labeled as complying with UL 44.
- G. Conductor Material
 1. Provide copper conductors only. Aluminum conductors are not acceptable for the Project. Conductors sizes indicated are based on copper material.
 2. Copper Conductors: Soft drawn annealed, ninety-eight percent (98%) conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M, unless otherwise indicated.
 3. Tinned Copper Conductors: Comply with ASTM B33.
- H. Minimum Conductor Size:
 1. Branch Circuits: 12 AWG
 - c. Exceptions for Voltage Drop:
 - 3) 20A, 120V circuits longer than 75 feet: 10 AWG minimum
 - 4) 20A, 120V circuits longer than 120 feet: 8 AWG minimum

5) 20A, 277V circuits longer than 150 feet: 10 AWG minimum

2. Control Circuits: 14 AWG

I. Conductor Color Coding:

1. Color code conductors as indicated and maintain consistent color coding throughout the Project.

2. Color Coding Method: Integrally colored insulation.

a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:

a. Color code conductors as follows:

208/120 V			480/277 V	
Phase A	Black		Phase A	Brown
Phase B	Red		Phase B	Orange
Phase C	Blue		Phase C	Yellow
Ground	Green		Ground	Green
Neutral	White		Neutral	Gray

b. Equipment Ground (All Systems): Green.

c. Isolated Ground (All Systems): Green with Yellow Stripe.

d. Travelers for 3-Way and 4-Way Switching: Pink.

2.04 SINGLE CONDUCTOR BUILDING WIRE, POWER CABLE, AND CONTROL CABLE (600 VOLTS OR LESS)

A. Description:

1. Building Wire: Single conductor insulated wire

2. Power Cable: Multi-conductor, insulated, with outer sheath containing building wire, No. 8 AWG and larger.

B. Conductor Stranding:

1. Feeders and Branch Circuits

a. Size 10 AWG and Smaller: Solid; except shall be stranded for final connections to motors, transformers, and vibrating equipment.

b. Size 8 AWG and Larger: Stranded

C. Insulation Voltage Rating: 600V.

D. Insulation:

1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below:

a. Size 4 AWG and Larger: Type XHHW-2

- b. Installed Underground: Type XHHW-2
- c. Fixed Wiring within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.
- E. Type THWN for exterior or wet locations, in raceway.
- F. Control cables shall be color coded in conformance with NEMA/ICEA Method 1, Table E-2.
- G. Surface mark with manufacturer's name or trademark, conductor size, insulation type, and UL label.

2.05 SHIELDED VFD CABLE

- A. Description:
 - 1. Multi-conductor, insulated, with shield, drain wire and building wires, No. 12 and larger.
- B. Insulation Voltage Rating: 600V.
- C. Cables No. 1 AWG and smaller:
 - 1. Type RHW-2 or XHHW-2 insulation with an overall PVC jacket.
 - 2. Shielding: eighty-five percent (85%) tinned copper braid, full size tinned copper drain wire and one hundred percent (100%) foil shield.
 - 3. Number of Conductors: 3 PH and one (1) full size ground.
- D. Surface mark with manufacturer's name or trademark, conductor size, insulation type, and UL label.

2.06 INSTRUMENTATION CABLE

- A. Surface mark with manufacturer's name or trademark, conductor size, insulation type, and UL label.
- B. Analog Cable:
 - 1. Tinned copper conductors.
 - 2. 300V or 600V PVC insulation with PVC jacket.
 - 3. Twisted with one hundred percent (100%) foil shield coverage with drain wire.
 - 4. Six (6) twists per foot minimum.
 - 5. Individual conductor color coding: ICEA Method 1, Table K-2.
 - 6. Conform to UL 2250, UL 1581 and NFPA 70 Type ITC.
- C. Digital Cable:
 - 1. As recommended by equipment (e.g. PLC, RTU) manufacturer.

2. Horizontal voice and data cable:
 - a. Category 6 per TIA/EIA/ANSI 568.
 - b. Cable shall be label-verified.
 - c. Cable jacket shall be factory marked at regular intervals indicating verifying organization and performance level.
 - d. Conductors: No. 24 AWG solid untinned copper or as indicated on the Project Drawings.
 - e. Rated CMP per NFPA 70.
 - f. Conform to NFPA 262 and NFPA 70 Type ITC.

2.07 FIBER OPTIC CABLE

A. Design and Fabrication - Multi-Mode:

1. Type:
 - a. Indoor: Tight buffered or loose tube with a dry gel water blocking system.
 - b. Outdoor: Loose tube with a wet or dry gel water blocking system.
2. Number of Fibers: As indicated on the Project Drawings.
3. Fiber Size: 62.5/125 micrometer (core diameter/cladding diameter).
4. Glass fiber core.
5. Step index.
6. Maximum attenuation:
 - a. At 850 nm: 3.75 dB/km.
 - b. At 1300 nm: 1.5 dB/km.
7. Minimum bandwidth:
 - a. At 850 nm: 160 Mhz/km.
 - b. At 1300 nm: 500 Mhz/km.
8. Maximum tensile load:
 - a. Installation: 225 lbs.
 - b. Long term: 67 lbs.
9. Cable jacket material:
 - a. In rigid steel conduit: PVC or polyethylene.
 - b. In plenum or riser: Flame retardant material, PVC not allowed.
 - 1) Plenum applications: Cable materials shall pass NFPA 262 requirements.
 - 2) Riser applications: Cable materials shall pass UL 1666 requirements.

- c. In cable tray: Polyethylene or equivalent; PVC not allowed. Meet vertical flame tray test requirements of NFPA 262.
- 10. Cables shall be listed and marked in accordance with the requirements of NFPA 70.
- 11. Optical fiber cable type utilized shall be in accordance with NFPA 70.
- 12. Utilize ST type connectors:
 - a. Tip material: Ceramic or ceramic/glass composite.
 - b. Utilize connectors which do not require adhesive, epoxy, or polish.

2.08 WIRING CONNECTORS

A. Description:

- 1. Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Splices and Taps:

- 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors or compression connectors.
- 2. Copper Conductors Size 6 AWG and Larger: Use split bolt mechanical connectors.

C. Wiring Connectors for Terminations:

- 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
- 2. Provide compression adapters for connecting connectors to equipment furnished with mechanical lugs when only compression connectors are specified.
- 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
- 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
- 5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors where connectors are required.
- 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
- 7. Conductors for Control Circuits: Use crimped terminals for all connections.

D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

- F. Twist-On Insulated Spring Connectors: Rated 600V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations. Connectors shall be Buchanan Type B2, Scotchlok Type B, Thomas and Betts Type PT, or approved equal.
- G. Mechanical Connectors: Provide bolted type.
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration. Connectors and crimping tool shall be Square D-Anderson, Thomas and Betts, Buchanan, or approved equal.
- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
- J. Electrical tape shall be rated to splice and insulate wires up to 600V, resistant to abrasion, alkalis, acids, corrosion, moisture, low and high temperatures. The tape shall be as manufactured by 3M or approved equal.
- K. Wire lubricant shall be used per manufacturer's recommendations where necessary. The lubricant shall be Burndy "Slikon", Holub "Hi-Green", Ideal "Yellow 77", or approved equal.
- L. Wire markers shall be provided to identify conductors and cables at equipment terminals, and in boxes and handholes. The markers shall be adhesive and manufactured by Thomas and Betts, Brady, or approved equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Provide the wiring installations and equipment installations, including connections and interconnections as indicated, specified, and required.
- B. Verify that interior of building has been protected from weather and that Work likely to damage conductors and cable has been completed.
- C. Verify that raceway installation is complete and supported.
- D. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- E. Assure proper fits for all equipment and materials in the spaces shown on the Project Drawings.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:

1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated and routing is not shown, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Include circuit lengths required to install connected devices within ten (10) feet of location shown.
5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is not permitted.
8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three (3) single phase branch circuits of different phases installed in the same raceway is permitted where not otherwise prohibited, except for the following:
 - a. Branch circuits fed from ground fault circuit interrupter (GFCI) circuit breakers.

B. Install products in accordance with manufacturer's instructions.

C. Install conductors and cable securely in a neat and workmanlike manner in accordance with NECA 1.

D. Installation in Raceway:

1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into a raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the manufacturer. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

G. Install conductors with a minimum of 12-inches of slack at each outlet.

- H. Where conductors are installed in enclosures for future termination by others, provide a minimum of five (5) feet of slack.
- I. Neatly train and bundle conductors inside boxes, raceways, panel boards and other equipment enclosures.
- J. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking, or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to remove corrosion, oxides, and other contaminants. Do not use wire brush or plated connector surfaces.
 - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- K. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
 - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing tape, followed by outer covering of vinyl insulating electrical tape.
 - 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations, but apply outer covering of moisture sealing electrical tape.
 - 3. Wet/Damp Locations: Use heat shrink tubing.
- L. Insulate ends of spare conductors using vinyl insulating electrical tape.
- M. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation (conductors 4 AWG and larger), apply half overlapping turns of tape at each termination and at each location conductors are accessible.

- N. Wire Marking: All wire shall be marked with wire markers at each end and at each intermediate j-box, pull box, or enclosure except for short “jumper” wires. Wire markers shall indicate the designation/destination of the wiring in the conduit. Example, LPCB1 – REC1 to indicate lighting panel circuit breaker No. 1 to receptacle No. 1; MCCCCB4 – MTR4 indicating motor control center circuit breaker No. 4 to Motor No. 4. Conduit numbers shall be imprinted on brass tags with the numbers as indicated on the “conduit and wire schedule” or as designated by the County.
- O. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.
- P. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise. Keep splices in underground junction boxes, handholes, and manholes to an absolute minimum. Where splices are necessary, use resin pressure splices and resin splicing kits manufactured by 3M or approved equal.

3.04 INSPECTIONS AND TESTING

- A. Contractor to inspect and test in accordance with NETA ATS, except Section 4.
- B. Contractor to perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. Insulation tests shall be made with a hand crack test instrument. The resistance test for parallel conductors listed as optional is not required.
- C. Power feeders branch conductors and motors shall be tested phase-to-phase, and phase-to-ground. A copy of the test results for feeders and motors shall be submitted to the County when completed and after any deficiencies have been corrected.
- D. Contractor to prepare and submit field test reports.
- E. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION 26 0519

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 0526: GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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SECTION 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Grounding and bonding requirements.
2. Conductors for grounding and bonding.
3. Connectors for grounding and bonding.
4. Grounding and bonding components.
5. Grounding test wells.

B. Related Detailed Provisions Sections include but are not limited to:

1. Division 01 - General Requirements.
2. Section 26 0500 - Electrical: Basic Requirements.
3. Section 26 0519 – Wire and Cable: 600 Volts and Below.
4. Section 26 0543 – Electrical: Exterior Underground.
5. Section 26 0533 – Raceways and Boxes.
6. Section 26 0553 – Identification for Electrical Systems.

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM B8 – Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

B. National Electrical Contractors Association (NECA)

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

C. International Electrical Testing Association (NETA)

1. NETA ATS – Acceptance Testing Specifications for Electrical Power Equipment and Systems

D. National Fire Protection Association (NFPA)

1. NFPA 70 – National Electrical Code

E. Underwriters Laboratories

1. UL 467 – Grounding and Bonding Equipment

1.03 SUBMITTALS

- A. Submittal Procedures: Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data
 - 1. Provide manufacturer's standard catalog pages and data sheets for grounding electrodes, clamps, terminals, connectors, and exothermic welding system.
- C. Quality Assurance Submittals:
 - 1. Prepare and submit field test reports for all NETA ATS testing.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers or an approved equal are acceptable:
 - 1. Ground rods and bars and grounding clamps, connectors and terminals:
 - a. Burndy a part of Hubbell, Inc.; www.burndy.com
 - b. Harger Lighting and Grounding; www.harger.com
 - c. Heary Brothers Lighting Protection; www.hearybros.com
 - d. National Lighting Protection Corporation; www.theprotectionsource.com
 - e. Robbins Lighting Company; www.robbinlightning.com
 - f. Thomas and Betts a part of ABB Group; www.tnb.com
 - g. Thompson Lighting Protection, Inc.; www.tlpinc.com
 - 2. Exothermic weld connections:
 - a. ERICO a part of Pentair Company(CADWELD); www.erico.com
 - b. Harger Lighting and Grounding; www.harger.com
 - c. Burndy a part of Hubbell, Inc. (Thermoweld); www.burndy.com
 - 3. Precast or prefabricated handholes for test wells:
 - a. Prefabricated composite handholes:
 - 1) Armorcast Products Company; www.armorcastprod.com
 - 2) Quazite, Hubbel Power Systems, Inc.;
<https://www.hubbell.com/hubbellpowersystems/en/hps-brands/quazite>
 - b. Precast, polymer concrete or steel reinforced cement concrete, handholes:
 - 1) Armorcast Products Company; www.armorcastprod.com
 - 2) Christy Concrete, Oldcaste Precast, Inc.;
www.oldcastleprecast.com/plants/Enclosures/brands/Pages/Christy.aspx

- 3) Jensen Precast; www.jensenprecast.com
- 4) Oldcastle Precast, Inc.;
www.oldcastleprecast.com/plants/Enclosures/Pages/default.aspx
- c. Cast iron AASHTO H-20 traffic rated covers:
 - 1) Alhambra Foundry Company; www.alhambrafoundry.com/
 - 2) Long Beach Iron Works; www.lbiw.com/

2.02 REQUIREMENTS

- A. Grounding System Resistance: 25 ohms
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit boxes, fittings, supports, accessories, and any other necessary appurtenances required for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Separately Derived System Grounding
 1. Separately derived systems include, but are not limited to:
 - d. Transformers (except autotransformers such as buck-boost transformers).
 2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
 3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
 4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
 5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.

2.03 COMPONENTS

- A. Provide products listed, classified, and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in addition to requirements of Detailed Provisions Section 26 0519 – Wire and Cable: 600 Volt and Below:

1. Use insulated copper conductors unless otherwise indicated.

a. Exceptions:

3) Use bare copper conductors where installed underground in direct contact with earth.

4) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:

1. Connectors shall be appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.

3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

2.04 CONDUCTORS

A. Insulated Conductors

1. Copper wire or cable insulated for 600V unless otherwise required by Applicable Code or standard.

B. Bare Copper Conductors

1. Solid Conductors: ASTM B 3.

2. Stranded Conductors: ASTM B 8.

3. Tinned Conductors: ASTM B 33.

4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, ¼ inch (6 mm) in diameter.

5. Bonding Conductor: No. 4 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrule; 1½-inch (41mm) wide and 1/16-inch (1.6 mm) thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrule; 1½-inch (41mm) wide and 1/16-inch (1.6 mm) thick.

8. Rod Electrodes: Copper-clad steel.

2.05 CONNECTORS AND ACCESSORIES

- A. Mechanical Connectors: Bronze.
- B. Exothermic Connections:
 - 1. Cadweld or approved equal.
- C. Wire: Stranded copper
- D. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.
- E. Grounding Well:
 - 1. Well Pipe: 8-inch diameter x 18-inch long precast cement concrete or polymer concrete valve box.
 - 2. Well Cover: Cast iron (H-20 traffic rated) or polymer concrete (SCTE Tier 15 traffic rated) lid with marking "GROUND" embossed on cover.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds – Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Install ground rods and grounding conductors in undisturbed, firm soil.
 - 1. Provide excavation required for installation of ground rods and ground conductors.
 - 2. Use driving studs or other suitable means to prevent damage to threaded ends of sectional rods.
 - 3. Unless otherwise specified, connect conductors to ground rods with compressor type connectors or exothermic weld.

4. Provide sufficient slack in grounding conductor to prevent conductor breakage during backfill or due to ground movement.
 5. Backfill excavation completely, thoroughly tamping to provide good contact between backfill materials and ground rods and conductors.
- E. Ground Ring Grounding System:
1. Ground ring consists of ground rods and a grounding conductor looped around the structure.
 2. Placed at a minimum of ten (10) feet from the structure foundation and two and a half (2.5) feet below grade.
 3. Provide a minimum of four (4) ground rods placed at the corners of the structure and additional rods so that the maximum distance between ground rods does not exceed fifty (50) feet.
 4. Building/Structure grounding:
 - a. Bond building/structure metal support columns to the ground ring at all corners of the structure.
 5. Grounding conductor: Bare conductor, size as indicated on the Project Drawings.
- F. Triad Grounding System:
1. Triad consists of three ground rods arranged in a triangle separated by ten (10) feet and a grounding conductor interconnecting each ground rod.
 2. Place first ground rod a minimum of ten (10) feet from the structure foundation and two and a half (2.5) feet below grade.
 3. Grounding conductor: Bare conductor, size as indicated on the Project Drawings.
- G. Grounding Conductors
1. Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- H. Conductor Terminations and Connections
1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 4. Connections to Structural Steel: Welded connectors.
- I. Raceway Bonding/Grounding:
1. All metallic conduit shall be installed so that it is electrically continuous.
 2. All conduits to contain a grounding conductor with insulation identical to the phase conductors, unless otherwise indicated on the Project Drawings.

3. NFPA 70 required grounding bushings shall be of the insulating type.
4. Provide double locknuts at all panels.
5. Bond all conduit, at entrance and exit of equipment, to the equipment ground bus or lug.
6. Provide bonding jumpers if conduits are installed in concentric knockouts.
7. Make all metallic raceway fittings and grounding clamps tight to ensure equipment grounding system will operate continuously at ground potential to provide low impedance current path for proper operation of overcurrent devices during possible ground fault conditions.

J. Handhole, Pull Box, and Vault Grounding:

1. Provide a ground rod and ground bar, when indicated or as needed, in each handhole, pull box, or vault with exposed metal parts. Expose a minimum of 4-inches of the rod above the floor for field connections to the rod. Connect all exposed metal parts (e.g., conduits and cable racks) to the ground rod.

K. Equipment Grounding:

1. All utilization equipment shall be grounded with an equipment ground conductor.

L. Crane and Hoists Grounding:

1. Ground cranes and hoists in accordance with NFPA 70, Article 610.

M. Telecommunications Grounding System:

1. Coil five (5) feet of insulated #6 AWG conductor at each telephone terminal board and mechanically connected to the ground bar.
2. Grounding bar: Mounted on or adjacent to telephone terminal board.
3. Interconnect all telecommunication ground bars in a daisy chain or radial fashion to the main ground bar.
 - a. Grounding conductor: Bare conductor, size as indicated on the Project Drawings.

N. Cable Tray Grounding:

1. Make metal cable tray electrically continuous by one (1) of the following methods:
 - a. Tray sections and fittings suitable for grounding purposes.
 - b. Provide bonding jumpers at discontinuous joints.
 - c. Lay a grounding conductor within the tray for bonding of each individual tray section.
 - 1) Provide a minimum of one (1) ground lug per tray section.
 - 2) Grounding conductor: Bare #4 AWG minimum.

- 3) Securely tie the grounding conductor to cable tray every ten (10) feet. Bond the grounding conductor to the cable tray run a minimum of every fifty (50) feet with a UL listed connector.
 2. Bond the tray or tray grounding conductor to every electrical equipment ground bus or telecomm backboard ground bus where conductors terminate.
 3. Bond all conduits to the tray that extend the conductors to field equipment.
- O. Metal Light Poles:
1. Connect metal pole to a grounding rod.
 2. Grounding conductor: Bare No. 6 AWG minimum.

3.02 INSPECTIONS AND TESTING

- A. Contractor to inspect and test in accordance with NETA ATS, Section 7.13.
- B. Contractor to prepare and submit field test reports.
- C. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION 26 0526



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 26 0529: HANGERS AND SUPPORTS FOR ELECTRICAL
SYSTEMS
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SECTION 26 0529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0526 – Grounding and Bonding for Electrical Systems
4. Section 26 0533 – Raceways and Boxes
5. Section 26 2726 – Wiring Devices

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM A123/A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM A153/A153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
3. ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
4. ASTM E488/E488M – Strength of Anchors in Concrete Elements

B. Manufacturers Standardization Society (MSS):

1. MSS SP-58 – Pipe Hangers and Supports –Material, Design, and Manufacture

C. Metal Framing Manufacturers Association (MFMA):

1. MFMA-4 – Metal Framing Standards

D. National Electrical Contractors Association (NECA):

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

E. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code

1.03 SUBMITTALS

- A. Submittal Procedures: Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 - 1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, earthquake and shock loads where applicable.
 - 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 4. Steel Components:
 - a. Use corrosion resistant materials suitable for the environment where installed.
 - 1) Zinc-Plated Steel: Electroplated in accordance with ASTM B633
 - 2) Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports:
 - 1. Straps, clamps, and all other appurtenances needed to support conduit or cable.
 - a. Conduit Straps: One-hole or two-hole type, steel or malleable iron.
 - b. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports:
 - 1. Hangers, brackets, and all other appurtenances needed to support boxes.
- D. Metal Channel (Strut) Framing Systems:
 - 1. Factory-fabricated continuous-slot metal channel and associated fittings, accessories, and hardware required for field assembly of supports in compliance with MFMA-4.
- E. Hanger Rods:
 - 1. Threaded zinc-plated steel unless otherwise indicated.

F. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

2.02 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory fabricated components for field assembly.

1. Shall be manufactured by one of the following or approved equal:
 - a. Allied Tube and Conduit a part of Atkore International; www.alliedeg.us
 - b. Cooper B-Line by Eaton Corporation; www.eaton.com
 - c. Power-Strut a part of Atkore International; www.power-strut.com
 - d. Thomas and Betts a part of ABB Group; www.tnb.com
 - e. Unistrut a part of Atkore International; www.unistrut.us
2. Coatings:
 - a. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - b. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - c. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
3. Channel Dimensions: Selected for applicable load criteria.

B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with $\frac{9}{16}$ -inch (14 mm) diameter holes at a maximum of 8-inches (200 mm) on-center, in at least one surface.

1. Shall be manufactured by the following or approved equal:
 - a. Allied Tube and Conduit a part of Atkore International; www.alliedeg.us
 - b. Cooper B-Line by Eaton Corporation; www.eaton.com
 - c. Fabco Plastics Wholesale Limited; www.fabcoplastics.com
 - d. Seasafe, Inc.; www.seasafe.com
2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items. Same material as channels and angles, except metal items may be stainless steel.
3. Channel Dimensions: Selected for applicable load criteria.

C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cable supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Shall be manufactured by the following or approved equal:
 - 1) Hilti Inc.; www.us.hilti.com
 - 2) ITW Ramset/Red Head, a division of Illinois Tool Works, Inc.; www.itwredhead.com
 - 3) MKT Fastening, LLC.; www.mktfastening.com
 - 4) Simpson Strong-Tie, Inc.; Masterset Fastening Systems Unit.; www.strongtie.com
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Shall be manufactured by the following or approved equal:
 - 1) Hilti Inc.; www.us.hilti.com
 - 2) ITW Ramset/Red Head, a division of Illinois Tool Works, Inc.; www.itwredhead.com
 - 3) MKT Fastening, LLC.; www.mktfastening.com
 - 4) Simpson Strong-Tie, Inc.; Masterset Fastening Systems Unit.; www.strongtie.com
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18, complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

PART 3 EXECUTION

3.01 SUPPORT INSTALLATION

- A. Raceway Support Methods: In addition to methods described in NECA 1, electrical metallic tubing (EMT), intermediate metallic conduit (IMC), and rigid metallic conduit (RMC) may be supported by openings through structure members, as permitted in NFPA 70. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum hanger rod size shall be 1/4-inch diameter. For multiple raceways or cables, install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least twenty-five percent (25%) in the future without exceeding specified design load limits. Secure raceways and cables to these supports with two-bolt conduit clamps.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus two hundred pounds (200 lbs (90kg)).
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components:
 - 1. Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated:
 - a. To Wood: Fasten with lag screws or through bolts.
 - b. To New Concrete: Bolt to concrete inserts.
 - c. To Existing Concrete: Expansion anchor fasteners.
 - d. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete, 4-inches thick or greater. Do not use anchorage to lightweight-aggregate concrete or for slabs less than 4-inches thick.
 - e. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - f. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts or Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-58.
 - g. To Light Steel: Sheet metal screws.
 - h. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.02 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M

3.03 INSTALLATION

- A. Install products in accordance with manufacturer's instructions
- B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by County, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by County, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval from the County's Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

3.04 INSPECTIONS AND TESTING

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION 26 0529

SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 0533: RACEWAYS AND BOXES

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SECTION 26 0533 RACEWAYS AND BOXES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Galvanized steel rigid metal conduit (RMC)
 - b. Aluminum rigid metal conduit (RMC)
 - c. Intermediate metal conduit (IMC)
 - d. PVC-coated galvanized steel rigid metal conduit (RMC)
 - e. Flexible metal conduit (FMC)
 - f. Liquidtight flexible metal conduit (LFMC)
 - g. Electrical metallic tubing (EMT)
 - h. Rigid polyvinyl chloride (PVC) conduit
 - i. Conduit fittings and accessories
 - j. Surface raceways (metallic and non-metallic)
 - k. Wireways
- l. Outlet and device boxes up to 100 cubic inches in volume, including those used as junction and pull boxes.
- m. Poke-thru devices

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Division 03 - Concrete
3. Section 26 0500 – Basic Electrical Requirements
4. Section 26 0526 – Grounding and Bonding for Electrical Systems
5. Section 26 0529 – Hangers and Supports for Electrical Systems
6. Section 26 0543 – Electrical: Exterior Underground
7. Section 26 0553 – Identification for Electrical Systems
8. Section 26 2726 – Wiring Devices

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. American National Standards Institute (ANSI):

1. ANSI C80.1 – Electrical Rigid Steel Conduit (ERSC)

2. ANSI C80.3 – Steel Electrical Metallic Tubing (EMT)
 3. ANSI C80.5 – Electrical Rigid Aluminum Conduit (ERAC)
 4. ANSI C80.6 – Electrical Intermediate Metal Conduit (EIMC)
- B. American Society for Testing and Materials (ASTM):
1. ASTM A123/A123M – Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 2. ASTM A153/A153M – Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Hardware.
 3. ASTM D2564 – Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Piping Systems.
- C. National Electrical Contractors Association (NECA):
1. NECA 1 – Standard for Good Workmanship in Electrical Construction
 2. NECA 101 – Standard for Installing Steel Conduits (Rigid, IMC, EMT)
 3. NECA 102 – Standard for Installing Aluminum Rigid Metal Conduit
 4. NECA 111 – Standard for Installing Nonmetallic Raceways
 5. NECA 130 – Standard for Installing and Maintaining Wiring Devices
- D. National Electrical Manufacturers Association (NEMA):
1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
 2. NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable
 3. NEMA OS 1 – Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
 4. NEMA OS 2 – Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports
 5. NEMA RN 1 – Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
 6. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Conduit
 7. NEMA TC 3 – Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing
- E. National Fire Protection Association (NFPA):
1. NFPA 70 – National Electrical Code (NEC).
- F. Underwriters Laboratories, Inc.:
1. UL 1 – Flexible Metal Conduit.
 2. UL 5 – Surface Metal Raceways and Fittings
 3. UL 5A – Nonmetallic Surface Raceways and Fittings
 4. UL 6 – Electrical Rigid Metal Conduit.

5. UL 50 – Enclosures for Electrical Equipment, Non-Environmental Considerations.
6. UL 50E – Enclosures for Electrical Equipment, Environmental Considerations.
7. UL 360 – Liquid-Tight Flexible Steel Conduit.
8. UL 467 – Grounding and Bonding Equipment.
9. UL 514A – Metallic Outlet Boxes.
10. UL 514B – Conduit, Tubing, and Cable Fittings.
11. UL 651 – Schedule 40 and 80 Rigid PVC Conduit and Fittings.
12. UL 797 – Electrical Metallic Tubing – Steel.
13. UL 870 – Wireways, Auxiliary Gutters, and Associated Fittings.
14. UL 1203 – Safety ExplosionProof and Dust-IgnitionProof Electrical Equipment for Use in Hazardous (Classified) Locations

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 1. Provide manufacturer's standard catalog pages and data sheets for conduit, boxes, wireways, fittings, and accessories.
- C. Shop Drawings:
 1. Provide Drawings showing routing of buried raceways.
 2. Identify conduit by tag number of equipment served or by circuit schedule number.
 3. Identify dimensional size of pull and junction boxes to be used.

1.04 DEFINITIONS

- A. EMT: Electrical Metallic Tubing
- B. ENT: Electrical Nonmetallic Tubing
- C. EPDM: Ethylene-Propylene-Diene Terpolymer Rubber
- D. FMC: Flexible Metallic Conduit
- E. IMC: Intermediate Metallic Conduit
- F. LFMC: Liquidtight Flexible Metallic Conduit
- G. LFNC: Liquidtight Flexible Nonmetallic Conduit
- H. NBR: Acrylonitrile-Butadiene Rubber
- I. PVC: Poly-Vinyl-Chloride
- J. RMC: Rigid Metallic Conduit

K. RNC: Rigid Nonmetallic Conduit

L. Raceway: An enclosed channel of metal or nonmetallic materials designed expressly for holding wires, cables, or busbars, with additional functions as permitted in the NEC. Raceways include, but are not limited to, rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquid-tight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical nonmetallic tubing, electrical metallic tubing, underfloor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface raceways, wireways, and busways.

M. Wireway: A trough with hinged or removable covers for housing and protecting electric wires and cable. Conductors are laid into the wireway after the wireway has been installed as a complete system.

1.05 DELIVERY, STORAGE, AND HANDLING

A. See Detailed Provisions Section 26 0500 – Basic Electrical Requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers or an approved equal, are acceptable:

1. Galvanized Steel and Aluminum Rigid Metallic Conduit (RMC), Intermediate Metallic Conduit (IMC), and Electrical Metallic Tubing (EMT):
 - a. Allied Tube and Conduit a part of Atkore International; www.alliedeg.us
 - b. Calpipe Industries, Inc.; www.calpipe.com
 - c. Republic Conduit; www.republicconduit.com
 - d. Western Tube and Conduit Corporation; westerntube.com
 - e. Wheatland Tube Company a part of JMC Steel Group; www.wheatland.com
2. PVC-Coated Galvanized Steel Rigid Metallic Conduit (RMC) and Repair Kits:
 - a. Calpipe Industries, Inc.; www.calpipe.com
 - b. Robroy Industries; www.robroy.com
 - c. Thomas and Betts a part of ABB Group; www.tnb.com
3. Rigid Nonmetallic Conduit (RNC):
 - a. Cantex, Inc.; www.cantexinc.com
 - b. JM Eagle a part of J-M Manufacturing Company, Inc.; www.jmeagle.com
 - c. National Pipe and Plastics, Inc.; www.nationalpipe.com
 - d. Southern Pipe, Inc.; www.southern-pipe.com

4. Flexible Metallic Conduit (FMC) and Liquidtight Flexible Metallic Conduit (LFMC):
 - a. AFC Cable Systems a part of Atkore International; www.afcweb.com
 - b. Anamet Electrical, Inc.; www.anacondasealtite.com
 - c. Electri-Flex Company; www.electriflex.com
 - d. Encore Wire Corporation; www.encorewire.com
 - e. International Metal Hose Company; www.metalhose.com
 - f. Southwire Company, LLC.; www.southwire.com
5. Conduit Fittings and Accessories:
 - a. Same as manufacturer of conduit body fitting is to be installed on.
 - b. Appleton Group a part of Emerson Electric Company; www.appletonelec.com
 - c. Arlington Industries, Inc.; www.aifittings.com
 - d. Bridgeport Fittings, Inc.; www.bptfittings.com
 - e. Crouse-Hinds by Eaton Corporation; www.eaton.com
 - f. Killark a part of Hubbell Inc.; www.hubbell-killark.com
 - g. O-Z/Gedney a part of Emerson Electric Company; www.emersonindustrial.com
 - h. RACO a part of Hubbell Inc.; www.hubbell-rtb.com
 - i. Thomas and Betts a part of ABB Group; www.tnb.com
6. Surface Raceway (Metallic and Nonmetallic):
 - a. Hubbell Inc. Wiring Device-Kellems; www.hubbell-wiring.com
 - b. Thomas and Betts a part of ABB Group; www.tnb.com
 - c. Wiremold by Legrand, Inc.; www.legrand.us/wiremold.aspx
7. Wireway:
 - a. Cooper Industries by Eaton Corporation; www.eaton.com
 - b. Milbank Manufacturing Company; www.milbankmfg.com
 - c. Wiegmann a part of Hubbell Inc.; www.hubbell-wiegmann.com
8. Outlet, Device, Pull and Junction Boxes up to 100 Cubic Inches
 - a. Appleton Group a part of Emerson Electric Company; www.appletonelec.com
 - b. Arlington Industries, Inc.; www.aifittings.com
 - c. Bell a part of Hubbell Inc.; www.hubbell-rtb.com
 - d. Crouse-Hinds by Eaton Corporation; www.eaton.com
 - e. Hubbell Inc.; www.hubbell.com

- f. Hubbell Inc. Wiring Device-Kellems; www.hubbell-wiring.com
 - g. Legrand, Inc. www.legrand.us
 - h. Pass and Seymour by Legrand, Inc.; www.legrand.us/passandseymour.aspx
 - i. RACO a part of Hubbell Inc.; www.hubbell-rtb.com
 - j. Thomas and Betts a part of ABB Group; www.tnb.com
 - k. Wiremold by Legrand, Inc.; www.legrand.us/wiremold.aspx
9. Poke-Thru Devices:
- a. Hubbell Inc. Wiring Device-Kellems; www.hubbell-wiring.com
 - b. Wiremold by Legrand, Inc.; www.legrand.us/wiremold.aspx

2.02 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one (1) listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Under Slab on Grade: Use PVC-coated galvanized steel rigid metal conduit or rigid PVC conduit Schedule 40.
 - 2. Exterior, Direct-Buried: Use PVC-coated galvanized steel rigid metal conduit or rigid PVC conduit Schedule 80.
 - 3. Where rigid PVC conduit is provided, transition to PVC coated steel rigid metal conduit where emerging from underground.
 - 4. Where rigid PVC conduit larger than 2-inch trade size is provided, use PVC-coated galvanized steel rigid metal conduit elbows for bends.
 - 5. Concrete Encased Ductbanks: Use rigid PVC schedule 40 or PVC coated steel rigid metal conduit. Use PVC-coated galvanized steel fittings for transitions to above grade. Use PVC-coated galvanized steel rigid long sweeping bends for conduits 2-inch and larger, and for bends greater than fifteen (15) degrees.
- D. Concealed Within Concrete or Masonry Walls:
 - 1. Use rigid PVC Schedule 40.
- E. Concealed Within Hollow Stud Walls:
 - 1. Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

F. Concealed Above Accessible Ceilings:

1. Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT), or NEMA 1 rated wireway.

G. Interior, Damp or Wet Locations:

1. Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

H. Exposed, Interior, Not Subject to Physical Damage:

1. Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

I. Exposed, Interior, Subject to Physical Damage:

1. Locations subject to physical damage include, but are not limited to:
 - a. Where exposed below eight (8) feet, except within electrical and communication rooms or closets.
 - b. Where exposed below twenty (20) feet in warehouse, operations, and maintenance areas.

J. Exposed, Exterior:

1. Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

K. Concealed, Exterior, Not Embedded in Concrete or in Contact with Earth:

1. Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

L. Embedded Within Poured Concrete Footings, Walls and Floors:

1. Use rigid PVC Schedule 40 within concrete and PVC-coated galvanized steel when emerging from concrete.

M. Corrosive Locations above Ground:

1. Use PVC-coated galvanized steel rigid metal conduit or aluminum rigid metal conduit. Corrosive locations include, but are not limited to:
 - a. High-Pressure Wash System bay of Fleet Maintenance Facility.

N. Hazardous (Classified) Locations:

1. Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), aluminum rigid metal conduit, or PVC-coated galvanized steel rigid metal conduit.

O. Connections to Luminaires above Accessible Ceilings:

1. Use flexible metal conduit (FMC) with maximum length of six (6) feet.

P. Connections to Vibrating Equipment:

1. Dry Locations: Use liquidtight flexible metal conduit (LFMC).
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
3. Maximum Length: six (6) feet unless otherwise indicated.

4. Vibrating equipment includes, but is not limited to:
 - a. Transformers
 - b. Motors

2.03 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled by UL.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
 1. Branch Circuits: $\frac{3}{4}$ -inch trade size
 2. Branch Circuit Homeruns: $\frac{3}{4}$ -inch trade size
 3. Control Circuits: $\frac{1}{2}$ -inch trade size
 4. Flexible Connections to Luminaires: $\frac{1}{2}$ -inch trade size
 5. Underground, Interior: 1-inch trade size
 6. Underground, Exterior: 1-inch trade size
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.04 GALVANIZED STEEL RIGID METALLIC CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing. Threads shall be galvanized after cutting. Inside of conduit shall be coated with baked lacquer, varnish or enamel for a smooth surface.
- B. Fittings:
 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
 3. Material: Use steel or malleable iron. Die cast zinc fittings are not permitted.
 4. Bushings: Threaded, insulated metallic. Grounding or non-grounding type.
 5. Connectors and Couplings: Use threaded or compression type fittings only. Threadless set screw type fittings are not permitted.
 6. Hubs: Threaded, insulated and gasketed metallic for raintight connection.

7. Unions: Threaded galvanized steel or zinc plated malleable iron.
8. Sealing Fittings: Body shall be cast copper free aluminum with threaded hubs. Fiber and sealing compound UL listed for use with the sealing fitting.
9. Expansion Couplings: 2-inch nominal straight-line conduit movement in either direction. Galvanized steel with insulated bushing and gasketed for damp/wet locations. Internally or externally grounded.
10. Deflection Couplings: $\frac{3}{4}$ -inch nominal straight-line conduit movement in either direction and 30-degree nominal deflection from the normal in all directions. Metallic hubs, neoprene outer jacket and stainless steel jacket clamps. Liquidtight and internally or externally grounded.

2.05 PVC-COATED GALVANIZED STEEL RIGID METALLIC CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil and bonded to hot-dipped galvanized rigid steel conduit conforming to ANSI C80.1.
- C. Interior Coating: Urethane coating with a nominal thickness of 2 mil minimum.
- D. Conduit shall be primed with epoxy prior to application of PVC and urethane coatings. Conduit threads shall be coated with urethane.
- E. Female Ends: Have a plastic sleeve extending a minimum of one (1) pipe diameter or 2-inches, whichever is less beyond the opening. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used with it.
- F. PVC-Coated Fittings:
 1. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
 2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
 3. Same material and construction as those fittings listed under Section 2.04 Galvanized Steel Rigid Metallic Conduit (RMC) and coated as defined under this section.
- G. PVC-Coated Supports: Furnish with exterior coating of PVC, minimum thickness of 15 mil.

2.06 ALUMINUM RIGID METALLIC CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.

B. Fittings:

1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
3. Material: Use aluminum.
4. Connectors and Couplings: Use threaded or compression type fittings only. Threadless set screw type fittings are not permitted.

2.07 INTERMEDIATE METALLIC CONDUIT (IMC)

A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing. Inside of conduit shall be coated with baked lacquer, varnish or enamel for a smooth surface.

B. Fittings:

1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
3. Material: Use steel or malleable iron. Die cast zinc fittings are not permitted.
4. Connectors and Couplings: Use threaded or compression type fittings only. Threadless set screw type fittings are not permitted.

2.08 ELECTRICAL METALLIC TUBING (EMT)

A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 listed and labeled as complying with UL 797. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing. Inside of conduit shall be coated with baked lacquer, varnish or enamel for a smooth surface.

B. Fittings:

1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
2. Material: Use steel or malleable iron. Die cast zinc fittings are not permitted.
3. Connectors and Couplings: Use compression (gland) type
 - a. Do not use indenter type connectors and couplings.
 - b. Do not use set-screw type connectors and couplings.
4. Damp or Wet Locations (where permitted): Use fittings for use in wet locations.
5. Embedded within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.09 FLEXIBLE METALLIC CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron. Die cast zinc fittings are not permitted.

2.10 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 - 1. Description: Sealtight compression type fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron. Die cast zinc fittings are not permitted.

2.11 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C and shall be marked "maximum 90 Deg C". PVC plastic compound shall include inert modifiers to improve weatherability and heat distribution. Conduit shall be rated for direct sunlight exposure.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.12 CONDUIT ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- C. Pull Strings: Use nylon cord with average breaking strength of not less than two hundred (200) pound-force.
- D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.

- E. Weather and Corrosion Protection Tape: PVC based tape with a minimum nominal thickness of 10 mils to protect against moisture, acids, alkalis, salts, and suitable for direct bury. Shall be used with appropriate pipe primer.

2.13 SURFACE METALLIC RACEWAY

- A. Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway and conforms to UL 5. Raceways fittings shall be as recommended by raceway manufacturer.

2.14 SURFACE NONMETALLIC RACEWAY

- A. Description: Plastic channel with fitted cover, suitable for use as surface metal raceway and conforms to UL 5A. Raceways fittings shall be as recommended by raceway manufacturer.

2.15 WIREWAY

- A. Suitable for lay-in conductors and designed for continuous grounding.
- B. Covers: Hinged or removable in accessible areas. Non-removable when passing through partitions.
- C. Finish: Rust inhibiting primer and manufacturer's standard paint inside and out except for stainless steel type.

2.16 OUTLET AND DEVICE, JUNCTION AND PULL BOXES (UP TO 100 CUBIC INCHES) APPLICATIONS

- A. Use sheet-steel boxes for dry locations unless otherwise indicated or required. Sheet-steel boxes shall comply with NEMA OS 1, listed and labeled as complying with UL 514A.
- B. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required, furnish with compatible waterproof gasketed covers. Cast metal boxes shall comply with NEMA FB 1, listed and labeled as complying with UL514A; furnish with threaded hubs.
- C. Use suitable concrete type boxes where flush-mounted in concrete.
- D. Use suitable masonry type boxes where flush-mounted in masonry walls.
- E. Used raised covers suitable for the type of wall construction and device configuration where required.
- F. Use shallow boxes where required by the type of wall construction.
- G. Do not use "through-wall" boxes designed for access from both sides of wall.
- H. Boxes for Supporting Luminaires and Ceiling Fans – Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.

- I. Boxes for Ganged Devices – Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.

2.17 OUTLET AND DEVICE, JUNCTION AND PULL BOXES (UP TO 100 CUBIC INCHES) REQUIREMENTS

- A. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
- B. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements.
- C. Provide grounding terminals within boxes where equipment grounding conductors terminate.

2.18 OUTLET BOXES

A. Metallic Outlet Boxes:

- 1. In conformance with NEMA OS 1.
- 2. Hot-dip galvanized steel and include conduit knockouts and grounding pigtail.
- 3. Minimum size: 4-inch square x 1½-inch deep.
- 4. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include ½-inch male fixture studs where required.
- 5. Concrete Ceiling Boxes: Concrete type.

B. Nonmetallic Outlet Boxes:

- 1. In conformance with NEMA OS 2.

C. Cast Outlet Boxes:

- 1. In conformance with NEMA FB 1, cast ferroalloy. Gasketed cover, threaded hubs and grounding screw.
- 2. Styles:
 - a. “FS” or “FD”.
 - b. “Bell”.
 - c. Single or multiple gang and tandem.
 - d. “EDS” or “EFS” for hazardous locations.

- D. See Detailed Provisions Section 26 2726 – Wiring Devices for wiring devices, wallplates, and coverplates. Furnish gasketed wall plate for unfinished areas.

2.19 PULL AND JUNCTION BOXES

- A. Interior Sheet Metal Boxes: NEMA OS 1, galvanized steel. Finished with rust inhibiting primer and manufacturers standard paint inside and out. Interior boxes larger than 12-inches in any dimension shall have a hinged cover.

- B. Exterior Boxes and Wet/Damp Location Installations: NEMA 250, Type 4 and Type 6; flat-flanged, surface mounted junction box, UL listed as rain-tight:
 - 1. Material: Galvanized cast iron or copper-free aluminum.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- C. In-Ground Cast Metal Box: NEMA 250, Type 6; outside flanged, recessed cover box for flush mounting:
 - 1. Material: Copper-free cast aluminum
 - 2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws. Legend shall be "POWER" or "SIGNAL", or as otherwise noted on Project Drawings.
- D. Box extensions and adjacent boxes within 48-inches of each other are not allowed for the purpose of creating more wire capacity.
- E. Junction boxes 6" x 6" or larger size shall be without stamped knock-outs.

PART 3 EXECUTION

3.01 GENERAL – RACEWAY INSTALLATION

- A. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction, and splicing points.
- B. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop. Unless specifically indicated otherwise, the minimum raceway size shall be:
 - 1. Conduit: ¾-inch.
 - 2. Wireway: 2½ x 2½ inches.
- C. Coordinate the Work with other trades to avoid placement of structural members, ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
- D. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed by other trades.
- E. Coordinate the Work with other trades to provide roof penetrations that preserve the integrity of the roofing system.
- F. All exposed conduit runs, fittings and supports located within structure exterior and interior finished areas shall be painted to match the finish.
- G. Do not install aluminum conduits in contact with concrete.

3.02 RACEWAY INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install galvanized steel RMC and IMC in accordance with NECA 101.
- D. Install aluminum RMC in accordance with NECA 102.
- E. Install PVC-coated galvanized steel RMC using only tools approved by the manufacturer.
- F. Install rigid PVC conduit in accordance with NECA 111.
- G. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated and routing is not shown, determine exact routing required.
 - 3. Conceal all conduits unless specifically indicated to be exposed.
 - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms
 - b. Mechanical equipment rooms
 - c. Within joists and framing with structures that have no interior finished walls and/or ceilings.
 - 5. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors
 - b. Across roofs
 - c. Across top of parapet walls
 - d. Across building exterior surfaces
 - 6. Only where approved, route exposed conduit parallel and perpendicular to walls.
 - 7. Conduits installed underground and/or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 - 8. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 9. Arrange conduit to provide no more than the equivalent of three 90-degree bends between pull points.
 - 10. Route conduits above water and drain piping where possible.
 - 11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

12. Maintain minimum clearance of 6-inches between conduits and piping for other systems.
13. Maintain minimum clearance of 12-inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters
 - b. Hot water piping
 - c. Flues
14. Group parallel conduits in the same area together on a common rack.
15. Conduits Embedded in Above-Grade Reinforced Concrete:
 - a. Conduit shall not be run in beams.
 - b. Place conduit after reinforcing steel has been laid. The reinforcement steel shall not be displaced by the conduit.
 - c. Provide a minimum of 1½-inch of cover over conduit, excluding surface finish.
 - d. Conduits parallel to main reinforcement shall be run near the center of the wall.
 - e. Conduits perpendicular to main reinforcement shall be run midway between wall or slab supports.

H. Field Bending and Cutting of Conduits:

1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all filed bends and cuts.
2. Do not reduce the internal diameter of the conduit when making conduit bends.
3. Degrease threads after threading and apply a zinc rich paint.
4. Debur interior and exterior after cutting.

I. Conduit Seals: Installed in conduit systems located in hazardous areas as required by the NFPA 70.

J. The protective coating integrity of conduits, fittings, outlet, pull and junction boxes and accessories shall be maintained.

1. Repair galvanized components utilizing a zinc rich paint provided by or approved by the manufacturer.
2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit.

K. Underground Installations

1. Provide the required rigid steel and PVC conduits with watertight connections and completely encased with concrete. Provide at least 3-inches of concrete between the conduits and the outside of the encasement, and 2-inches of concrete between

conduits unless otherwise indicated. Install spacers and adapters to support and terminate nonmetallic conduits. Connect the adapters to rigid steel conduit risers that terminate at above-grade equipment. The steel conduit riser shall be completely concrete encased to finish grade. The top of the concrete encasement shall be a minimum of 30-inches below finish grade. Concrete shall be red-dye in accordance with Detailed Provisions Section 26 0543 – Electrical: Exterior Underground. Trench and backfilling shall be done in accordance with Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities. Restore the finish grade surface to match existing. Repave the trench to match existing pavement if trench passes through a paved area. Install warning tape in accordance with Detailed Provisions Section 26 0553 – Identification for Electrical Systems. Comply with Detailed Provisions Section 03 1113 – Formwork-Structural Cast-in-Place Concrete, Detailed Provisions Section 03 2100 – Concrete Reinforcement, Detailed Provisions Section 03 3100 – Cast-in-Place Structural Concrete, Detailed Provisions Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing, and Detailed Provisions Section 03 3132 – Concrete Finishing and Repair of Surface Defects.

L. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods. See Detailed Provisions Section 26 0529 - Hangers and Supports for Electrical Systems.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

M. Connections and Terminations:

1. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound as recommended by the conduit manufacturer. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two (2) threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for damp and wet locations.
6. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
7. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.

8. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
9. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum twenty (20) minutes.

N. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of the County's Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Make penetrations of roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
7. Provide metal escutcheon plates for conduit penetrations exposed to public view.
8. Install firestop to preserve fire resistance rating of partitions and other elements.

O. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where conduits are subject to earth movement by settlement or frost.

P. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:

1. Where conduits pass from outdoors into conditioned interior spaces.
2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
3. Where conduits penetrate coolers or freezers.

Q. Provide nylon or polyethylene pull rope in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12-inches at each end.

- R. Provide grounding and bonding.
- S. Remove moisture and debris from conduit before wire is pulled into place.
 - 1. Pull mandrel with diameter approximately 1/4-inch less than the inside diameter of the conduit, to remove obstructions.
 - 2. Swab conduit by pulling a heavy duty wire brush mandrel followed by a rubber duct swab through each conduit.
 - 3. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

3.03 OUTLET AND DEVICE, JUNCTION AND PULL BOXES (UP TO 100 CUBIC INCHES) INSTALLATION

A. General:

- 1. Install products in accordance with manufacturer's instructions.
- 2. See Detailed Provisions Section 26 0500 – Basic Electrical Requirements and Project Drawings for area classifications.
- 3. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
- 4. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
- 5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, and any other potential conflict items. Electrical boxes are shown on Project Drawings in approximate locations unless otherwise dimensioned. Adjust box locations up to ten (10) feet if required to accommodate intended purpose.
- 6. Perform Work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 120, including mounting heights specified in those standards where mounting heights are not indicated. Unless otherwise indicated in the Contract Documents, the Contractor shall mount center of outlets or boxes at the following heights above finish floor:
 - a. Distribution Panels – 6'-0" to top
 - b. Outlets – 14"
 - c. Switches – 3'-6"
- 7. Close unused box openings. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- 8. Provide grounding and bonding in accordance with Detailed Provisions Section 26 0526 – Grounding and Bonding for Electrical Systems.

B. Outlet and Device Boxes:

1. Permitted use of metallic boxes:

a. Housing of wiring devices:

- 1) Recessed in all stud framed walls and ceilings.
- 2) Recessed in poured concrete, concrete block and brick walls or architecturally finished areas and exterior building walls.

b. Pull or junction box:

- 1) Above gypsum wall board or acoustical tile ceilings. Inaccessible ceiling area, install box no more than 6-inches from ceiling access panel or from removable recessed luminaire.
- 2) Above ten (10) feet in an architecturally finished area where there is no ceiling.
- 3) Above ten (10) feet in dry non-architecturally finished areas.
- 4) Provide NEMA 4 pull or junction box mounted in damp/wet areas.
- 5) Provide NEMA 4X pull or junction box mounted in areas designated as wet and/or corrosive.
- 6) Provide NEMA 7 pull or junction box mounted in areas designated as Class I hazardous. Provide PVC coating in corrosive and highly corrosive areas when PVC coated conduit is used.

2. Permitted use of cast outlet boxes:

- a. Housing of wiring devices surface mounted in non-architecturally finished dry, damp, wet, corrosive, highly corrosive and hazardous areas.
- b. Pull and junction box surface mounted in non-architecturally finished dry, damp, wet, corrosive, highly corrosive and hazardous areas.

3. Install boxes plumb and vertical to the floor.

C. Box Supports:

1. Secure and support boxes in accordance with NFPA 70 and Detailed Provisions Section 26 0529 – Hangers and Supports for Electrical Systems using suitable supports and methods.
2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

D. Flush-Mounted Boxes:

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4-inch or does not project beyond finished surface.

2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than $\frac{1}{8}$ -inch at the edge of the box.
- E. Install boxes as required to preserve insulation integrity, where applicable.
 - F. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300V.
 - G. Provide grounding and bonding in accordance with Detailed Provisions Section 26 0526 – Grounding and Bonding for Electrical Systems.
 - H. Install in locations as shown on Project Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
 - I. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
 - J. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
 - K. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
 - L. Use flush mounting outlet box in finished areas. Locate flush mounting box in masonry wall to require cutting off masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
 - M. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
 - N. Locate outlet boxes so that wall plates do not span different building finishes.
 - O. Locate outlet boxes so that wall plates do not cross masonry joints.
 - P. Do not install flush mounting box back-to-back in walls, provide minimum 6-inches separation.
 1. Provide minimum 24-inches separation in acoustic rated walls.
 2. Provide minimum 24-inches separation in fire rated walls.
 - Q. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
 - R. Use stamped steel bridges to fasten flush mounting outlet box between studs.
 - S. Use adjustable steel channel fasteners for hung ceiling outlet box.
 - T. Do not fasten boxes to ceiling support wires.
 - U. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12-inches of box.
 - V. Use gang box where more than one device is mounted together. Do not use sectional box.

- W. Use gang box with plaster ring for single device outlets.
- X. Use cast outlet box in exterior locations exposed to weather and wet locations. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

3.04 INSPECTIONS AND TESTING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign matter.
- B. Contractor to test and clean interior of conduits using test mandrel, heavy-duty wire brush mandrel followed by a rubber duct swab.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Where coating of PVC-coated galvanized steel RMC contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- E. Correct deficiencies and replace damaged or defective conduit, boxes, fittings, and accessories.

END OF SECTION 26 0533



SPECIFICATIONS – DETAILED PROVISIONS

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SECTION 26 0543

ELECTRICAL: EXTERIOR UNDERGROUND

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Hand Holes.
 - b. Pull Boxes.
 - c. Vaults
 - d. Concrete encased underground nonmetallic conduits and ductbanks.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Division 03 - Concrete
3. Section 26 0500 – Basic Electrical Requirements
4. Section 26 0519 – Wire and Cable: 600 Volt and Below
5. Section 26 0526 – Grounding and Bonding for Electrical Systems
6. Section 26 0533 – Raceways and Boxes
7. Section 26 0553 – Identification for Electrical Systems
8. Section 31 2133 – Trenching, Backfilling and Compacting for Utilities

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO HB – Standard Specification for Highway Bridges

B. American Society for Testing and Materials (ASTM):

1. ASTM A48/A48M – Standard Specification for Grey Iron Castings
2. ASTM F512 - Standard Specification for Smooth-Wall PVC Conduit and Fittings for Underground Installation
3. ASTM A536 – Standard Specification for Ductile Iron Castings
4. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
5. ASTM C858 – Standard Specification for Underground Precast Concrete Utility Structures

6. ASTM C891 – Standard Practice for Installation of Underground Precast Concrete Utility Structures
 7. ASTM C 1037 - Standard Practice for Inspection of Underground Precast Concrete Utility Structures
- C. California Public Utilities Commission (CalPUC):
1. CalPUC GO 128 - Rules for Construction of Underground Electrical Supply and Communications Systems.
- D. National Electrical Manufacturers Association (NEMA):
1. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Conduit
 2. NEMA TC 3 – Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing
 3. NEMA TC 6&8 – PVC Plastic Utilities Duct for Underground Installations
 4. NEMA TC 9 – Fittings for PVC Plastic Utilities Duct for Underground Installations.
- E. Society of Cable Telecommunications Engineers (SCTE):
1. SCTE 77 – Specification for Underground Enclosure Integrity.
- F. National Fire Protection Association (NFPA):
1. NFPA 70 – National Electrical Code (NEC)
- G. Underwriters Laboratories, Inc. (UL):
1. UL 514B – Conduit, Tubing, and Cable Fittings
 2. UL 651 – Schedule 40 and 80 Rigid PVC Conduit and Fittings

1.03 DEFINITIONS

- A. Concrete Encased Ductbank: An individual (single) or multiple conduits, arranged in one or more planes, encased in a common concrete envelope.
- B. Direct-Buried Conduit(s): Individual (single) or multiple underground conduits, arranged in one (1) or more planes, in a common trench.
- C. Duct: Interchangeable term for conduit.
- D. Duct Bank: An assembly of conduits that may either be directly buried in earth or encased in concrete.
- E. Hand Hole: Small underground structure (15"x20"x10") used for a maximum of two (2) 1¼ -inch conduits. Used for distribution to a single end point.
- F. Pull Box: Small underground structure (15"x26"x18") used for a maximum of two 2-inch conduits. .
- G. Vault: Large underground structure of varying size used for 4-inch conduits.
 1. Up to six (6) 4-inch conduits minimum vault size is 5'x7'x7'.

2. Up to twelve (12) 4-inch conduits minimum vault size is 6'x10'x7'.
3. Thirteen (13) to eighteen (18) 4-inch conduits minimum vault size is 6'x12'x7'.
4. Nineteen (19) to twenty-four (24) 4-inch conduits minimum vault size is 8'x15'x7'.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Shop Drawings:
 1. Provide dimensional drawings of each hand hole, pull box, and vault indicating all specified accessories and conduit entry locations.
 2. Provide cross-sectional sketch of each concrete encased ductbank. Dimension spacing between conduits. Dimension concrete envelope and reinforcing, if applicable. Provide dimensions from top of encasement to finish grade. Show and dimension placement of warning tape.
- C. Product Data:
 1. Provide manufacturer's standard catalog pages and data sheets for conduit, hand holes, pull boxes, vaults, spacers, fittings, and accessories.
 2. Provide specifications for red-dye concrete mix to be used for encasement.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers or an approved equal are acceptable:
 1. Prefabricated Composite Handholes:
 - a. Armorcast Products Company; www.armorcastprod.com
 - b. Quazite, Hubbel Power Systems, Inc.; www.hubbellpowersystems.com/about/quazite/
 2. Precast Handholes, Pull Boxes, and Vaults:
 - a. Armorcast Products Company; www.armorcastprod.com
 - b. Christy Concrete, Oldcastle Precast, Inc.; <https://oldcastleinfrastructure.com/brands/christy/>
 - c. Jensen Precast; www.jensenprecast.com
 - d. Oldcastle Precast, Inc.; <https://oldcastleinfrastructure.com/products/energy/substations/>
 3. Accessories:
 - a. Alhambra Foundry Company; www.alhambrafoundry.com/

- b. Condux International, Inc.; www.condux.com/
- c. Long Beach Iron Works; www.lbiw.com/
- d. Underground Devices, Inc.; www.udevices.com/
- e. Unistrut, a part of Atkore International; www.unistrut.us/
- 4. Concrete Encasement Red Dye:
 - a. L.M. Scofield Company, Integral Color “Utility Red”; www.scofield.com

2.02 HANDHOLES, PULL BOXES, AND VAULTS

A. Prefabricated Composite Material Handholes:

- 1. Handhole Body and Cover: Fiberglass reinforced polymer concrete conforming to all tests provision of SCTE 77.
- 2. Minimum Load Ratings: In compliance with SCTE 77 Tier 15.
- 3. Open bottom, stackable design as required for specified depth.
- 4. Cover:
 - a. Engraved legend “ELECTRIC” or “COMMUNICATIONS”.
 - b. Non-gasketed bolt down with stainless steel penta head bolts.
 - c. Lay-in non-bolt down, when cover is over one hundred pounds (100 lbs).
 - d. One or multiple sections so the maximum weight of section is one hundred twenty-five pounds (125 lbs).
- 5. Cover Lifting Hook: 24-inch minimum length.

B. Precast Handholes, Pullboxes, and Vaults:

- 1. Fiberglass reinforced polymer concrete or steel reinforced cement concrete
- 2. AASHTO Live Load Rating: H-20 for full deliberate vehicle traffic.
- 3. Mating Edges: Tongue and groove type.
- 4. Solid bottom with a 12”x12” sump or 12-inch diameter french drain in the bottom of each vault.
- 5. Gasketed removable top slab with lifting eyes and cast in frame for cover.
- 6. Cable pulling eyes opposite all conduit entrances.

2.03 ACCESSORIES

A. Concrete Handhole, Pull Boxes, and Vaults:

- 1. Cover and Frame:
 - a. Cast Ductile Iron: ASTM A536.
 - b. AASHTO Live Load Rating: H-20.

- c. Cast legend “ELECTRICAL” or “COMMUNICATIONS” into covers.
- B. Cable Racks and Hooks:
 - 1. Material: Heavy-duty, non-metallic (glass reinforced nylon).
 - 2. Hook Loading Capacity: four hundred pounds (400 lbs.) minimum.
 - 3. Rack Loading Capacity: Four (4) hooks maximum.
 - 4. Hook Deflection: ¼-inch maximum.
 - 5. Hooks: Length, as required, with positive locking device to prevent upward movement.
 - 6. Mounting Hardware: Stainless Steel.
 - 7. Cable Pulling Irons:
 - a. 7/8-inch diameter hot-dipped galvanized steel.
 - b. Six thousand pound (6,000 lb.) minimum pulling load.
 - 8. Grounding Rods and Grounding Equipment: See Detailed Provisions Section 26 0526 – Grounding and Bonding for Electrical Systems.

2.04 UNDERGROUND CONDUIT AND ACCESSORIES

- A. Concrete Encasement:
 - 1. Comply with Detailed Provisions Section 03 1113 – Formwork – Structural Cast-in-Place Concrete, Detailed Provisions Section 03 2100 – Concrete Reinforcement, Detailed Provisions Section 03 3100 – Cast-in Place Structural Concrete, Detailed Provisions Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing, and Detailed Provisions Section 03 3132 – Concrete Finishing and Repair of Surface Defects.
 - 2. Concrete shall be red dyed utilizing red dye mixed into the concrete for a minimum of five (5) minutes prior to pouring. Minimum of twelve pounds (12 lbs.) of dye per one (1) cubic yard of concrete.
 - 3. Compressive Strength: Unless noted otherwise, minimum 3,000 psi.
 - 4. Graded as specified in ASTM C33, size number 8.
- B. Conduit: Comply with Detailed Provisions Section 26 0533 – Raceways and Boxes.
- C. Duct Terminators: ABS plastic, window type and provided for conduit entrance. Designed for installation into handholes, pull boxes, and vaults for a watertight seal. Sufficient space between terminator walls to allow for placement of rebar and concrete.
- D. Duct Spacers/Supports: Interlocking, high density polyethylene or high impact polystyrene. Provide 3-inch minimum spacing between conduits. Provide accessories as required, including, but not limited to: hold down bars and ductbank strapping.
- E. Warning Tape – See Detailed Provisions Section 26 0553 – Identification for Electrical Systems.

PART 3 EXECUTION

3.01 GENERAL

- A. Project Drawings indicate the intended location of handholes, pull boxes, vaults and routing of ductbanks and direct buried conduit. Field conditions may affect actual routing. Proposed deviations from locations and routing shown on the Project Drawings must be approved by the County in writing.
- B. Handhole, pull box, and vault locations:
 - 1. Approximately as shown on the Project Drawings. Determine exact locations after careful consideration has been given to the location of other utilities, grading, and paving. Shall not be located in a swale or drainage ditch.
 - 2. As required for pulling distances, for number of bends in ductbank routing, and to keep pulling tension under allowable cable tensions.
 - 3. Locations are to be approved by the County prior to excavation and placement of all handholes, pull boxes, and vaults.
- C. Install products in accordance with manufacturer's instructions.
- D. Comply with Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities.

3.02 HANDHOLES, PULL BOXES, AND VAULTS

- A. Prefabricated Composite Material Handholes:
 - 1. Only for use in areas subjected to occasional non-deliberate vehicular traffic.
 - 2. Place handhole on a foundation of compacted ¼-inch to ½-inch crushed rock, a minimum 8-inches thick and extended a minimum 6-inches past the handholes footprint on all sides.
 - 3. Provide concrete encasement ring around handhole per manufacturer's installation instructions.
 - 4. Install so that the surrounding grade is 1-inch lower than the top of the handhole.
 - 5. Size: As indicated on Project Drawings or as required for the number and size of conduits.
 - 6. Provide cable rails and pulling eyes as needed.
- B. Precast Handholes, Pull Boxes, and Vaults:
 - 1. For use in vehicular and non-vehicular traffic areas.
 - 2. Construction:
 - a. Grout or seal all joints, per manufacturer's instructions.

- b. Support cables on wall by cable racks:
 - 1) Provide a minimum of two (2) racks, install symmetrically on each wall of handholes, pull boxes, and vaults. Provide additional cable racks, as required, so that both ends of cable splices will be supported horizontally.
 - 2) Equip cable racks with adjustable hooks in quantity as required by the number of conductors to be supported.
- c. In each handhole, pull box, and vault, drive a ¾-inch diameter by 10-foot long copper clad ground rod into the earth with approximately 6-inches exposed above finished floor.
 - 1) Drill opening in floor for ground rod.
 - 2) Connect all metallic components to ground rod by means of #8 AWG minimum copper wire and approved grounding clamps.
 - 3) Utilize a ground bar in the handhole, pull box, or vault if the quantity of ground wires exceeds three (3). Connect ground bar to ground rod with a #2/0 AWG minimum copper wire.
- 3. Place handhole, pull box, or vault on a foundation of compacted ¼-inch to ½-inch crushed rock, a minimum 8-inches thick and extended a minimum 6-inches past the handhole, pull box, or vault footprint on all sides.
- 4. Install so that the top of cover is 1-inch above finished grade. Where existing grades are higher than finished grades, install sufficient number of courses of curved segmented concrete block between top of structure and cover frame to temporarily elevate cover to existing grade level.
- 5. After installation is complete, backfill and compact soil around handholes, pull boxes, and vaults.
- 6. Size: As indicated on Project Drawings or as required for the number and size of conduits entering. See paragraph 1.03 of this Detailed Provisions Section for minimum required sizes.

3.03 UNDERGROUND CONDUITS

A. General Installation Requirements:

- 1. Ductbank types per location:
 - a. Concrete encased ductbank:
 - 1) As indicated in the Ductbank Schedule and/or Project Drawings.
 - b. Direct-buried conduit(s):
 - 1) Area/Roadway lighting
 - 2) As indicated in the Ductbank Schedule and/or Project Drawings.
- 2. Do not place concrete encasement or backfill with soil until conduits have been observed and surveyed by the County.

3. Ductbanks shall be sloped a minimum of 4-inches per one hundred (100) feet. Low points shall be at handholes, pull boxes, or vaults.
4. During construction and after conduit installation is complete, plug the ends of all conduits.
5. Provide conduit supports and spacers.
 - a. Place supports and spacers for rigid nonmetallic conduit on maximum centers as indicated for the following trade sizes:
 - 1) 1-inch and less: 3 feet.
 - 2) 1¼-inch to 3-inches: 5 feet.
 - 3) 3-inch and larger: 20 feet.
 - b. Place supports and spacers for rigid steel conduit on maximum centers as indicated for the following trade sizes:
 - 1) 1-inch and less: 10 feet.
 - 2) 1¼-inch to 2½-inch: 14 feet.
 - 3) 3-inch and larger: 20 feet.
 - c. Securely anchor conduits to supports and spacers to prevent movement during placement of concrete or soil.
6. Stagger conduit joints at intervals of 6-inches vertically.
7. Make conduit joints watertight and in accordance with manufacturer's recommendations.
8. Accomplish changes in direction of runs exceeding a total of fifteen (15) degrees by long sweep bends having a minimum radius of twenty-five (25) feet. Sweep bends may be made up of one or more curved or straight sections or combinations thereof.
9. Furnish manufactured bends at end of runs. Minimum radius of 18-inches for conduits less than 3-inch trade size and 36-inches for conduits 3-inch trade size and larger.
10. Field cuts requiring tapers shall be made with the proper tools and shall match factory tapers.
11. After the conduit run has been completed:
 - a. Prove joint integrity and test for out-of-round duct by pulling a test mandrel through each conduit.
 - 1) Test Mandrel:
 - (a) Length: Not less than 12-inches.
 - (b) Diameter: Approximately ¼-inch less than the inside diameter of the conduit.
 - b. Clean the conduit by pulling a heavy duty wire brush mandrel followed by a rubber duct swab through each conduit.

12. Pneumatic rodding may be used to draw in lead wire.
 - a. Install a heavy nylon cord free of kinks and splices in all unused new ducts.
 - b. Extend cord three (3) feet beyond ends of conduit.
 13. Transition from rigid non-metallic conduit to rigid metallic conduit, per Detailed Provisions Section 26 0533 – Raceways and Boxes, prior to entering a structure or going above ground.
 - a. Except rigid non-metallic conduit may be extended directly to handholes, pull boxes, vaults, pad mounted transformer boxes and other exterior pad mounted electrical equipment where the conduit is concealed within the enclosure.
 - b. Terminate rigid PVC conduits with end bells.
 - c. Terminate rigid steel conduits with insulated bushings.
 14. Place warning tape in trench over ductbanks, direct-buried conduit, and direct-buried wire and cable in accordance with Detailed Provisions Section 26 0553 – Electrical Devices Identification.
 15. Placement of conduits stubbing into handholes, pull boxes, and vaults shall be located to allow for proper bending radiuses of the cables.
- B. Concrete Encased Ductbank:
1. Provide the required rigid steel and PVC conduits with watertight connections and completely encased with concrete.
 2. Provide at least 3-inches of concrete between the conduits and the outside of the encasement, and 2-inches of concrete between conduits unless otherwise indicated.
 3. Install spacers and adapters to support and terminate nonmetallic conduits. Connect the adapters to rigid steel conduit risers that terminate at above-grade equipment.
 4. The steel conduit riser shall be completely concrete encased to finish grade. The top of the concrete encasement shall be a minimum of 30-inches below finish grade.
 5. Trench backfilling shall be done in accordance with Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities. Restore the finish grade surface to match existing. Repave the trench to match existing pavement if trench passes through a paved area.
 6. Install warning tape in accordance with Detailed Provisions Section 26 0553 – Identification for Electrical Systems.
 7. Comply with Detailed Provisions Section 03 1113 – Formwork-Structural Cast-in-Place Concrete, Detailed Provisions Section 03 2100 – Concrete Reinforcement, Detailed Provisions Section 03 3100 – Cast-in-Place Structural Concrete, Detailed Provisions Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing, and Detailed Provisions Section 03 3132 – Concrete Finishing and Repair of Surface Defects.

C. Direct-Buried Conduit(s):

1. Install so that the top of the uppermost conduit, at any point:
 - a. Is not less than 30-inches below grade.
 - b. Is below pavement sub-grading.
2. Provide a uniform minimum clearance of 3-inches between conduits or as required in Detailed Provisions Section 26 0533-Raceways and Boxes for different cabling types.
 - a. Maintain the separation of multiple planes of conduits by one of the following methods:
 - 1) Install multilevel conduits with the use of conduit supports and spacers to maintain the required separations, and backfill with flowable fill (100 psi) or concrete per Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities.
 - 2) Install the multilevel conduits one level at a time. Each level is backfilled with the appropriate amount of soil and compaction, per Detailed Provisions Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities, to maintain the required separations.

3.04 INSPECTIONS AND TESTING

- A. Inspect handholes, pull boxes, vaults, conduits, fittings, and accessories for damage and defects.
- B. Contractor to test and clean interior of conduits using test mandrel, heavy –duty wire brush mandrel followed by a rubber duct swab.
- C. Correct deficiencies and replace damaged or defective conduit, fittings, and accessories.

END OF SECTION 26 0543



SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 0553: IDENTIFICATION FOR ELECTRICAL SYSTEMS CONTENTS

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SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Electrical identification, material and installation requirements for:
 - a. Identification nameplates and labels
 - b. Wire and cable markers
 - c. Warning Signs and Labels

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements.
2. Section 11 0505 – Equipment: Basic Requirements
3. Section 26 0500 – Basic Electrical Requirements
4. Section 26 0519 – Wire and Cable: 600 Volt and Below
5. Section 26 0533 – Raceways and Boxes
6. Section 26 2717 – Equipment Wiring

1.02 REFERENCE STANDARDS

A. American National Standards Institute (ANSI):

1. ANSI Z535.2 – Environmental and Facility Safety Signs
2. ASNI Z535.4 – Product Safety Signs and Labels

B. American Society for Testing and Materials (ASTM):

1. ASTM D 709 – Standard Specification for Laminated Thermosetting Materials

C. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):

1. UL 969 – Marking and Labeling Systems

1.03 SUBMITTALS

A. Shop Drawings:

1. Showing nameplate data including material, heights of letters and proposed inscriptions.

B. Product Data:

1. Provide manufacturer's standard catalog pages and data sheets for nameplates, wire and cable markers, and labels.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:

1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Switchboards/Panelboards
 - 1) Identify ampere rating
 - 2) Identify voltage and phase
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - b. Mini-Power Zone
 - 1) Identify ampere rating
 - 2) Identify voltage and phase
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 6) For panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - c. Transformers
 - 1) Identify KVA rating
 - 2) Identify voltage and phase for primary and secondary
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.

- 4) Identify load(s) served. Include location when not within sight of equipment.
 - d. Enclosed Switches, Circuit Breakers, and Motor Control Centers (MCCs)
 - 1) Identify voltage and phase
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
 2. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized. Warning labels shall be in accordance with Detailed Provisions Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, And Field Testing of Electrical Equipment.
- B. Identification for Conductors and Cables:
1. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
 2. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
 - a. At each source and load connection.
 - b. Within boxes when more than one circuit is present.
 - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
- C. Identification for Raceways:
1. Use identification labels or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not with sight.
 2. Use identification labels or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
 3. Use underground traceable warning tape to identify underground raceways.
- D. Identification for Boxes:
1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
 - a. For exposed boxes in public areas, use only identification labels.

E. Identification for Devices:

1. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
 - a. For receptacles in public areas or in areas as directed by the County, provide identification on inside surface of wallplate.

F. Buried Electrical, Telephone, and Communication Lines:

1. Use polyethylene plastic and metallic core, acid and alkali resistant, warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3-inch minimum width, color coded as stated below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil. Minimum thickness of the tape shall be 0.004 inches. Tape shall have a minimum strength of 1,500 psi lengthwise and 1,250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when the tape is buried up to three (3) feet deep below finished grades. Warning tape color coded as follows:
 - a. Electric – Red
 - b. Telephone and Other Communications – Orange
 - c. Water Lines - Blue

G. Communication Cabinets – Use identification nameplates.

H. Electrical Distribution and Control Equipment Enclosures – Use identification nameplates.

I. Junction Box Load Connections – Use wire markers.

J. Outlet Box Load Connections – Use wire markers.

K. Panel Gutter Load Connections – Use wire markers.

L. Pull Box Load Connections – Use wire markers.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.

2. Plastic Nameplates: Two-layer of three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of $\frac{1}{16}$ -inch; engraved text. Provide minimum thickness of $\frac{1}{8}$ -inch when any dimension is greater than 4 inches.
 3. Stainless Steel Nameplates: Minimum thickness of $\frac{1}{32}$ -inch, engrave or laser-etched text.
 4. Aluminum Nameplates: Anodized; minimum thickness of $\frac{1}{32}$ -inch; engraved or laser-etched text.
 5. Mounting Holes for Mechanical Fasteners: Two (2), centered on sides for sizes up to 1-inch high; four (4), located at corners for larger sizes.
- B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1-inch by $2\frac{1}{2}$ -inches.
 2. Legend: Equipment designation or other approved description.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height:
 - a. Equipment Designation: $\frac{1}{2}$ -inch.
 - b. Other Information: $\frac{1}{4}$ -inch.
 5. Color:
 - a. Nominal Power System: White text on black background.
- D. Format for Receptacle Identification:
1. Minimum Size: $\frac{3}{8}$ -inch by $1\frac{1}{2}$ -inches.
 2. Legend: Power source and circuit number or other designation indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: $\frac{3}{16}$ -inch
 5. Color: Black text on clear background.
- E. Format for Control Device Identification:
1. Minimum Size: $\frac{3}{8}$ -inch by $1\frac{1}{2}$ -inches.
 2. Legend: Load controlled or other designation indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: $\frac{3}{16}$ -inch

5. Color: Black text on clear background.

2.03 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: $\frac{1}{8}$ -inch
- F. Color: Black text on white background unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 1. Surface-Mounted Equipment: Enclosure front.
 2. Flush-Mounted Equipment: Inside of equipment door.
 3. Free-Standing Equipment: Enclosure front, also enclosure rear for equipment with rear access.
 4. Elevated Equipment: Legible from the floor or working platform.
 5. Branch Devices: Adjacent to device.
 6. Interior Components: Legible from the point of access.
 7. Conduits: Legible from the floor.
 8. Boxes: Outside face of cover.
 9. Conductors and Cables: Legible from the point of access.
 10. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing of epoxy cement.

- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Mark all handwritten text, where permitted, to be neat and legible.

3.02 INSPECTIONS AND TESTING

- A. Inspect nameplates, labels, and markers for damage and defects.
- B. Correct deficiencies and replace damaged or defective nameplates, labels, and markers. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling, or other signs of improper adhesion.

END OF SECTION 26 0553

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 0573: ELECTRICAL SHORT CIRCUIT/COORDINATION STUDY, ARC FLASH HAZARD STUDY, AND FIELD TESTING OF ELECTRICAL EQUIPMENT

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SECTION 26 0573

ELECTRICAL SHORT CIRCUIT/COORDINATION STUDY, ARC FLASH HAZARD STUDY, AND FIELD TESTING OF ELECTRICAL EQUIPMENT

PART 1 GENERAL

1.01 GENERAL

- A. The proposed electrical distribution equipment shall be designed, manufactured, and supplied to limit the Arc Flash Hazard/Risk Categories of the equipment to Level 3 or less. The engineer(s) performing the studies shall coordinate with Contractor, the County, and the electrical equipment manufacturer to assist in achieving this requirement.

1.02 SCOPE – SHORT CIRCUIT/COORDINATION STUDY

- A. The Contractor shall provide short circuit and protective device evaluation and coordination study to verify electrical protective devices selected and selective tripping coordination for proposed facilities.
- B. Unless otherwise noted, the evaluations and study shall include all portions of the existing and proposed electrical distribution system from the normal power source or sources down to and including the smallest adjustable trip circuit breaker in the distribution system. Normal system connections and those which result in maximum fault conditions shall be adequately covered in the study.
- C. The study shall be performed, stamped and signed by a registered electrical engineer in the State of California. Credentials of the individual(s) performing the study and background of the firm shall be submitted to the County for approval prior to start of the Work. A minimum of five (5) years experience in power system analysis is required for the individual in charge of the Project. The firm performing the study shall provide assistance during start up as required.
- D. The Engineer performing the system studies shall furnish the Contractor with a listing of the required data immediately following award of the Contract, and Contractor shall expedite collection of the data to assure completion of the study prior to final approval of the electrical equipment shop drawings and/or release of the equipment for manufacture.

1.03 SCOPE – ARC FLASH HAZARD STUDY

- A. Contractor shall provide an Arc Flash Hazard Study to determine potential arc flash incident energies, arc flash boundaries, shock hazard boundaries and required personal protective equipment (PPE) for all energized electrical equipment, and arc flash and shock hazard warning labels.
- B. Unless otherwise noted, the study shall include all electrical equipment from the normal power source or sources to and including all electrical panels with voltage greater than 120 volts.

- C. The study shall be performed, stamped, and signed by a registered electrical engineer in the State of California. Credentials of the individual(s) performing the study and background of the firm shall be submitted to the County for approval prior to start of Work. The study shall be performed using the latest revision of SKM Arc Flash Evaluation software by SKM Systems Analysis Software. The firm performing the study shall provide assistance during startup as required.
- D. The engineer performing the study shall furnish Contractor with a listing of the required data immediately following award of the Contract, and Contractor shall expedite collection of the data to assure completion of the study prior to final approval of the electrical equipment shop drawings and/or release of the equipment for manufacture.

1.04 SCOPE – FIELD TESTING AND VERIFICATION

- A. Contractor shall provide the services of an independent testing consultant to field verify that all protective devices are set in accordance with the accepted short circuit/coordination study requirements and recommendations. In addition, the consultant shall perform resistance testing of ground systems to confirm compliance with National Fire Protection Association (NFPA) 70 (National Electric Code-NEC_ and electric utility requirements and other testing as specified herein, and verify that arc flash and stock hazard warning labels have been installed.

PART 2 PRODUCTS

2.01 SHORT CIRCUIT AND PROTECTIVE DEVICE EVALUATION AND COORDINATION STUDY

A. General:

1. The short circuit study shall be performed in accordance with the latest applicable NEC, NETA, IEEE, ANSI, and NFPA standards. Provide calculation methods and assumptions, the base per unit quantities selected, one-line diagrams, source impedance data including power company system characteristics, typical calculations, tabulations of calculation quantities and results, conclusions, and recommendations. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed 3-phase bolted fault at each supply switchgear lineup, unit substation primary and secondary terminals, low-voltage switchgear lineup, switchboard, motor control center, distribution panelboard, pertinent branch circuit panelboard, and other significant locations throughout the system. Provide a ground fault current study for the same system areas, including the associated zero sequence impedance data. Include in tabulations fault impedance, X to R ratios, asymmetry factors, motor contribution, short circuit kVA, and symmetrical and asymmetrical fault currents.
2. In the protective device evaluation and coordination study include utility company device characteristics, system medium-voltage equipment relay and device characteristics, low-voltage equipment circuit breaker trip device characteristics, pertinent transformer characteristics, pertinent motor and generator characteristics, and characteristics of other system load protective devices. Include all devices,

including branch circuits and feeder circuit breakers in each motor control center, and main breaker in branch panelboards.

Provide time-current curves graphically indicating the coordination proposed for the system. Include with each curve sheet a complete title and one-line diagram with legend identifying the specific portion of the system covered by that particular curve sheet. Include a detailed description of each protective device identifying its type, function, manufacturer, and time-current characteristics. Tabulate recommended device tap, time dial, pickup, instantaneous, and time delay settings.

Include all adjustable settings for ground fault protective devices. Include manufacturing tolerance and damage bands in plotted fuse characteristics. Show transformer full load and 150, 400, or 600 percent currents, transformer magnetizing inrush, ANSI transformer withstand parameters, and significant symmetrical and asymmetrical fault currents. Terminate device characteristic curves at a point reflecting the maximum symmetrical or asymmetrical fault current to which the device is exposed.

3. When emergency generator is provided, include phase and ground coordination of the generator protective devices. Show the generator decrement curve and damage curve along with the operating characteristic of the protective devices. Obtain the information from the generator manufacturer and include the generator actual impedance value, time constants and current boost data in the study. Do not use typical values for the generator.
4. For motor control circuits, show the MCC full-load current plus symmetrical and asymmetrical of the largest motor starting current and time to ensure protective devices will not trip during major or group start operation.

B. Study Report:

1. The results of the power system study shall be summarized in a final report. Three (3) bound copies of the final report and two (2) CDs containing Adobe Acrobat PDF format of the report and the root data file (.drw) shall be submitted to the County.
2. The report shall include the following sections:
 - a. Descriptions, purpose, basis and scope of the study.
 - b. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties, and commentary regarding same.
 - c. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
 - d. Fault current calculations including a definition of terms and guide for interpretation of computer printout.

C. Modifications Required by Study:

1. The Contractor shall coordinate the study results with the manufacturer and supplier of the electrical equipment to incorporate the recommendations and modifications therein, prior to fabrication.

2.02 ARC FLASH HAZARD STUDY

A. General:

1. The Arc Flash Hazard Study shall be performed in accordance with the latest applicable NFPA, IEEE, and ANSI Standards. Provide calculation methods and assumptions, typical calculations, tabulations of calculation quantities and results, conclusions, and recommendations.
2. Calculate equipment arc gap.
3. Calculate bolted and estimated arcing fault current at the fault point.
4. Calculate trip time, opening time, and total clearing time (total arc time) of the protective device.
5. Calculate worst-case arc flash boundary for each bus/panel.
6. Calculate worst-case arc flash hazard energy in cal/cm² for each bus/panel and establish the Arc Flash Hazard/Risk Categories.
7. Determine worst-case Personal Protective Equipment (PPE) for each bus/panel.
8. Calculate shock hazard approach boundaries (limited approach boundary, restricted approach boundary, and prohibited approach boundary).
9. Provide recommendations to reduce arc flash hazard energy and exposure.
10. Coordinate with the manufacturer/supplier of the electrical equipment.

B. Study Report:

1. The results of the Arc Flash Hazard Study shall be summarized in a final report. Three (3) bound copies of the final report and two (2) CDs containing Adobe Acrobat PDF format of the report and the root data file (.drw) shall be submitted to the County.
2. The report shall include the following sections:
 - a. Descriptions, purpose, basis, and scope of study.
 - b. Tabulations of equipment arc gap and bolted and estimated arcing fault current at the fault point.
 - c. Tabulations of trip time, opening time, and total clearing time (total arc time) for each protective device.
 - d. Tabulations of worst-case arc flash hazard incident energy and worst-case PPE for each bus/panel.

- e. Tabulations of shock hazard approach boundaries (limited approach boundary, restricted approach boundary, and prohibited approach boundary).
- f. Recommendations to reduce arc flash hazard energy and exposure.
- g. Listing of SKM Arc Flash Evaluation software computer file(s) prepared for the study and CD containing electronic file data.

C. Warning Labels


1. Warning labels shall be 4" x 6" UV resistant vinyl labels (white label with orange warning stripe and black letters). Sample warning label is presented at the end of this Detailed Provisions Section.
2. Firm performing the Study shall provide labels to Contractor.
3. For outdoor electrical panels (NEMA 1 MCC in NEMA 3R wrapper), warning labels shall be provided on both outer and inner doors.

Each outer door section shall be provided with a warning label stating "WARNING, ARC FLASH AND SHOCK HAZARD, APPROPRIATE PPE REQUIRED".

Each inner door, behind each set of outer doors, shall be provided with one (1) warning label every four (4) feet. Inner warning labels shall include the following information:

- a. "WARNING, ARC FLASH AND SHOCK HAZARD, APPROPRIATE PPE REQUIRED".
 - b. Flash hazard boundary.
 - c. Cal/cm² flash hazard for worst-case.
 - d. Worst case PPE level and list required PPE.
 - e. Shock hazard when cover is removed.
 - f. Limited approach distance and list required PPE.
 - g. Restricted approach distance and list required PPE.
 - h. Prohibited approach distance and list required PPE.
4. For all electrical panels without a NEMA 3R wrapper (stand-alone panels), one (1) warning label shall be provided every four (4) feet. Warning labels shall include the following minimum information:
 - a. "WARNING, ARC FLASH AND SHOCK HAZARD, APPROPRIATE PPE REQUIRED".
 - b. Flash hazard boundary.
 - c. Cal/cm² flash hazard for worst-case.
 - d. Worst case PPE level and list required PPE.
 - e. Shock hazard when cover is removed.
 - f. Limited approach distance and list required PPE.

- g. Restricted approach distance and list required PPE.
- h. Prohibited approach distance and list required PPE.

 <h1 style="margin: 0;">WARNING</h1>
<h2 style="margin: 0;">Arc Flash and Shock Hazard Appropriate PPE Required</h2>
<p>24 inch Flash Hazard Boundary</p> <p>3 cal/cm2 Flash Hazard at 18 inches</p> <p>PPE Level, 1 Layer 6 oz Nomex®, Leather Gloves, Faceshield</p>
<p>480 VAC Shock Hazard when Cover is removed</p> <p>42 inch Limited Approach</p> <p>12 inch Restricted Approach - 500 V Class 00 Gloves</p> <p>1 inch Prohibited Approach - 500 V Class 00 Gloves</p>
<p>Equipment Name: Slurry Pump Starter</p>

PART 3 EXECUTION

3.01 FIELD SETTINGS AND TESTING

- A. Prior to energizing facilities, final testing shall be performed by the Contractor and witnessed by the field testing consultant. Testing shall be performed to confirm compliance with Contract Documents, NEC, and to permit energizing the equipment including the "green tagging" of the electrical service.
- B. The Contractor shall perform field adjustments of the protective devices as required to place the equipment in final operating condition. The settings shall be in accordance with the approved short circuit study, protective device evaluation study, and protective device coordination study. The testing consultant shall witness the settings and confirm same.
- C. Necessary field settings of devices and adjustments and minor modifications to equipment to accomplish conformance with the approved short circuit and protective device coordination study shall be carried out by the Contractor at no additional cost to the County.
- D. Field testing consultant shall measure and record the resistance of the ground systems.

- E. Field testing consultant shall confirm proper torque of wire lug connections to the main switchgear, power distribution sections, MCC, lighting panels, and check for loose wiring connections.
- F. Field testing consultant shall megger test each motor at 500 volts and 1,000, and report results.
- G. The field testing consultant shall verify proper short circuit duty and amperage rating of all devices and bussing.
- H. The field testing consultant shall verify that arc flash and shock hazard warning labels have been installed in accordance with the requirements of Part 2.02.C, herein.

3.02 FIELD TESTING REPORT

- A. The field testing consultant shall provide a detailed report showing all test results and showing that settings of protective devices are in compliance with the coordination study. The report shall state adequacy of grounding systems and protective device settings and indicate the facilities are in compliance with NEC and ready to be energized. Report shall be submitted to the County for acceptance as a submittal document.

3.03 UTILITY COMPANY APPROVAL

- A. Unless otherwise noted, copies of the final report shall be submitted to the County for submittal to the utility company for their review and approval. Report shall demonstrate that the service is ready to be energized and include suitable test results meeting the utility's requirements.

END OF SECTION 26 0573

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SPECIFICATIONS – DETAILED PROVISIONS
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SECTION 26 0813

ELECTRICAL ACCEPTANCE TESTING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Basic requirements for electrical acceptance testing.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Division 01 – General Requirements.
 - 2. Division 26 – Electrical.
 - 3. Division 33 - Utilities

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

- A. Reference Standards:
 - 1. National Electrical Testing Association (NETA):
 - a. NETA ATS – Standard for Acceptance Testing Specifications for Electric Power Equipment and Systems.
 - 2. Nationally Recognized Testing Laboratory (NRTL).
 - 3. Telecommunications Industry Association/Electronic Industries Alliance/American National Standards Institute (TIA/EIA/ANSI):
 - a. TIA/EIA/ANSI 455-78 – Optical Fibers- Part 1-40: Measurement and Test Procedures – Attenuation.
- B. Qualifications:
 - 1. Testing Firm Qualifications:
 - a. An independent firm performing, as the sole or principal part of its business for a minimum of 10 years, the inspection, testing, calibration, and adjusting of systems.
 - b. Must have an established monitoring and testing equipment calibration program with accuracy traceable in an unbroken chain, according to NIST.
 - 2. Field Personnel:
 - a. Minimum of one (1) year field experience covering all phases of electrical equipment inspection, testing, and calibration.
 - b. Relay test technician having previous experience with testing and calibration of relays of the same manufacturer and type used on project and proficient in setting and testing the types of protection elements used.
 - c. As an alternative, supervising technician may be certified by the equipment manufacturer.

3. Analysis Personnel:
 - a. Minimum three (3) years combined field testing and data analysis experience.
 - b. As an alternative, supervising technician may be certified by the equipment manufacturer.
- C. Phasing Diagram:
 1. Coordinate with Utility Company for phase rotations and Phase A, B and C markings.
 - a. Create a phasing diagram showing the coordinated phase rotations with generators and motors through the transformers.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
 1. See Detailed Provisions Section 26 0500- Basic Electrical Requirements for electrical equipment and connection testing plan submittal requirements.
- C. Quality Assurance Submittals:
 1. Prior to energizing equipment:
 - a. Coordinated phasing diagram.
 2. Electrical Equipment and Connections Testing Program prepared by an independent electrical testing firm. Contractor shall procure the firm and bear all costs associated with preparation and implementation of the Electrical Equipment and Connections Testing Program.
 3. Within two (2) weeks after successful completion of testing:
 - a. Single report containing information including:
 - 1) Summary of Work.
 - 2) Information from pre-energization testing.
 - 3) See testing and monitoring reporting requirements in Detailed Provisions Section 26 0500-Basic Electrical Requirements.

PART 2 PRODUCTS

2.01 FACTORY QUALITY CONTROL

- A. Provide Division 26, and 33 equipment with all routing factory tests required by the applicable industry standards or NRTL.
- B. Factory testing will not be accepted in lieu of field acceptance testing requirements specified in this Detailed Provisions Section.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. General:

1. See Detailed Provisions Section 26 0500 – Basic Electrical Requirements and individual electrical equipment and component sections for electrical testing requirements.
2. Contractor to procure services of an independent firm to prepare and implement Electrical Equipment and Connections Testing Program. Firm shall provide all required electrical testing and Contractor shall be responsible for all costs associated with testing.
3. Complete electrical testing in three (3) phases:
 - a. Pre-energization testing phase.
 - b. Equipment energized with no load.
 - c. Equipment energized under load.
4. Perform testing in accordance with this Detailed Provisions Section and NETA ATS.
5. Provide field setting and programming of all adjustable protective devices and meters to settings provided by the County.

B. Equipment Monitoring and Testing Plan:

1. Approved in accordance with Shop Drawing submittal schedule.
2. Included as a minimum:
 - a. Qualifications of firm, field personnel, and analysis personnel doing the Work.
 - b. List and description of testing and analysis equipment to be utilized.
 - c. List of all equipment to be testing, including:
 - 1) Name and tag numbers identified in the Contract Documents.
 - 2) Manufacturer's serial numbers.
 - 3) Other pertinent manufacturer identification.

C. Instruments Used in Equipment and Connections Quality Control Testing:

1. Minimum calibration frequency:
 - a. Field analog instruments: Not more than 6 months.
 - b. Field digital instruments: Not more than 12 months.
 - c. Laboratory instruments: Not more than 12 months.
 - d. If instrument manufacturer's calibration requirements are more stringent, those requirements shall govern.
2. Carry current calibration status and labels on all testing instruments.

3. See individual testing programs for additional instrumentation compliance requirements.
- D. Testing and Monitoring Program Documentation:
1. Provide reports with tabbed sections for each piece of equipment tested.
 2. Include all testing results associated with each piece of equipment under that equipment's tabbed section.
 - a. Include legible copies of all forms used to record field test information.
 3. Prior to start of testing, submit one (1) copy of preliminary report format for County review and comment.
 - a. Include data gathering and sample test report forms that will be utilized.
 4. In the final report, include as a minimum, the following information for all equipment tested:
 - a. Equipment identification, including:
 - 1) Name and tag numbers identified in the Contract Documents.
 - 2) Manufacturer's serial numbers.
 - 3) Other pertinent manufacturer identification.
 - a. Date and time of each test.
 - b. Ambient conditions including temperature, humidity, and precipitation.
 - c. Visual inspection report.
 - d. Description of test and referenced standards, if any, followed while conducting tests.
 - e. Results of initial and all retesting.
 - f. Acceptance criteria.
 - g. "As found" and "as left" conditions.
 - h. Corrective action, if required, taken to meet acceptance.
 - i. Verification of corrective action signed by the Contractor, equipment supplier, and County.
 - j. Instrument calibration dates of all instruments used in testing.
 5. Provide three (3) bound final reports prior to Project final completion.
- E. Electrical Equipment and Connections Testing Program:
1. Perform testing on Division 26 and Division 33 equipment and connections in accordance with Division 26 requirements.
 2. Testing of motors:
 - a. After installation and prior to energizing the motor, perform inspections and tests per NETA ATS 7.15 for all motors 10 HP or above.

- b. Bump motor to check for correct rotation.
- 3. Repair or replace equipment shown to be out of range of the acceptable tolerance until the equipment meets or exceeds acceptability standards.

3.02 SPECIFIC EQUIPMENT TESTING REQUIREMENTS

A. Cable – Low Voltage:

- 1. Perform inspections and tests per NETA ATS 7.3.2. See Detailed Provisions Section 26 0519 – Wire and Cable: 600 Volt and Below.

B. Cable – Optical Fiber:

- 1. Perform inspections on tests per TIA/EIA/ANSI 455-78, including:
 - a. Optional time domain reflectometer test.
 - b. Power attenuation test.
 - c. Gain margin test.

C. Low Voltage Power Circuit Breakers:

- 1. Perform inspections and tests per NETA ATS 7.6.1.2. See Detailed Provisions Section 26 2800- Overcurrent and Short Circuit Protective Devices:
 - a. Tests shall include primary current injection testing of all breakers at final settings.
 - b. Where short-time or instantaneous settings on large frame breakers are beyond the current capability of field testing, primary injection tests at reduced currents shall be permitted if combined with secondary injection calibration test of trip unit at final settings.
- 2. Components: Test all components per applicable paragraphs of this Detailed Provisions Section and NETA ATS.
- 3. Perform the following additional tests:
 - a. Shunt trip devices minimum tripping voltage.
- 4. Record as-left settings.

D. Low Voltage Molded Case Circuit Breakers:

- 1. Perform inspections and tests per NETA ATS 7.6.1.1. See Detailed Provisions Section 26 2800- Overcurrent and Short Circuit Protective Devices.
- 2. Components:
 - a. Test all components per applicable paragraphs of this Detailed Provisions Section and NETA ATS.
 - b. Thermal magnetic breakers: Visual and mechanical inspection per NETA ATS only.
 - c. Solid state trip type: Visual and mechanical inspection and electrical tests per NETA ATS.

3. Record as-left settings.

E. Metering:

1. Perform inspections and tests per NETA ATS 7.11.
2. Components: Test all components per applicable paragraphs of this Detailed Provisions Section and NETA ATS.

F. Grounding:

1. Perform inspections and tests per NETA ATS 7.13. See Detailed Provisions Section 26 0526- Grounding and Bonding for Electrical Systems.
2. Components: Test all components per applicable paragraphs of this Detailed Provisions Section and NETA ATS.

G. Ground Fault Protection:

1. Perform inspections and tests per NETA ATS 7.14. See Detailed Provisions Section 26 0573.
2. Components: Test all components per applicable paragraphs of this Detailed Provisions Section and NETA ATS.
3. Perform the following optional tests per NETA ATS:
 - a. Control wiring insulation resistance.
4. Perform the following additional tests for four-wire systems:
 - a. Primary current injection into switchgear bus with test set configured to simulate transformer source and high current jumper used to simulate unbalanced load and ground fault conditions.
 - b. Verify no tripping for unbalanced load on each feeder and each main breaker.
 - c. Verify no tripping for unbalanced load across tie breaker for dual-source schemes.
 - d. Verify tripping for ground fault on load side of feeder each feeder and on each main bus.
 - e. Verify tripping for ground fault on a single feeder and on each main bus through tie breaker(s) for multiple-source schemes.

H. Motors:

1. Perform inspections and tests per NETA ATS 7.15.
2. See Detailed Provisions Section 33 1136 – Submersible Well Pumps.

I. Motor Controllers:

1. Perform inspections and tests per NETA ATS 7.16. See Detailed Provisions Section 26 2419 – Motor Control Centers.
2. Components: Test all components per applicable paragraphs of this Detailed Provisions Section and NETA ATS.

J. Control System Functional Test:

1. Perform test upon completion of equipment acceptance tests.
2. The test is to prove the correct interaction of all sensing, processing and action devices.
3. Develop a test plan and parameters for the purpose of evaluating the performance of the system.
4. Perform the following tests:
 - a. Verify the correct operation of all interlock safety devices for fail-safe functions in addition to design function.
 - b. Verify the correct operation of all sensing devices, alarms and indicating devices.
5. Systems to be tested:
 - a. Submersible Well Pumps – See Detailed Provisions Section 33 1136 – Submersible Well Pumps.

END OF SECTION 26 0813

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**SPECIFICATIONS – DETAILED PROVISIONS
SECTION 26 0916: CONTROL EQUIPMENT ACCESSORIES
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SECTION 26 0916 CONTROL EQUIPMENT ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Operator control/pilot devices (selector switches, pushbuttons, indicator lights, etc.).
 - b. Control devices (timers, relays, contactors, etc.).
 - c. Control panels and operator stations.
 - d. Alarm devices.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0553 – Identification for Electrical Systems
4. Section 26 2419 – Motor-Control Centers
5. Section 33 1136 – Submersible Well Pumps

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. National Electrical Contractors Association (NECA)

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

B. National Electrical Manufacturers Association (NEMA)

1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
2. ICS 2 – Industrial Control and System Controllers, Contactors and Overload Relays Rated 600 Volts

C. Underwriters Laboratories, Inc.

1. UL 508 – Industrial Control Equipment
2. UL 508A – Industrial Control Panels

D. Supplier of Industrial Control Panels shall build control panel under the provisions of UL 508A.

1. Entire assembly shall be affixed with a UL 508A label “Listed Enclosed Industrial Control Panel” prior to shipment to the jobsite.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 - 1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.
- C. Shop Drawings:
 - 1. Control panel interior and exterior layout.
 - 2. Control panel wiring diagrams.
- D. Operation and Maintenance (O&M) Manual: Provide O&M documentation, including updated fabrication/shop drawings reflecting as-built condition.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers or an approved equal are acceptable:
 - 1. Operator control/pilot devices (pushbuttons, selector switches, indicator lamps, toggle switches, stacklights, etc.) and relays:
 - a. Allen-Bradley a division of Rockwell Automation, Inc.; www.ab.rockwellautomation.com
 - b. ATC Diversified Electronics a division of Marsh Bellofram Group; www.marshbellofram.com/diversified-electronics
 - c. Eaton Corporation; www.eaton.com
 - d. General Electric Company; www.geindustrial.com
 - e. Time Mark Corporation; www.time-mark.com
 - 2. Contactors:
 - a. Allen-Bradley a division of Rockwell Automation, Inc.; www.ab.rockwellautomation.com
 - b. ASCO a part of Emerson Electric Company; www.ascoswitch.com
 - c. Eaton Corporation; www.eaton.com
 - d. General Electric Company; <https://electrification.us.abb.com/>
 - 3. Terminal Blocks:
 - a. Allen-Bradley a division of Rockwell Automation, Inc.; www.ab.rockwellautomation.com
 - b. Phoenix Contact; www.phoenixcontact.com

4. Enclosures:
 - a. Adalet a part of ScottFetzer Company; www.adalet.com
 - b. Allen-Bradley a division of Rockwell Automation, Inc.; www.ab.rockwellautomation.com
 - c. Eaton Corporation; www.eaton.com
 - d. General Electric Company; <https://electrification.us.abb.com/>
 - e. Hoffman a part of nVent; <https://hoffman.nvent.com/hoffman>
 - f. Wiegmann a part of Hubbell Inc.; www.hubbell-wiegmann.com

2.02 OPERATOR CONTROL/PILOT DEVICES

A. General:

1. Standards: NEMA ICS 2, UL 508.
2. Heavy-duty NEMA 4/13 watertight/oiltight.
3. Heavy-duty NEMA 4/4X corrosion resistant.
4. Mounting hole: 30.5 mm.
5. Contact blocks: 10 amp, NEMA A600 rated, number as required to fulfill functions.
6. Legend plate marked as specified.

B. Selector Switches:

1. Two, three- or four-position rotary switch as required to fulfill functions.
2. Maintained contact type.
3. Knob or lever type operators.
 - a. Non-fused: 10,000A.
 - b. Fused: 200,000A.

C. Pushbuttons:

1. Non-illuminated type:
 - a. Protective boot.
 - b. Momentary contact.
 - c. Standard flush and mushroom operators.
 - d. Black colored buttons for START or ON and red color for STOP or OFF.
 - e. Emergency stop pushbuttons: Mushroom head operator and maintained contact.

D. Indicating Lights:

1. Allowing replacement of bulb without removal from control panel.
2. Lamp: LED, 120V or 24V as required.

3. Full voltage type.
4. Push-to-test indicating lights.
5. Glass lens.
6. Color code lights as follows:
 - a. Green: OFF or stopped, valve open.
 - b. Amber: Standby; auto mode; ready.
 - c. Red: ON or running; valve closed.

2.03 RELAYS

A. General:

1. Standards: NEMA ICS 2, UL 508.

B. Control Relays:

1. General purpose (ice cube) type:
 - a. Plug-in housing.
 - b. Clear polycarbonate dust cover with clip fastener.
 - c. Coil voltage: 120V or as required.
 - d. Contacts:
 - 1) 10 amp continuous.
 - 2) Silver-cadmium oxide.
 - 3) Minimum of three (3) SPDT contacts.
 - e. Sockets: DIN rail mounted.
 - f. Internal neon or LED indicator is lit when coil is energized.
 - g. Manual operator switch.
2. Industrial type:
 - a. Coil voltage: 120V or as required.
 - b. Contacts:
 - 1) 10 amp, NEMA A600 rated.
 - 2) Double break, silver alloy.
 - 3) Convertible from normally open to normally closed or vice versa, without removing any wiring.
 - 4) Expandable from two (2) poles to twelve (12) poles.
 - c. Provide contacts for all required control plus two (2) spares.

2.04 CONTACTORS

A. General:

1. Standards: NEMA ICS 2, UL 508.

B. Lighting and Remote Control Switches:

1. Electrically operated, electrically held.
2. Coil voltage: 120V or as required.
3. Contacts: Totally enclosed, double-break, silver-cadmium oxide.
4. Rated for ballasted lighting, tungsten and general use loads.
5. Number of poles, continuous ampere rating and voltage, as indicated on drawings or as specified.
6. Auxiliary control relays, as indicated on drawings or as specified.
7. Auxiliary contacts, as indicated on drawings or as specified.

C. Definite Purpose:

1. Coil voltage: 120V or as required.
2. Contacts: Totally enclosed, double-break, silver-cadmium oxide.
3. Resistive load and horsepower rated.
4. Number of poles, continuous ampere rating and voltage, as indicated on drawings or as specified.
5. Auxiliary contacts, as indicated on drawings or as specified.

2.05 TERMINATION EQUIPMENT

A. General:

1. Modular type with screw compression clamp.
2. Screws: Stainless steel.
3. Current bar: Nickel-plated copper alloy.
4. Thermoplastic insulation rated for -40 to +90 Deg C.
5. Wire insertion area: Funnel-shaped to guide all conductor strands into terminal.
6. End sections and end stops at each end of terminal strip.
7. Machine-printed terminal markers on both sides of block.
8. Spacing: 6mm.
9. Wire size: 22-12 AWG.
10. Rated voltage: 600V.
11. DIN rail mounting.

B. Standard-Type Block:

1. Rated current: 30A.
2. Color: Gray body.

C. Bladed-Type Disconnect Block:

1. Terminal block with knife blade disconnect which connects or isolates the two sides of the block.
2. Rated current: 10A.
3. Color:
 - a. Panel control voltage leaves enclosure – normal: Gray body, orange switch.
 - b. Foreign voltage entering enclosure: Orange body, orange switch.

D. Grounded-Type Block:

1. Electrically grounded to mounting rail.
2. Terminal ground wires and analog cable shields.
3. Color: Green and yellow body.

E. Fuse Holders:

1. Blocks can be ganged for multi-pole operation.
2. Spacing: 9.1 mm.
3. Wire size: 30-12 AWG.
4. Rated voltage: 300V.
5. Rated current: 12A.
6. Fuse size: ¼ x 1¼.
7. Blown fuse indication.
8. DIN rail mounting.

2.06 ENCLOSURES

A. Control Panels:

1. NEMA 4 rated:
 - a. Seams continuously welded and ground smooth.
 - b. No knockouts.
 - c. External mounting flanges.
 - d. Hinged or non-hinged cover held closed with stainless steel screws and clamps.
 - e. Cover with oil resistant gasket.

2. Control Panel Miscellaneous Accessories:
 - a. Back-Plane Mounting Panels: Steel with white enamel finish or Type 304 stainless steel.
 - b. Interiors shall be white or light gray in color.
 - c. Wire management duct:
 - 1) Bodies: PVC with side holes.
 - 2) Cover: PVC snap-on.
 - 3) Size as required.
 - d. Rigid handles for covers larger than nine (9) sq. ft. or heavier than twenty-five pounds (25 lbs.).
 - e. Split covers when heavier than twenty-five pounds (25 lbs.).
 - f. Floor stand kits made of same material as enclosure.
 - g. Weldnuts for mounting optional panels and terminal kits.
 - h. Ground bonding jumper from door, across hinge, to enclosure body.
 3. Standards: NEMA 250, UL 508.
 4. Identify panel in compliance with Detailed Provisions Section 26 0553 – Identification for Electrical Systems.
- B. Operator Control Stations:
1. NEMA 4/13 rated:
 - a. Die cast aluminum body with manufacturer's standard finish.
 - b. Gasketed die cast aluminum cover with manufacturer's standard finish.
 - c. Number of device mounting holes as required.
 2. Identify panel in compliance with Detailed Provisions Section 26 0553 – Identification for Electrical Systems.

2.07 REPLACEMENT PARTS

- A. Provide one hundred percent (100%) replacement lamps for indicating lights.
- B. Provide ten percent (10%) replacement caps for indicating lights.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install as indicated and in accordance with manufacturer's instructions and recommendations.

B. Control Panels:

1. Size as required to mount the equipment.
2. Permitted uses of NEMA 4 enclosure:
 - a. Surface mounted in areas designated as damp and/or wet.
3. Permitted uses of NEMA 12 enclosure:
 - a. Surface mounted in areas designated as dry and/or dusty architecturally or non-architecturally finished areas.

C. Operator Control Stations:

1. Permitted uses of NEMA 4/13 enclosure:
 - a. Surface mounted in areas designated as dry and/or dusty architecturally or non-architecturally finished areas and damp and/or wet.

3.02 FIELD QUALITY CONTROL

- A. See Detailed Provisions Section 26 0500 – Basic Electrical Requirements for individual equipment sections.

END OF SECTION 26 0916



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SECTION 26 2419 MOTOR-CONTROL CENTERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Separately mounted motor starters (including those supplied with equipment).
 - b. Manual motor starters.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0553 – Identification for Electrical Systems
4. Section 26 0916 – Control Equipment Accessories
5. Section 26 2800 – Overcurrent and Short Circuit Protective Devices
6. Section 33 1136 – Submersible Well Pumps

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. National Electrical Testing Association (NETA):

1. ATS – Acceptance Testing Specification Electrical Power Distribution Equipment and Systems.

B. International Electrotechnical Commission (IEC).

C. National Electrical Contractors Association (NECA):

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

D. National Electrical Manufacturers Association (NEMA):

1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
2. ICS 2 – Controllers, Contactors, and Overload Relays Rated 600 V.

E. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code (NEC).

F. Underwriters Laboratories, Inc. (UL):

1. UL 508 – Industrial Control Equipment.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data
 - 1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.
- C. Shop Drawings
 - 1. Separately mounted combination starters:
 - a. Unit ladder logic wiring for each unit depicting electrical wiring and identification of terminals where field devices or remote control signals are to be terminated as indicated on the Project Drawings and/or loop descriptions.
 - b. Schematic and connection wiring diagrams.
- D. Operation and Maintenance (O&M) Manual: Provide O&M documentation, including updated fabrication/shop drawings reflecting as-built condition.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. See Detailed Provisions Section 26 0500 – Basic Electrical Requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Motor-control centers shall be manufactured by one of the following, or an approved equal:
 - 1. Allen-Bradley a division of Rockwell Automation, Inc.;
www.ab.rockwellautomation.com
 - 2. Eaton Corporation; www.eaton.com
 - 3. General Electric Company; <https://electrification.us.abb.com/geindustrialcom>

2.02 SEPARATELY MOUNTED COMBINATION STARTERS

- A. Standards: NEMA 250, NEMA ICS 2, and UL 508.
- B. Enclosure:
 - 1. NEMA 4 rated:
 - a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturer's standard paint inside and out.
 - b. No knockouts, external mounting flanges, hinged and gasketed door.

C. Operating Handle:

1. With the door closed the handle mechanism allows complete ON/OFF control of the unit disconnect and clear indication of the disconnect status.
2. Circuit breaker and MCP operators includes a separate TRIPPED position.
3. Mechanical interlock to prevent the opening of the door when the disconnect is in the ON position with a defeater mechanism for use by authorized personnel.
4. Mechanical interlock to prevent the placement of the disconnect in the ON position with the door open with a defeater mechanism for use by authorized personnel.

D. External mounted overload relay pushbutton.

E. Control Devices:

1. Provide control devices per Detailed Provisions Sections 26 0916 – Control Equipment Accessories and 33 1136 – Submersible Well Pumps.
2. The following devices are the minimum required unless otherwise indicated on the Project Drawings:
 - a. Three-position switch (HAND-OFF-AUTO).
 - b. Red ON indicator light.
 - c. Green OFF indicator light.
3. Devices will be accessible with the door closed.

F. Fault Current Withstand Rating: Equal to the rating of the electrical gear from which it is fed.

G. Motor Starters: See requirements within this Detailed Provisions Section.

H. Disconnect Switch, Overcurrent and Short Circuit Protective Devices:

1. Motor circuit protector.
2. See Detailed Provisions Section 26 2800 – Overcurrent and Short Circuit Protective Devices for requirements.
3. Factory installed.

2.03 MOTOR STARTERS

A. Standards: NEMA ICS 2 and UL 508.

B. Full Voltage Non-Reversing (FVNR) Magnetic Starters:

1. NEMA full size rated contactor.
 - a. NEMA half sizes and IEC contactors are not permitted.
2. Double-break silver alloy contacts.

3. Overload relays:
 - a. Ambient compensated, bimetallic type with interchangeable heaters, twenty-four percent (24%) adjustability, single phase sensitivity, an isolated arm contact and manual reset.
4. Interlock and auxiliary contacts, wired to terminal blocks:
 - a. Holding circuit contact, normally open.
 - b. Overload alarm contact, normally open.
 - c. Normally open auxiliary contact, for remote run status.
 - d. Additional field replaceable auxiliary contacts as required per the Sequence of Operation.
 - e. Two (2) additional normally open spare field replaceable auxiliary contacts.

2.04 MANUAL MOTOR STARTERS

- A. Standards: NEMA 250, NEMA ICS 2 and UL 508.
- B. Quick-make, quick-break toggle mechanism that is lockable in the OFF position.
- C. Types:
 1. Horsepower rated, for ON/OFF control.
 2. Horsepower rated, for ON/OFF control and thermal overload protection.
 - a. Switch to clearly indicate ON, OFF, and TRIPPED position.
- D. Voltage and current ratings and number of poles as required for the connected motor.
- E. Enclosures:
 1. NEMA 4 rated:
 - a. Sheet steel finished with rust inhibiting primer and manufacturer's standard paint inside and out or cast gray iron alloy or copper-free aluminum with manufacturer's standard finish.
 - b. No knockouts, external mounting flanges.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install as indicated on the Project Drawings, in accordance with the NFPA 70, and in accordance with manufacturer's instructions and in a neat and workmanlike manner in accordance with NECA 1.
- B. Mounting height for surface mounted equipment: See Detailed Provisions Section 26 0500 – Basic Electrical Requirements.

C. Overload Heaters:

1. Size for actual motor full load current of the connected motor.

D. Combination and Manual Starter Enclosures:

1. Permitted uses of NEMA 4 enclosure:
 - a. Surface mounted in areas designated as damp/wet.

E. Install MCC identification nameplate in accordance with Detailed Provisions Section 26 0553 – Identification for Electrical Systems.

3.02 INSPECTIONS AND TESTING

- A. Inspect motor-control centers and accessories for damage and defects.
- B. Correct deficiencies and replace damaged motor-control centers and accessories.

END OF SECTION 26 2419

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SECTION 26 2717 EQUIPMENT WIRING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Electrical connections to equipment.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0519 – Wire and Cable: 600 Volt and Below
4. Section 26 0533 – Raceways and Boxes
5. Section 26 0916 – Control Equipment Accessories
6. Section 26 2419 – Motor-Control Centers
7. Section 26 2726 – Wiring Devices
8. Section 26 2800 – Overcurrent and Short Circuit Protective Devices
9. Section 26 4313 – Low Voltage Surge Protection Devices (SPD)
10. Section 33 1136 – Submersible Well Pumps

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. National Electrical Manufacturers Association (NEMA):

1. NEMA WD 1 – General Color Requirements for Wiring Devices
2. NEMA WD 6 – Wiring Devices: Dimensional Requirements

B. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Obtain and review Shop Drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for electrical equipment furnished as part of the Project.
2. Determine connection locations and requirements.

B. Sequencing:

1. Install rough-in electrical connections before installation of equipment is required.

2. Make electrical connections before required start-up of equipment.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide any additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction, debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose of lifting. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.
- C. Ambient Temperature: Do not exceed 86 degrees F average or 104 degrees F maximum measured during any twenty-four (24) hour period during and after installation of transformers.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
 1. Colors: Conform to NEMA WD 1.
 2. Cord Construction: NFPA 70, Type SO, multi-conductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
- B. Disconnect Switches: In individual equipment Detailed Provisions Sections.
- C. Wiring Devices: As specified in Detailed Provisions Section 26 2726 – Wiring Devices.
- D. Flexible Conduit: As specified in Detailed Provisions Section 26 0533 – Raceways and Boxes.
- E. Wire and Cable: As specified in Detailed Provisions Section 26 0519 – Wire and Cable: 600 Volt and Below.
- F. Boxes: As specified in Detailed Provisions Section 26 0533 – Raceways and Boxes.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

- A. Perform Work in a neat and workmanlike manner in accordance with NECA 1.
- B. Make electrical connections in accordance with equipment manufacturer's instructions.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

END OF SECTION 26 2717

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**SPECIFICATIONS – DETAILED PROVISIONS
SECTION 26 2800: OVERCURRENT AND SHORT CIRCUIT
PROTECTIVE DEVICES
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SECTION 26 2800 OVERCURRENT AND SHORT CIRCUIT PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Low voltage circuit breakers.
 - b. Low voltage fuses.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0553 – Identification for Electrical Systems
4. Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.
5. Section 26 0813 – Electrical Acceptance Testing
6. Section 26 2413 – Switchboards
7. Section 26 2416 – Panelboards
8. Section 33 1136 – Submersible Well Pumps

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1. IEEE C37.13 - Low-Voltage AC Power Circuit Breakers Used in Enclosures.
2. IEEE C37.16 - Low-Voltage Power Circuit Breakers and AC Power Circuit Protectors - Preferred Ratings, Related Requirements, and Application Recommendations.

B. National Electrical Testing Association (NETA):

1. ATS – Acceptance Testing Specification Electrical Power Distribution Equipment and Systems.

C. National Electrical Contractors Association (NECA):

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

D. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code (NEC).

- E. Underwriters Laboratories, Inc. (UL):
 - 1. UL 248-1 – Low-Voltage Fuses – Part 1: General Requirements
 - 2. UL 248-4 – Low-Voltage Fuses – Part 4: Class CC Fuses
 - 3. UL 248-8 – Low-Voltage Fuses – Part 8: Class J Fuses.
 - 4. UL 489 – Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
 - 5. UL 943 – Ground-Fault Circuit-Interruptioners.
 - 6. UL 1053 – Ground-Fault Sensing and Relaying Equipment.
 - 7. UL 1066 - Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 - 1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.
- C. Quality Assurance Submittals
- D. Ground fault protection system test reports signed by the supervising electrical foreman.
- E. Short circuit study report.
- F. Protective coordination study report.
- G. Operation and Maintenance Manual:
 - 1. Operation and Maintenance (O&M) Manual Content: Provide O&M manual documentation as required by Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

1.04 ARC FLASH STUDY REPORT

- A. Perform arc flash hazard study after the short circuit and protective device coordination study has been completed. See Detailed Provisions Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers or an approved equal are acceptable:
 - 1. Circuit Breakers:
 - a. Eaton Corporation; www.eaton.com
 - b. General Electric Company; <https://electrification.us.abb.com/geindustrialcom>
 - 2. Fuses:
 - a. Bussmann a part of Eaton Corporation; www.eaton.com
 - b. Littelfuse, Inc.; www.littelfuse.com

2.02 CIRCUIT BREAKERS

- A. Molded Cast Type:
 - 1. General:
 - a. Standards: NEMA AB1, UL 489.
 - b. Unit construction.
 - c. Over-center, toggle handle operated.
 - d. Quick-make, quick-break, independent of toggle handle operation.
 - e. Manual and automatic operation.
 - f. All poles open and close simultaneously.
 - g. Three (3) position handle: On, off and tripped.
 - h. Molded-in ON and OFF markings on breaker cover.
 - i. One-, two- or three-pole as indicated on the Project Drawings.
 - j. Current and interrupting ratings as indicated on the Project Drawings.
 - k. Bolt-on type.
 - 2. Thermal Magnetic Type:
 - a. Inverse time overload and instantaneous short circuit protection by means of a thermal magnetic element.
 - b. Frame size 150 amp and below:
 - 1) Non-interchangeable, non-adjustable thermal magnetic trip units.
 - c. Frame sizes 225 to 400 amp (trip settings less than 400A):
 - 1) Interchangeable and adjustable instantaneous thermal magnetic trip units.

- d. Ground Fault Circuit Interrupter (GFCI) Listed:
 - 1) Standard: UL 943.
 - 2) One- or two-pole as indicated on the Project Drawings.
 - 3) Class A ground fault circuit.
 - 4) Trip on 5mA ground fault (4-6mA range).
 - e. Ground Fault Equipment Protective Circuit Interrupter (GFEPIC) Listed:
 - 1) Standard: UL 1053.
 - 2) Trip on 30 mA ground fault (6-50 mA range).
 - f. HACR listed: Heating, air conditioning and refrigeration applications.
3. Solid State Trip Type:
- a. Inverse time overload, instantaneous short circuit and ground fault protection by means of a solid state trip element, associated current monitors and flux shunt trip mechanism.
 - b. Frame size 400 amp to 1200 amp (trip settings between 400 and 1200 A):
 - 1) Standard rating.
 - 2) Interchangeable current sensor or rating plug.
 - 3) Adjustable long time pick-up setting.
 - (a) Adjustable from fifty to one hundred percent (50% to 100%) of the current sensor or rating plug.
 - 4) Adjustable short time pick-up setting.
 - 5) Adjustable instantaneous pick-up.
 - 6) Fixed ground fault pick-up, when indicated on the Project Drawings.
 - c. Frame size 1600 amp and above:
 - 1) One hundred percent (100%) rated.
 - 2) Interchangeable current sensor or rating plug.
 - 3) Adjustable long time pick-up setting.
 - (a) Adjustable from fifty to one hundred percent (50% to 100%) of the current sensor or rating plug.
 - 4) Adjustable long time delay setting.
 - 5) Adjustable short time pick-up setting.
 - 6) Adjustable instantaneous pick-up setting.
 - 7) Adjustable ground fault pick-up setting, when indicated on the Project Drawings.
 - 8) Adjustable ground fault delay setting, when indicated on the Project Drawings.

4. Motor Circuit Protector:
 - a. Adjustable instantaneous short circuit protection by means of a magnetic or solid state trip element.
 - b. Sized for the connected motor.

2.03 FUSES

A. UL Class J Fuses:

1. Standard: UL 248-1 and 248-8.
2. Dual-element time-delay and current limiting rejection type.
3. Ratings: 600V, 0-600 amps and 200,000 RMS AIC symmetrical.

B. UL Class RK-5 Fuses:

1. Standard: UL 248-1 and UL 248-12.
2. Dual-element time-delay and current limiting rejection type.
3. Ratings: 250 and 600V, 1/10-600 amps and 200,000 RMS AIC symmetrical.

C. UL Class CC Fuses:

1. Standard: UL 248-1 and UL 248-4.
2. Single-element fast-acting and current limiting rejection type.
3. Ratings: 250 and 600V, 1/10-30 amps and 200,000 RMS AIC symmetrical.

2.04 ARC FLASH HAZARD LABELS

- A. Provide labels on all electrical equipment and weatherproof labels for equipment mounted outdoors.
- B. Information on each equipment Arc Flash Hazard warning label shall include:
 1. Flash Protection Boundary distance.
 2. Hazard/Risk Category level (0-4) defined by NFPA 70E.
 3. Required Protective Clothing and PPE.
 4. Shock Hazard when enclosed equipment is exposed.
 5. Equipment name and field marked location.
 6. See Detailed Provisions Section 26 0553 – Identification for Electrical Systems and Detailed Provisions Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Current and interrupting ratings as indicated on the Project Drawings.
- B. Series rated systems not acceptable.
- C. Devices shall be ambient temperature compensated.
- D. Circuit Breakers:
 - 1. Molded case circuit breakers shall incorporate the following, unless indicated otherwise:
 - a. Frame sizes 250 amp and less with trip setting less than 250 amp shall be thermal magnetic type.
 - b. Frame sizes 400 amp and larger shall be solid state trip type.
 - c. Frame sizes 400 amp and larger shall include integral ground fault protection.
 - d. Motor circuit protectors sized for the connected motor.
- E. Fuses:
 - 1. UL Class J: Use for feeder devices 600 amps and smaller.
 - 2. UL Class RK-5: Use for motor feeder and branch circuit devices.

3.02 SHORT CIRCUIT AND PROTECTIVE DEVICE EVALUATION AND COORDINATION STUDY.

- A. The Contractor shall provide short circuit and protective device evaluation and coordination study to verify electrical protective devices selected and selective tripping coordination for proposed facilities.
- B. See Detailed Provisions Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.

3.03 ARC FLASH HAZARD STUDY

- A. Contractor shall provide an Arc Flash Hazard Study to determine potential arc flash incident energies, arc flash boundaries, shock hazard boundaries and required personal protective equipment (PPE) for all energized electrical equipment, and arc flash and shock hazard warning labels.
- B. See Detailed Provisions Section 26 0573 - Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.

3.04 FIELD TESTING AND VERIFICATION

- A. Contractor shall provide the services of an independent testing consultant to field verify that all protective devices are set in accordance with the accepted short circuit/coordination study requirements and recommendations. In addition, the consultant shall perform resistance testing of ground systems to confirm compliance with NEC and electric utility requirements and other testing as specified herein, and verify that arc flash and stock hazard warning labels have been installed.
- B. See Detailed Provisions Section 26 0573 - Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.

3.05 INSPECTIONS AND TESTING

- A. See Detailed Provisions Section 26 0813 – Electrical Acceptance Testing.
- B. Adjustable circuit breakers:
 - 1. Test and verify all circuit breaker trip functions using a test set provided by the manufacturer for that purpose for circuit breakers 1200A and above.

END OF SECTION 26 2800

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 2816: SAFETY SWITCHES

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SECTION 26 2816 SAFETY SWITCHES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Safety switches.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0553 – Identification for Electrical Systems
4. Section 26 0813 – Electrical Acceptance Testing
5. Section 26 2717 – Equipment Wiring
6. Section 26 2800 – Overcurrent and Short Circuit Protective Devices
7. Section 33 1136 – Submersible Well Pumps

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. National Electrical Contractors Association (NECA):

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

B. National Electrical Manufacturers Association (NEMA):

1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA KS1 – Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

C. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code (NEC).

D. Underwriters Laboratories, Inc. (UL):

1. UL 98 – Enclosed and Dead-Front Switches

1.03 SUBMITTALS

A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.

B. Product Data

1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.

- C. Quality Assurance Submittals
- D. Provide a table that associates safety switch model number with connected equipment tag number.
- E. Operation and Maintenance Manual:
 - 1. Operation and Maintenance (O&M) Manual Content: Provide O&M manual documentation as required by Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following safety switch manufacturers or an approved equal are acceptable:
 - 1. Eaton Corporation; www.eaton.com
 - 2. General Electric Company; <https://electrification.us.abb.com/geindustrialcom>

2.02 SAFETY SWITCHES

- A. General:
 - 1. Standards: NEMA KS 1, UL 98.
 - 2. Non-fusible or fusible as indicated on the Project Drawings.
 - 3. Suitable for service entrance when required.
 - 4. NEMA Type HD heavy-duty construction.
 - 5. Switch blades will be fully visible in the OFF position with the enclosure door open.
 - 6. Quick-make/quick-break operating mechanism.
 - 7. Deionizing arc chutes.
 - 8. Manufacture double-break rotary action shaft and switchblade as one (1) common component.
 - 9. Clear line shields to prevent accidental contact with line terminals.
 - 10. Operating handle:
 - a. Red and easily recognizable.
 - b. Padlockable in the OFF position
 - c. Interlocked to prevent door from opening when the switch is in the ON position with a defeater mechanism.
- B. Ratings:
 - 1. Horsepower rated of connected motor.
 - 2. Voltage and amperage: As indicated on the Project Drawings.

- 3. Short circuit withstand:
 - a. Non-fused: 10,000A.
 - b. Fused: 200,000A.
- C. Enclosures:
 - 1. NEMA 4 rated:
 - a. Body and cover: Sheet steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
 - b. No knockouts, external mounting flanges, hinged, gasketed and lockable door.
- D. Overcurrent and Short Circuit Protective Devices:
 - 1. Fuses.
 - 2. See Detailed Provisions Section 26 2800 - Overcurrent and Short Circuit Protective Devices.
- E. Accessories, when indicated in PART 3 of this Detailed Provisions Section or on the Project Drawings:
 - 1. Neutral kits.
 - 2. Ground lug kits.
 - 3. Auxiliary contact kits with 1 N.O. and 1 N.C. contact.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install as indicated and in accordance with manufacturer's instructions and recommendations.
- B. Install switches adjacent to the equipment they are intended to serve unless otherwise indicated.
- C. Permitted uses of NEMA 4 enclosure:
 - 1. Surface mounted in areas designated as damp/wet.

END OF SECTION 26 2816

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 26 4313: LOW VOLTAGE SURGE PROTECTION DEVICES CONTENTS

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SECTION 26 4313

LOW VOLTAGE SURGE PROTECTION DEVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Material and installation requirements for:
 - a. Transient voltage surge protection devices (SPD) for installation in motor control center, integrally mounted.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements
2. Section 26 0500 – Basic Electrical Requirements
3. Section 26 0553 – Identification for Electrical Systems
4. Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment.
5. Section 26 0813 – Electrical Acceptance Testing
6. Section 26 2419 – Motor-Control Centers
7. Section 33 1136 – Submersible Well Pumps

1.02 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1. IEEE C62.41.1 – Guide on the Surge Environment in Low-Voltage (1000V and Less) Power Circuits.
2. IEEE C62.41.2 – Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits.
3. IEEE C62.45 – Recommended on Surge Testing for Equipment Connected to Low-Voltage AC Power Circuits.

B. Military Standard (MIL):

1. MIL-STD-220B - Method of Insertion-Loss Measurement.

C. National Electrical Contractors Association (NECA)

1. NECA 1 – Standard for Good Workmanship in Electrical Construction

D. National Electrical Manufacturers Association (NEMA)

1. NEMA 250 – Enclosures for Electrical Equipment.

E. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code (NEC).

- F. Underwriters Laboratories, Inc. (UL):
 - 1. UL 1283 – Electromagnetic Interference Filters.
 - 2. UL 1449 – Transient Voltage Surge Suppressors.

1.03 MANUFACTURER QUALIFICATIONS

- A. Provide devices from a manufacturer who has been regularly engaged in the development, design, testing, listing and manufacturing of SPDs of the types and ratings required for a period ten (10) years or more and whose products have been in satisfactory use in similar service.
 - 1. Upon request, suppliers or manufacturers shall provide a list of not less than three (3) customer references showing satisfactory operation.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 - 1. Standard manufacturer catalog and data sheets.
 - 2. Drawings showing unit dimensions, weights, mounting provisions, connection details and layout diagram of the unit.
 - 3. Create a Product Data Sheet for each different model number of SPD provided (i.e., Model XYZ with disconnect and Model XYZ without disconnect, each require a Product Data Sheet).
 - a. Data in the Product Data Sheet heading:
 - 1) SPD Manufacturer's name and product model number.
 - b. Data in the Product Data Sheet body:
 - 1) Column One: Specified value/feature of every paragraph of Part 2 of this Detailed Provisions Section.
 - 2) Column Two: Manufacturer's certified value confirming the product meets the specified value/feature.
 - 3) Name of the nationally recognized testing laboratory that performed the tests.
 - c. Data in the Product Data Sheet closing:
 - 1) Signature of the manufacturer's official (printed and signed).
 - 2) Title of the official and date of signature.
- C. Quality Assurance Submittals:
 - 1. Manufacturer's qualifications

2. Testing procedures and testing equipment data. Testing shall include, but not limited to, the following:
 - a. Quality control checks.
 - b. MIL STD-220B.
 - c. ANSI/IEEE C62.41.1
 - 1) Category A.
 - 2) Category B.
 - 3) Category C.
- D. Operation and Maintenance Manual:
 1. Operation and Maintenance (O&M) Manual Content: Provide O&M manual documentation as required by Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

1.05 DEFINITIONS

A. Clamping Voltage:

1. The applied surge shall be induced at the ninety (90) degree phase angle of the applied system frequency voltage.
2. The voltage measured at the end of the 6-inch output leads of the SPD and from the zero voltage reference to the peak of the surge.

B. Let-Through Voltage:

1. The applied surge shall be induced at the ninety (90) degree phase angle of the applied system frequency voltage.
2. The voltage measured at the end of the 6-inch output leads of the SPD and from the system peak voltage to the peak of the surge.

C. Maximum Continuous Operating Voltage (MCOV): The maximum steady-state voltage at which the SPD device can operate and meet its specification within its rated temperature.

D. Maximum Surge Current:

1. The maximum 8 x 20 microsecond surge current pulse the SPD device is capable of surviving on a single-impulse basis without suffering either performance degradation or more than ten percent (10%) deviation of clamping voltage at a specified surge current.
2. Listed by mode, since number and type of components in any SPD may vary by mode.

E. MCC: Motor Control Center.

F. MOV: Metal Oxide Varistor.

- G. Protection Modes: This parameter identifies the modes for which the SPD has directly connected protection elements, i.e., line-to-neutral (L-N), line-to line(L-L), line-to-ground (L-G), neutral-to-ground (N-G).
- H. Surge Current per Phase:
1. The per phase rating is the total surge current capacity connected to a given phase conductor.
 - a. For example, a wye system surge current per phase would equal L-N plus L-G; a delta system surge current per phase would equal L-L plus L-G.
 - b. The N-G mode is not included in the per phase calculation.
- I. System Peak Voltage: The electrical equipment supply voltage sine wave peak (i.e., for a 480/277 V system the L-L peak voltage is 679V and the L-N peak voltage is 392 V).

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers of SPDs are acceptable:
1. Eaton Corporation; www.eaton.com
 2. General Electric Company; <https://electrification.us.abb.com/geindustrialcom>
 3. Or approved equal.

2.02 SURGE PROTECTION DEVICE (SPD)

- A. General:
1. The SPD shall be listed to UL 1449 as a SPD Type 1 or SPD Type 2.
 2. The UL 1449 Nominal Discharge Current (In) for the SPD shall be 20 kA. A SPD with Nominal Discharge Current listing of 3 kA, 5 kA, or 10 kA will not be accepted.
 3. MCOV shall be greater than one hundred fifteen (115%) of the nominal operating voltage.
 4. The SPD shall have a stand-off voltage rating twice the nominal voltage. The SPD shall be able to withstand Temporary over Voltage Conditions twice the nominal voltage for an indefinite period of time, without damage, removing components from the circuit, or interrupting panel.
 5. The SPD shall protect all modes via L-N, L-G and N-F modes of protection. For Delta power systems L-L and L-G protections modes shall be provided, with the ability to configure L-G to L-L for ungrounded systems.

6. Independent certification shall be provided proving that the SPD meets the required 8x20 micros per phase single shot surge rating, without failure of any fusing, disconnects or surge module. Bypassing of any fusing/disconnects for purpose of this test is not acceptable.
7. Each mode of the SPD shall be rated to exceed the life cycle testing of ANSI/IEEE C62.45 by withstanding at least two hundred (200) operations at 10kA 8x20 micros and at least one hundred (100) operations at 20 kA without failure.
8. SPD shall have a Short Circuit Current Rating (SCCR) of 200 kAIC, per UL 1449.
9. SPD shall be capable of withstanding multiple temporary over-voltage per UL 1449 Section 36 "Overvoltage Test" and Section 37 "Abnormal Overvoltage Tests" without failure or need to reset or replace modules/fuses.
10. Each MOV shall be protected with individual thermal disconnect devices bonded directly to the MOV substrate for rapid and automatic disconnection of any MOV exhibiting excessive temperature. The following are not acceptable:
 - a. SPDs without thermal fuses/disconnects.
 - b. SPDs with shared thermal devices that disconnect more than one MOV.
11. For safety, the SPD shall have a maximum continuous operating voltage (MCOV) of at least:

Power System	MCOV (L-N)
Single phase (2W+G) 220-240V	310V
Three phase (4W +G) 120/208 WYE	170V
Three phase (4W+G) 277/480 WYE	310V

12. Enclosure shall be:
 - a. NEMA 4 enclosure suitable for outdoor usage.
 - b. The SPD depth shall be less than 3.5-inches to allow mounting within wall cavity with optional flush mount kit.
 - c. The SPD width shall be less than 5-inches to enable installation between adjacent electrical enclosures.

B. Switchgear, Switchboard, Panelboard and Motor-Control Centers:

1. Provide SPDs integrally mounted in all power distribution panels (switchgear, switchboard, panelboards, motor-control centers, etc.)
2. The SPD shall incorporate 200 kA 8x20 micros MOV protection per phase.
3. The SPD shall have the following status indications:
 - a. Each individual mode of protection shall be separately monitored and displayed via a mechanical flag status indication for each mode.
 - b. A LED status indication per phase.

- c. An overall status LED
 - d. Form-C alarm contacts for remote alarming of faults
 - e. Audible Alarm.
 - f. A five (5) digit surge counter that cannot be reset.
4. The SPD shall have a built-in disconnect that allows fusing and surge components to be removed without interrupting power, or disconnecting hard wire connections.
 5. The following Voltage Protection Ratings (VPR) shall not be exceeded by the SPD:

	Voltage Protection Rating	
Impulse Standard (no AC applied)	120/240V 120/208V	277/480V
ANSI/IEEE C62.41 Cat B3 3kA	600V	1000V
ANSI/UL 1449 20 kA Nominal Discharge Current Testing	1200V	1800V

6. At least -40 dB @ 100 kHz EMI/RFI shall be provided L-N (L-L for Delta units). To avoid unsafe ground leakage current, not filtering shall connect to ground.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install SPDs in full accordance with manufacturer's written instructions and recognized industry practices to ensure that the SPDs comply with the requirements and serve the intended purposes. Comply with the requirements of NEMA and NEC standards and applicable portions of NECA's "Standard of Installation", for installation of electrical devices.
- B. SPDs with a UL 1449 listing as SPD Type 2 shall have a 30-amp circuit breaker or other size as recommended by the manufacturer's instructions. This independent circuit breaker will serve as a means of a disconnect for servicing the SPD with the protected panel remaining energized.
- C. SPDs with a UL 1449 listing as a SPD Type 1, an integrated disconnect can be connected directly to the buss without a designated circuit breaker.
- D. Install the SPD integrally mounted in the panel or adjacent to the equipment which it protects. Maximum cable length from the SPD to the protected device shall not exceed three (3) feet. The protector status alarm monitor shall be located in the face of the protector. Provide wiring connections and disconnect/overcurrent device as required for connection to the protected equipment bus.

3.02 FIELD TESTING AND VERIFICATION

- A. Prior to energization, check SPDs for continuity of circuits and for short circuits.
- B. Subsequent to wire and cable hookup, energize SPDs and demonstrate proper functioning.
- C. See Detailed Provisions Section 26 0573 – Electrical Short Circuit/Coordination Study, Arc Flash Hazard Study, and Field Testing of Electrical Equipment and Detailed Provisions Section 26 0813 – Electrical Acceptance Testing.

END OF SECTION 26 4313

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 31 2133: TRENCHING, BACKFILLING, AND COMPACTING
FOR UTILITIES
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SECTION 31 2133 TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.01 SUMMARY

- A. This Work consists of excavating, backfilling and compacting for underground utilities.
- B. Related Detailed Provisions Sections include, but are not limited to:
 - 1. Division 03 – Concrete
 - 2. Division 26 – Electrical

1.02 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM C33/C33M – Standard Specification for Concrete Aggregates.
 - b. ASTM D75/D75M – Standard Practice for Sampling Aggregates.
 - c. ASTM D698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - d. ASTM D1556/D1556M – Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - e. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - f. ASTM D2216 – Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - g. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
 - h. ASTM D2487 – Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - i. ASTM D2488 – Standard Practice for Description and Identification of Soils.
 - j. ASTM D4253 – Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - k. ASTM D4254 – Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - l. ASTM D4643 – Standard Test Method for Determination of Water (Moisture) Content of Soil by Microwave Oven Heating.
 - m. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2. California Code of Regulations (CCR): CCR Title 8 – Industrial Relations.
3. California Department of Industrial Relations – Division of Occupational Safety and Health (Cal-OSHA).
4. California Labor Code – Section 6705
5. State of California, Business and Transportation Agency, Department of Transportation (Caltrans):
 - a. Caltrans Standard Specifications – Division III: Earthwork and Landscape
 - b. Caltrans Manual of Uniform Traffic Control Devices;
<http://www.dot.ca.gov/hq/traffops/engineering/mutcd/>
6. Southern California Edison (SCE):
 - a. SCE Electrical Service Requirements,
www.sce.com/nrc/aboutsce/regulatory/distributionmanuals/esr.pdf
 - b. SCE Underground Structures Standards,
www.sce.com/nrc/aboutsce/regulatory/distributionmanuals/ugs.pdf

1.03 DEFINITIONS

- A. Backfill Material: Backfill for both trench backfill and pipe bedding (or pipe zone backfill).
- B. Pipe Bedding: Layer of material immediately below pipe or conduit and extending over the full trench width in which the pipe is bedded. Thickness of pipe bedding shall be a minimum of 6-inches compacted to ninety percent (90%) relative compaction. Bedding material may be specified as sand, rock, gravel, or concrete base, cradle, or encasement.
- C. Pipe Zone: The pipe zone shall include the full width of trench from the bottom of the pipe or conduit to a horizontal level 12-inches above the top of the pipe or conduit. Where multiple pipes are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipe or conduit to a horizontal level above the top of the highest or topmost pipe. Thickness of pipe zone above the highest top of pipe shall be a minimum of 12-inches.
- D. Relative Compaction: Ratio, expressed as a percentage of the in-place dry-density as compacted to a laboratory maximum dry-density of representative sample of the same material determined by ASTM D1557.
- E. Standard Specifications: Refers to the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation (Caltrans), latest edition. In case of conflict between the Standard Specifications and these Specifications, the strictest specifications shall govern. Provisions for measurement and payment specified within the Standard Specifications shall be disregarded and the provisions of these Contract Documents shall govern.
- F. Subgrade: Previously undisturbed material prepared and compacted to required density and elevation to support a structure, pavement system, or to receive additional specified materials.

- G. Trench Zone: The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the pavement zone or to the existing surface in unpaved areas.
- H. Unsuitable Material: Shall consist of materials determined by the County and/or Testing/Inspection Provider to be:
1. Soft, loose, unstable or yielding, or
 2. Previously placed uncontrolled fill, or
 3. Designated material to be over-excavated per geotechnical report requirements, or
 4. Unable to be compacted to specified density using ordinary methods at optimum moisture content, or
 5. Contains visible or excessive deleterious material as determined by the County or Testing/Inspection Provider, or
 6. Too wet to be properly compacted and circumstances prevent processing suitable in-place drying prior to being used as backfill, or
 7. Otherwise unsuitable for planned use.
- Such material shall be removed to the limits directed by the County and the resulting excavation backfilled with engineered fill material.
- I. Upper Zone: The upper zone includes the portion of the trench from the top of the pipe zone to the bottom of the pavement zone or to the existing surface in unpaved areas.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Approval Submittals:
1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 2. Submit respective pipe or conduit manufacturer's data regarding bedding methods of installation and general recommendations.
 3. Deliver bulk samples of import backfill materials to County in quantities sufficient for testing. Deliver at least fifteen (15) Days prior to use.
 4. Excavation Plan:
 - a. In accordance with Section 5.1.5 – Accident Prevention of the General Provisions, Contractor shall submit to the County a detailed plan showing the design of shoring, bracing, sloping of the sides of trenches, or other provisions to be made for the protection of personnel during earthwork operations.

- b. County acceptance of the Excavation Plan does not release the Contractor of liability in the event of an accident or injury, nor does it place any liability on the County or any County employees.
- 5. Trench shoring or shield (trench box) certification if employed:
 - a. Specific to Project Conditions.
 - b. Certified by Professional Structural Engineer, registered in California.
 - c. County is not responsible to, and will not, review and approve.
 - d. Cal-OSHA Contractor compliance information for trench safety. Submit an exemption letter or trenching permit from Cal-OSHA and comply with California Labor Code Section 6705, Excavation Plans for Worker Protection.
 - e. Submit a Confined Space Emergency Plan prior to any personnel entering trenches or excavations greater than four (4) feet in depth.
- 6. Testing laboratory reports verifying that imported material conforms to the specified gradations or characteristics.
- C. Quality Assurance Submittals:
 - 1. Submit sieve analysis reports on all granular materials.
 - 2. Submit field quality control test results.

1.05 SAFETY PRECAUTIONS

- A. Observe safety precautions in all phases of the Work. Included shall be trench shoring, bracing, lighting, and barricades as dictated by reason and by Safety Orders of the Division of Industrial Safety, State of California (Cal-OSHA).
- B. Acquire an exemption letter or trenching permit from Cal-OSHA and comply with California Labor Code Section 6705, Excavation Plans for Worker Protection. Submit a copy of the exemption letter or trenching permit with excavation drawings to the County prior to excavation work.
- C. Install all necessary underpinning, shoring, lagging, cribbing, and bracing of ample strength to support adjoining soils, paving and structures.
- D. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
- E. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
- F. No trenches deeper than four (4) feet shall be left open during non-working hours, unless temporary steel plating and shoring support for the plates is provided to completely cover excavation. See Paragraph 1.06.I. herein for more information.
- G. Install fences and barricades to secure excavation areas.

1.06 PROJECT CONDITIONS

- A. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving.
 - 1. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to landfill operations.
- B. Provide full access to areas required for landfill operations and points as designated by the County to prevent serious interruption of travel.
- C. Protect and maintain benchmarks, monuments or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of the County.
- D. Verify location of existing underground utilities.
- E. When performing underground work, the Contractor shall call Underground Service Alert of Southern California (USA/SC) at 811, the one-call underground facility locating service two (2) Working Days prior to making an excavation. Contractor shall be responsible for such notification of Subcontractor's Work, or shall require Subcontractor to assume this responsibility.
- F. The Contractor's attention is directed to the possible existence of pipe, conduit and other underground improvements which may or may not be shown on the Project Drawings. Preserve and protect any such improvements whether shown on the Project Drawings or not. Expose such improvements in advance of the underground construction to allow for changes in alignment as necessary. Where it is necessary to remove and replace or to relocate such improvements in order to prosecute Work, they shall be removed, maintained, and permanently replaced by the Contractor at their expense. Relocation of said improvements shall not be performed without written permission of the County or the owner of the utility. Unless otherwise noted, existing underground utilities shall be protected in place.
- G. Excavation made with power driven equipment is not permitted within five (5) feet of any know utility or subsurface construction. For Work immediately adjacent to or for excavation exposing a utility or other buried obstruction, use hand or light equipment excavation. Start excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing Work as affected by the contract excavation until approval for backfill is granted by the County. The Contractor shall report damage of utility lines or subsurface construction immediately to the County and make repairs at no additional cost to the County.
- H. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods as required, to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to roadways and walks.
- I. Contractor shall provide temporary steel plating and shoring support for the plates, to completely cover the excavation created across roadways. Temporary steel plating must be provided by the Contractor for areas which will remain open overnight. The temporary plating shall be a minimum of 0.75-inch thickness steel, but in no case shall the thickness be less than that required to support AASHTO-H20 traffic loading.

Provide a visible barrier along the excavation path on each side of the roadway with a combination of highly visible “Caution Tape” and construction cones.

- J. Protect existing streams, ditches and storm drain inlets using proper erosion control methodology.
- K. Do not use explosives unless approved otherwise in writing by the County.
- L. Provide dust alleviation and control measures continuously during the course of the Work to the satisfaction of the County.

1.07 SOILS TESTING

- A. A Testing/Inspection Provider will be procured by the County for testing and inspection as required by the Contract Documents.
- B. All materials, Work, methods and equipment shall be subject to inspection at the jobsite and import sources. Material or workmanship not complying with the Contract Documents will not be accepted. The Contractor shall give the Testing/Inspection Provider reasonable notice when ready for inspection and shall supply samples for inspection without extra charge.
- C. Cost of Testing:
 - 1. With the exceptions of retest due to material or Contractor workmanship, the County will assume the cost for all tests and inspections specified to be performed by the Testing/Inspection Provider. Additional costs of retesting incurred by the County shall be deducted from the Contract Final Payment.
- D. Tests performed by the Testing/Inspection Provider may include, but are not limited to:
 - 1. Determine the density of soil in place by the sand cone method, ASTM D1556 or by nuclear methods, ASTM D6938.
 - 2. Determine laboratory moisture-density relations of soils by ASTM D1557.
 - 3. Determine the relative density of cohesion-less soils by ASTM D4253 and D4254.
 - 4. Visual soil classification by ASTM D2488.
 - 5. Sample backfill materials in accordance with ASTM D75.
 - 6. Conduct in-place moisture-density tests for backfilling to assure that all work complies with this Detailed Provisions Section.
- E. Make excavation for compaction tests at the locations and to the depths designated by the Testing/Inspection Provider. Backfill and re-compact the excavation at completion of testing. When test indicate that the compaction is less than the specified relative compaction, rework and retest those areas until the specified relative compaction has been obtained.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipe Bedding and Pipe Zone Materials:

1. Imported sand consisting of natural or manufactured granular material, or a combination thereof, free of deleterious amounts of organic material, mica, loam, clay, and other substances. The material must have been tested to a minimum Sand Equivalent of 30 within two (2) weeks of its use. Imported sand shall have the following gradation or similar:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3/8"	100
#4	75-100
#30	12-50
#100	5-20
#200	0-15

2. Pipe bedding thickness = $\frac{1}{8}$ pipe outside diameter or 6-inches, whichever is greater.
3. Special requirements for bedding may be described as part of the Special Conditions, pipe manufacturer's instructions or as shown on the Project Drawings shall supersede and take precedence over any and all other requirements found elsewhere in these Detailed Provisions.

B. Concrete Encasement:

1. Comply with Detailed Provisions Section 03 3100 – Cast-in Place Structural Concrete and Section 26 0543 – Electrical: Exterior Underground.
2. Concrete shall be red dyed utilizing red dye mixed into the concrete for a minimum of five (5) minutes prior to pouring. Minimum of twelve pounds (12 lbs.) of dye per one cubic yard (1 CY) of concrete.
3. Compressive Strength: Unless noted otherwise, minimum 3,000 psi.
4. Graded as specified in ASTM C33, size number 8.

C. Trench Zone Backfill Materials – General:

1. Backfill material shall consist of suitable material from excavation or imported when suitable material is not available from the excavated material. All excavated materials incorporated as part of trench backfill must be inspected and approved to be suitable by the County and/or Testing/Inspection Provider. Excavated material may need to be processed to meet specification requirements and shall be provided at the Contractor's expense.
2. Free of rock cobbles, roots, trash, vegetation or other organic matter.
3. Contains no lumps of rocks over 3-inches in greatest dimension, and with no more than fifteen percent (15%) of rocks over 2-inches in their greatest dimension.

4. Backfill materials that are obtained from trench excavated materials to the extent such material is available, shall be screened at the discretion of the County. Hand selecting of rocks from excavated material will not be permitted in lieu of screening. Under no circumstances will native earth materials be allowed or used in the pipe bedding, pipe zone, or directly under paved roads.
5. Special requirements for trench backfill materials may be described as part of the Special Conditions, pipe manufacturer's instructions or as shown on the Project Drawings shall supersede and take precedence over any and all other requirements found elsewhere in these Detailed Provisions.

D. Unsuitable Material:

1. Shall consist of materials too wet, soft, or loose to properly support the utility pipe, conduit or appurtenant structure. Such material shall be removed to the limits directed by the County or Testing/Inspection Provider and the resulting excavation backfilled with pipe bedding material compacted to a minimum of ninety percent (90%) relative compaction.

E. Controlled Density Fill (CDF)

1. As approved on a case-by-case basis by the County, controlled density fill (CDF) may be accepted in lieu of standard trench backfill materials. It shall be mandatory in trenches 8-inches wide or less where the prevention of subsequent settlement after placement of backfill is required. CDF shall conform to the following requirements:
 - a. CDF shall produce unconfined 28-day compressive strengths from 75 psi to a maximum of 175 psi. CDF material characteristics and approximate quantities for each component per cubic yard of mixed material shall be as follows:
 - 1) Cement (ASTM C150, Type I or II): 50 lbs.
 - 2) Fly ash (ASTM C618, for Class F pozzolans): 200 lbs.
 - 3) Fine sand: 2,700 lbs.
 - 4) Water: 420 lbs.
 - 5) Air content (air entraining agent- ASTM C260): 10%.
 - 6) Actual quantities shall be adjusted to provide a yield of one (1) cubic yard with the materials used.
 - b. Fine Sand: Fine sand shall be an evenly graded material having not less than ninety-five percent (95%) passing the No. 4 sieve and not more than five percent (5%) passing the No. 200 sieve.
 - c. Mix Design and Proportions:
 - 1) CDF shall be a mixture of cement, Class F pozzolan, fine sand, water and air having a consistency which will flow under a very low head. CDF shall be batched by a ready-mixed concrete plant and delivered to the site by means of transit mixing trucks.
 - 2) Mix design shall be submitted for County approval.

- 3) Approximate compressive strength should be 85 psi to 175 psi.
- 4) Mixing and handling of the material shall be in accordance with Detailed Provisions Section 03 3131 – Concrete Mixing, Placing, Jointing and Curing.
- F. Bedding and Backfill Materials for Southern California Edison (SCE) underground electrical utilities shall meet SCE specifications.
- G. Subgrade Stabilization Materials: Clean (less than five percent (5%) fines) compacted structural fill.

PART 3 EXECUTION

3.01 GENERAL

- A. Remove and dispose of unsuitable materials as directed by the County.
- B. Trenches shall be excavated in such a manner as to ensure that trench sidewalls will be stable under all working conditions.
- C. Trench walls shall be sloped and/or supported in conformance with Cal-OSHA standards.
- D. All excavations shall be barricaded in conformance with Cal-OSHA standards.
- E. Prior to excavation, Contractor shall acquire and submit an exemption letter or trenching permit from Cal-OSHA and comply with Labor Code Section 6705, Excavation Plans for Worker Protection.
- F. Sheet piling and shoring for the Work and for the safety of personnel shall be in compliance with Cal-OSHA regulations. Shoring is required for all trench portions greater than 4-feet in depth. Trenches greater than 20-feet in depth require protection systems designed by Professional Structural Engineer licensed in California.

3.02 EXCAVATION

- A. Unclassified Excavation: Remove rock excavation, clay, silt, gravel, hard pan, loose shale, and loose stone as directed by the County.
- B. Excavation for Appurtenances:
 - 1. 12-inch (minimum) clear distance between outer surface and embankment.
- C. Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to one-half the depth of the excavation, but in no instance closer than 2-feet. At Contractor's expense, excavated material not required or not suitable for backfill shall be disposed of or if deemed suitable by the County, may be stockpiled on-site in a location as directed by the County.
- D. Grading shall be completed as necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation.

E. Trench Excavation:

1. The trench shall be excavated as recommended by the manufacturer of the pipe or conduit to be installed.
2. Open trench outside buildings, units, and structures:
 - a. No more than the distance between two vaults, structures, units or three hundred (300) linear feet, whichever is less.
 - b. Field adjust limitations as weather conditions dictate.
3. Trenching within buildings, units, or structures:
 - a. No more than one hundred (100) linear feet at any one time.
4. Any trench or portion of trench, which is opened and remains idle for seven (7) Calendar Days, or longer, as determined by the County, may be directed to be immediately refilled, without completion of Work, at no additional cost to the County.
 - a. Said trench may not be reopened until County is satisfied that Work associated with trench will be prosecuted.
5. Observe following trenching criteria:
 - a. Trench size:
 - 1) Excavate width to accommodate free working space.
 - 2) Unless otherwise specified in the Special Conditions, pipe manufacturer instructions, or on the Project Drawings, maximum trench width at top of pipe or conduit may not exceed outside diameter of utility service by more than the following dimensions:

OVERALL DIAMETER OF UTILITY SERVICE	EXCESS DIMENSION
33-inches and less	18-inches
More than 33-inches	24-inches
 - 3) Cut trench walls vertically from bottom of trench to 1-foot above top of pipe, conduit, or utility service.
 - 4) Keep trenches free of surface water runoff.
 - (a) No separate payment for surface water runoff pumping will be made by the County.
6. Where the pipe or conduit is in an existing paved area, the pavement shall be saw cut in a straight line parallel to the pipe on each side. Saw cutting operations shall be performed prior to excavation to avoid excessive removal of pavement. Care shall also be taken during installation of pipe or conduit to avoid damage to adjoining surfaces.

F. Trench Excavation for Electrical Installations:

1. Observe Paragraph 3.02C.

2. Modify for electrical installations as follows:
 - a. Open no more than six hundred (600) linear feet of trench in exterior locations for trenches more than 12-inches but not more than 30-inches wide.
 - b. Any length of trench may be opened in exterior locations for trenches which are 12-inches wide or less.
 - c. Do not over-excavate trench.
 - d. Cut trenches for electrical runs with minimum 30-inches cover, unless otherwise specified or shown on Drawings.
 - e. See Division 26 for additional requirements.

G. Removal of Rock

1. Contractor shall notify County when rock is encountered at the bottom of a trench. Rock shall be removed to a depth and in a manner as directed by the County and replaced with select granular material.

H. Removal of Unsuitable Material

1. Contractor shall notify County when unsuitable material is encountered in the bottom of the trench. Such material shall be removed to the depth directed and replaced to proper grade with select granular material or compacted structural fill.

3.03 PREPARATION OF FOUNDATION FOR PIPE LAYING

A. Over-Excavation:

1. Excavate minimum of 6-inches below bottom exterior surface of the pipe or conduit.
2. Backfill and recompact to ninety percent (90%) of maximum dry density per ASTM D1557.
3. Backfill with granular bedding material as option.

B. Rock Excavation:

1. Excavate minimum of 6-inches below bottom exterior surface of the pipe or conduit.
2. Backfill to grade with suitable earth or granular material to ninety percent (90%) of maximum dry density per ASTM D1557.
3. Form bell holes in trench bottom.

C. Subgrade Stabilization:

1. Stabilize the subgrade when directed by the County.
2. Observe the following requirements when unstable trench bottom materials are encountered.
 - a. Notify County when unstable materials are encountered.
 - 1) Define by drawing station locations and limits.

- b. Remove unstable trench bottom caused by Contractor failure to dewater, rainfall, or Contractor operations.

- 1) Replace with subgrade stabilization with no additional compensation.

D. Concrete Encasement:

- 1. Comply with Detailed Provisions Section 03 1113 – Formwork – Structural Cast-in-Place Concrete, Section 03 2100 – Concrete Reinforcement, Section 03 3100 – Cast-in Place Structural Concrete, Section 03 3131 – Concrete Mixing, Placing, Jointing, and Curing, and Section 03 3132 – Concrete Finishing and Repair of Surface Defects.
- 2. See Detailed Provisions Section 26 0543 – Electrical: Exterior Underground for conduit installation.

3.04 BACKFILLING METHODS

A. Do not backfill until tests to be performed on system show system is in full compliance to specified requirements.

B. Carefully Compacted Backfill:

- 1. Furnish where indicated on Drawings, specified for trench embedment conditions and for compacted backfill conditions up to 12-inches above top of pipe or conduit.
- 2. Comply with the following:
 - a. Place backfill in lifts not exceeding 8-inch (loose thickness).
 - b. Hand place, shovel slice, and pneumatically tamp all carefully compacted backfill.
 - c. Observe specific manufacturer's recommendations regarding backfilling and compaction.
 - d. Compact each lift to specified requirements.

C. Common Trench Backfill:

- 1. Perform in accordance with the following:
 - a. Place backfill in lift thicknesses capable of being compacted to densities specified.
 - b. Observe specific manufacturer's recommendations regarding backfilling and compaction.
 - c. Avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion.

D. Water flushing (jetting) for consolidation is not permitted.

E. Backfilling for Electrical Installations:

- 1. Observe Paragraph 3.04.B. or C. or when approved by the County.

2. Modify for electrical installation as follows:
 - a. Observe notes and details on electrical drawings for fill in immediate vicinity of direct burial cables.
 - b. Install warning tape in accordance with Detailed Provisions Section 26 0553 – Identification for Electrical Systems.

3.05 COMPACTION

A. General:

1. Place and assure bedding, backfill, and fill materials achieve an equal or higher degree of compaction than undisturbed materials adjacent to the Work.
2. In no case shall degree of compaction below minimum compactions specified shall be accepted.

B. Compaction Requirements:

1. Unless noted otherwise on Drawings or more stringently by other Detailed Provisions Sections, comply with the following minimum trench compaction criteria.

a. Bedding material:

LOCATION	SOIL TYPE	COMPACTION DENSITY
All locations	Cohesionless soils	75% of relative density by ASTM D4253 and ASTM D4254.

b. Carefully compacted backfill:

LOCATION	SOIL TYPE	COMPACTION DENSITY
All applicable areas	Cohesive soils	95% of maximum dry density by ASTM D1557.
	Cohesionless soils	75% of relative density by ASTM D4253 and ASTM D4254.

c. Common trench backfill:

LOCATION	SOIL TYPE	COMPACTION DENSITY
Under pavements, roadways, surfaces within traffic areas.	Cohesive soils	95% of maximum dry density by ASTM D1557.
	Cohesionless soils.	60% of relative density by ASTM D4253 and ASTM D4254.
Under turfed, sodded, plant seeded, non-traffic areas.	Cohesive soils	85% of maximum dry density by ASTM D1557.
	Cohesionless soils	40% of relative density by ASTM D4253 and ASTM D4254.

3.06 FIELD QUALITY CONTROL

- A. The County shall procure the services of a Testing/Inspection Provider and laboratory to conduct in-place moisture-density tests for backfilling to assure that all Work complies with this Detailed Provisions Section.
- B. Testing:
 - 1. Perform in-place moisture-density tests as directed by the County.
 - 2. Perform tests through recognized testing laboratory approved by the County.
 - 3. Perform additional tests as directed until compaction meets or exceeds requirements.
 - 4. Assure County and Testing/Inspection Provider staff has immediate access for testing of all soils-related work.
 - 5. Ensure excavations are safe for testing personnel.

END OF SECTION 31 2133



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 32 3913: MANUFACTURED METAL BOLLARDS
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SECTION 32 3913 MANUFACTURED METAL BOLLARDS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. The Work covered by this section shall consist of furnishing all necessary labor, materials, tools, equipment, transportation, services, coordination, supervision, and all other items necessary for the construction of manufactured metal bollards.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Divisions 01 – General Requirements.
2. Section 03 3100 – Cast-In-Place Structural Concrete.
3. Section 31 2300 – Earthwork.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM):
 - a. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.
 - b. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - c. ASTM A312/A312M – Standard Specification for Seamless, Welded, and Heavy Cold Worked Austenitic Stainless-Steel Pipes.
 - d. ASTM A500/A500M – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - e. ASTM A536 – Standard Specification for Ductile Iron Castings.
 - f. ASTM B26/B26M – Standard Specification for Aluminum-Alloy Sand Castings.
 - g. ASTM D1654 – Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

1.03 SUBMITTALS

A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.

B. Approval Submittals:

1. Product Data: Provide bollard type, component, finish, and any accessory specified.

2. Shop Drawings:
 - a. Show mounted items and coordination required for Work specified in other Detailed Provisions Sections.
 - b. Indicate construction and installation details.
3. Verification Samples:
 - a. Provide one (1) sample of each product specified, representing colors and finishes to be installed.
4. Maintenance Information:
 - a. Submit manufacturer's touch-up, cleaning, and maintenance information.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect bollards and accessories during delivery, storage, and handling.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Calpipe Security Bollards; www.calpipebollards.com
 2. Lakewood Pipe & Steel; www.lakewoodpipe.com
 3. Alameda Pipe & Steel Co.; www.alamedapipe.com
- B. Submit requests for substitution in accordance with Detailed Provisions Section 01 6000 – Product Requirements.

2.02 MANUFACTURED METAL BOLLARDS

- A. Overall Dimensions:
 1. Outer Diameter: 4-inches
 2. Height: 4-feet (from Finished Surface Elevation to top of bollard)
- B. Material:
 1. Flat top carbon steel pipe completely filled with grout such that it has a rounded top.
- C. Concrete Footing:
 1. Concrete footing shall extend 6-inches on both sides of and below the bollard.
 2. Bollard shall be fixed, embedded into concrete footing a minimum of 3feet.
- D. Finish:
 1. Polymer powder coat finish utilizing an epoxy prime coat and a polyester top coat.

2. Color: Safety Yellow, RAL 1023 and affix a reflecting tape completely around the circumference of the bollard two inches from the top.
 3. Bollards shall be free of burrs and sharp corners.
- E. Spacing:
1. Post location shall be \geq 3-feet from the protected object.
 2. Post spacing shall be \leq 4-feet on-center of separation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrate for compliance with manufacturer's requirements for placement and location of embedment, condition of substrate, and other conditions affecting installation procedures.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Comply with manufacturer's installation instructions and Construction Drawings.
- B. Concrete Pads:
 1. Bollards shall be positioned no more than six (6) inches from the corners of concrete pads requiring protection from vehicular traffic and spaced no more than five (5) feet along the concrete pad sides, as determined by the Engineer.
- C. Do not install damaged, cracked, chipped, deformed, or marred bollards. Field touch-up minor imperfections in accordance with manufacturer's instructions. Replace bollards that cannot be field repaired.

3.03 CLEANING AND PROTECTION

- A. Protect bollards against damage.
- B. Immediately prior to Substantial Completion, clean bollards in accordance with manufacturer's instructions to remove dust, dirt, adhesives, and other foreign materials.
- C. Touch up damaged finishes according to manufacturer's instructions.

END OF SECTION 32 3913

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 33 0111: WELL DEVELOPMENT

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SECTION 33 0111 WELL DEVELOPMENT

PART 1 GENERAL

1.01 SUMMARY

- A. The Work covered by this Section shall consist of furnishing all necessary labor, materials, equipment, tools, permits, and supervision for the well development of newly constructed groundwater wells at approximate locations shown on the Project Drawings.
- B. Related Contract Document Sections include, but are not limited to:
 - 1. Detailed Provisions Section 01 1100 – Summary of Work
 - 2. Detailed Provisions Section 01 2900 – Payment Procedures
 - 3. Detailed Provisions Section 02 0100 – Maintenance of Existing Conditions
 - 4. Detailed Provisions Section 33 1114 – Non-Potable Water Production Wells
 - 5. Detailed Provisions Section 33 1153 – Groundwater Monitoring Wells

1.02 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. The “Greenbook” Standard Specifications for Public Works Construction.
 - 2. Water Well Standards: State of California (Bulletin 74-81 and 74-90).
 - 3. California Well Standards and Riverside County Ordinance No. 682.2.
- B. Quality Assurance:
 - 1. All Work shall be performed by a Contractor with a State of California C-57 Well Drilling License and registered with the Riverside County Department of Environmental Health.
 - 2. All Work shall be done to the satisfaction of the County and applicable regulatory agencies.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Daily Well Development Reports.
- C. Holding tank’s condition and required tests if tanks are not new.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Delivery, Storage and Handling shall be made in accordance with the following:
 - 1. Maintain end caps through shipping, storage and handling to prevent damage and to prevent entrance of dirt, debris and moisture. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
 - 3. Use slings to handle materials if size requires handling by crane or lift. Rig materials to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
 - 4. Store plastic piping protected from direct sunlight and provide support to prevent sagging and bending.

PART 2 PRODUCTS

2.01 GENERAL

- A. All construction materials shall be new prior to delivery onsite.
- B. Construction and equipment substitutions require written notification at the time of the bid and shall not be accepted anytime thereafter, unless by written authorization from the Engineer.
- C. All equipment supplied by the Contractor shall be available for inspection by the Engineer prior to the beginning of well development operations.
 - 1. If, in the opinion of the Engineer, any of the equipment is not suitable for well development, either because of mechanical problems, excessive noise, deviation from the specifications, or the build-up of substances which could cause groundwater contamination (i.e., from oil, diesel, hydraulic leaks or exhaust residue, etc.), the Contractor shall adjust, replace or decontaminate it with suitable equipment at the Contractor's expense.

2.02 BAILER

- A. A suction bailer shall be provided with the appropriate fittings to allow for the removal of debris, which may accumulate in the bottom of the well casing.

2.03 AIR COMPRESSOR, AIRLINE AND EDUCTOR PIPE

- A. An air compressor with airline, eductor pipe and appropriate fittings shall be onsite during the initial airlifting phase of the well development.
- B. The air compressor shall be of ample size for maximum airlifting capabilities.
- C. The air compressor shall have an effective external air-oil separator.

- D. Eductor pipe used in the development of the wells shall be a maximum of:
 - 1. 4-inch pipe size (i.e., well casing diameter) for monitoring wells.
 - 2. 8-inch pipe size (i.e., well casing diameter) for production wells.
- E. The size of the airline shall be a maximum 3/4-inch inner diameter to ensure good flow rates through the eductor pipe (i.e., well casing), and shall be fitted with a dump valve capable of discharging "downhole" air to the atmosphere.

2.04 MEASURING DEVICES

- A. Flow meter:
 - 1. The flow meter shall be capable of measuring a maximum of 20-cfm of air, such as Dwyer Instruments Inc., Series RM Rate- Master Flow meter Model No. RMC-10-inch scale or approved equal.
 - 2. The flow meter shall be mounted on the airline leading from the air compressor to the well in conjunction with a pressure gauge capable of measuring maximum air pressure on the airline, and fittings for a dump valve to discharge air to the atmosphere.

2.05 SUBMERSIBLE PUMP

- A. A submersible pump compatible with each well casing size shall be used to pump each well as a final step in the well development process.

2.06 HOLDING TANKS

- A. The Contractor shall use a drum(s) or tank(s) to store groundwater generated during well development activities for the groundwater monitoring well.
- B. The Contractor shall anticipate/provide adequate containment volume (e.g., number of drums or tanks) to maintain efficient operations.
- C. The well development water shall be temporarily stored on the landfill property.
- D. If the Contractor utilizes a holding tank that previously contained other liquids (i.e. a tank that is not new), laboratory test results of the holding tank rinsate shall be provided to the Engineer, prior to the delivery of the subject holding tank to the site.
 - 1. The tank rinsate shall be tested for:
 - a. Volatile organic compounds by EPA Test Method 8260B,
 - b. Volatile fuel hydrocarbons by EPA Test Method 8015M,
 - c. Extractable fuel hydrocarbons by EPA Test Method 8015M.
 - 2. All tests shall be conducted by a laboratory certified by the State Water Resources Control Board, Environmental Laboratory Accreditation Program.
 - 3. None of the subject compounds shall be detected above the laboratory method detection limit.

- E. Groundwater generated during well development activities for the non-potable water production well may be discharged into the borrow pit.
 - 1. The Contractor shall take every precaution to prevent erosion when discharging any groundwater into the borrow pit.

2.07 DISCHARGE PIPING

- A. The Contractor shall provide the temporary discharge piping required to convey well development water to the appropriate holding tank(s).

2.08 SCREEN BRUSH

- A. The Contractor shall provide a nylon brush to remove fine grained materials from the screened interval in the well.
- B. The Brush shall be manufactured for the appropriate well casing diameter.
 - 1. 4-inch diameter for the monitoring well.
 - 2. 8-inch diameter for the production well.

2.09 SURGE BLOCK

- A. A surge block consists of a rubber plunger specifically fabricated for the appropriate well casing diameter.
 - 1. 4-inch diameter for the monitoring well.
 - 2. 8-inch diameter for the production well.
- B. The surge block shall fit tightly within the well casing to create the necessary vacuum and pressure in the groundwater column for surging procedures.

PART 3 EXECUTION

3.01 GENERAL

- A. The well development shall be performed in accordance with:
 - 1. Water Well Standards: State of California (Bulletin 74-81 and 74-90).
 - 2. California Well Standards and Riverside County Ordinance No. 682.3.
- B. The Contractor is cautioned to properly secure/stabilize the well during well development. Improper or poor security/stabilization of the well may lead to delays.
 - 1. Such delays will be the responsibility of the Contractor and the County shall not pay any cost associated with such delays.
- C. The Contractor shall use good practice during well development to ensure the integrity of the screen and casing is maintained.

3.02 DAILY WELL DEVELOPMENT REPORTS

- A. Daily well development reports shall be submitted to the Engineer daily and include but not be limited to:
 - 1. Recording time and procedures completed during each Working Day
 - 2. Total chargeable hours for each Working Day
 - 3. Total gallons generated
 - 4. Flow rates
 - 5. Nephelometric Turbidity Units (NTU)
 - 6. Airline Length
 - 7. All other information as required by the Engineer for the well development period.

3.03 WELL DEVELOPMENT WATER:

- A. All fluids generated during well development of the groundwater monitoring well shall be temporarily contained by the Contractor in holding tank(s) provided by the Contractor.
- B. The County shall be responsible for the final disposal of the development water.
- C. If the Contractor chooses to retrieve the holding tank(s) that were used to temporarily store the development water, the County shall empty the holding tank(s) within seven (7) Working Days following completion of well development activities.
 - 1. The County shall dispose of the development water only. The County shall not clean or decontaminate the holding tank(s).
- D. Groundwater generated during well development activities for the non-potable water production well may be discharged into the borrow pit.
 - 1. The Contractor shall take every precaution to prevent erosion when discharging any groundwater into the borrow pit.

3.04 WELL DEVELOPMENT

- A. Payment for well development will be made at the unit price bid per hour for Well Development in Detailed Provision Section 01 2900 – Payment Procedures.
 - 1. The time required for well development will be recorded by the hour with 15-minute intervals as the smallest unit of recorded time.
 - 2. The time recorded for payment shall commence when the equipment installed in the well is placed in operation and shall end when development has stopped at the direction of the Engineer.
 - 3. No payment will be made for delays resulting from:
 - a. Equipment stuck in the well casing.
 - b. Equipment breakdown.

- c. Arranging major drilling, pumping or testing apparatus.
 - d. Failure to conduct the operations in a diligent and workmanlike manner by which the desired results could ordinarily be expected.
 - e. Additional development that is required as a result of damaged well casing or screen, voids in the gravel envelope, or any construction related defect resulting in additional well development.
- B. The initial development of a well is usually done by employing flushing, bailing, airlifting and pumping.
- 1. The actual well development procedure may vary from well to well dependent upon actual characteristics of the formations encountered during drilling.
- C. Well Development Procedure:
- 1. The Contractor shall commence initial development no sooner than 24-hours after completion of the well.
 - a. Groundwater monitoring well completion shall include the sanitary seal and well head protection.
 - b. Non-potable production well completion shall include sanitary seal.
 - 2. The Contractor will place a tremie down to the bottom of each casing open-ended, flush the well casing with at least two (2) casing volumes of fresh water, at the discretion of the Engineer, and then airlift until clean.
 - 3. Once airlifting is complete the Contractor shall remove the tremie, unless bailing is necessary, as directed by the Engineer.
 - 4. Each casing shall be bailed of sediment, as required, to clean the casing to the bottom.
 - a. If the sediment thickness is greater than five (5) feet, then the Contractor may be asked to utilize eductor pipe to airlift the sediment.
 - 5. Following bailing, the Contractor shall measure and record the static water level in the casing and prepare for airlifting.
 - 6. The Contractor will be required to fabricate an airlift discharge head to accommodate return flow and airline.
 - a. An airline submergence of at least sixty percent (60%) and eighty percent (80%) maximum is recommended.
 - 7. The Contractor shall airlift and surge each well casing and record water quality parameters and purging data.
 - a. Data shall be recorded at 15-minute intervals until development of a well casing is deemed complete and/or as directed by the Engineer.
 - b. The well casing shall be surged at 15-minute intervals or as directed by the Engineer.
 - c. During development the Contractor shall keep development records.

8. Should airlifting not be feasible due to the depth to groundwater or low specific capacity, a submersible pump may be used in-lieu of airlifting.
 - a. The submersible pump inlet shall be set as close to the screened interval as possible.
9. Once all well casings have been developed by airlifting or the approved method, the Contractor shall sound the bottom of each well.
10. If the level of sediment is within or above the perforation interval, then the Contractor shall bail the well until the perforations are clear of sediment.
11. Well development shall continue until the turbidity is similar to existing groundwater wells at the site.
 - a. The target turbidity, at which well development shall be considered complete, is less than 5.0 NTU.
 - b. The Contractor shall continue well development activities until the target turbidity is achieved or the Engineer directs the Contractor to stop.

3.05 CLEANUP

- A. Any waste that is generated by the Contractor, which is incidental to any well development activities, shall be collected and properly disposed by the Contractor, as specified in Detailed Provision Section 01 5600 – Project Environmental Controls and Section 01 7700 – Closeout Procedures.
- B. The procedure for collecting and handling well development water is specified in Section 3.03 above.

END OF SECTION 33 0111

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SECTION 33 1114

NON-POTABLE WATER PRODUCTION WELLS

PART 1 GENERAL

1.01 SUMMARY

- A. The Work covered by this Section shall consist of furnishing all necessary labor, materials, equipment, tools, permits, and supervision for the Construction of non-potable water production wells at approximate locations shown on the Project Drawings.
- B. Related Contract Document Sections include, but are not limited to:
 - 1. General Provisions
 - 2. Detailed Provisions Section 01 1100 – Summary of Work
 - 3. Detailed Provisions Section 01 2900 – Payment Procedures
 - 4. Detailed Provisions Section 02 0100 – Maintenance of Existing Conditions
 - 5. Detailed Provisions Section 32 3913 – Manufactured Metal Bollards
 - 6. Detailed Provisions Section 33 0111 – Well Development

1.02 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. The “Greenbook” Standard Specifications for Public Works Construction.
 - 2. Water Well Standards: State of California (Bulletin 74-81 and 74-90).
 - 3. California Well Standards and Riverside County Ordinance No. 682.2.
- B. Quality Assurance:
 - 1. All Work shall be performed by a Contractor with a State of California C-57 Well Drilling License and registered with the Riverside County Department of Environmental Health.
 - a. To register with the Department of Environmental Health please visit:
www.rivcoeh.org/OurServices/Wells.
 - 2. All Work shall be done to the satisfaction of the County and applicable regulatory agencies.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.

B. Well Construction Permit:

1. The Engineer shall obtain a Well Construction Permit from the Riverside County Department of Environmental Health for the subject project.
2. The Contractor shall sign the well construction permit prepared by the Engineer and abide by the permit condition.
3. The Contractor shall keep a copy of the well construction permit onsite at all times.

C. Product Details:

1. Submit for County approval product details of the:
 - a. Blank Well Casing and Well Screens.
 - b. Filter Pack Gradation and Supplier.
 - c. Transition Sand Gradation and Supplier.
 - d. Bentonite to be used for Annular Seal.
 - e. Bentonite powder and Cement to be used to create Transition Seal.
 - f. Certified cement mix design receipts and delivery receipts for cement placed for Sanitary Seal, if applicable.

D. Measuring Device:

1. The Contractor shall submit details of the measuring device to be used to measure the level of the filter pack, transition sand, and pellet annular seal throughout the backfilling process.
2. The Contractor shall provide documentation acceptable to the Engineer that the measurement method is proven to be accurate.

E. Alternative Drilling Method, if applicable.

F. Daily Construction Progress Report.

G. Material Calculations for:

1. Filter Pack and Transition Sand.
2. Pellet Annular Seal.
3. Transitional Grout Seal.
4. Sanitary Seal.

H. Well Report:

1. The Contractor shall provide the Department with a copy of the completed California Department of Water Resources (DWR) Well Completion Report for each well installed, within two (2) weeks after the well has been completed.

1.04 DELIVERY, STORAGE AND HANDLING

A. Delivery, Storage and Handling shall be made in accordance with the following:

1. Maintain end caps through shipping, storage and handling to prevent damage and to prevent entrance of dirt, debris and moisture. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
3. Use slings to handle materials if size requires handling by crane or lift. Rig materials to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
4. Store plastic piping protected from direct sunlight and provide support to prevent sagging and bending.

PART 2 PRODUCTS

2.01 GENERAL

- A. All construction materials shall be new prior to delivery onsite.
- B. Construction and equipment substitutions require written notification at the time of the bid and shall not be accepted anytime thereafter, unless by written authorization from the Engineer.
- C. All equipment supplied by the Contractor shall be available for inspection by the Engineer prior to the beginning of well construction operations.
1. If, in the opinion of the Engineer, any of the equipment is not suitable for well construction operations, either because of mechanical problems, excessive noise, deviation from the specifications, or the build-up of substances which could cause borehole contamination (i.e., from oil, diesel, hydraulic leaks or exhaust residue, etc.), the Contractor shall adjust, replace or decontaminate it with suitable equipment at the Contractor's expense.

2.02 DRILLING METHODS

- A. The drilling rig and drilling method is at the Contractor's discretion. All associated drilling equipment shall be in good condition and have sufficient capacity to drill to the depths specified in the Contract Documents.
1. The mast and all running gear (hoists, cable, etc.) of the drill rig shall have a proven, sufficient and demonstrated capacity to lift three (3) times the buoyant weight of the drilling string.
- B. Drill Pipe/Auger
1. If the Contractor chooses to use the drilling pipe/auger drilling method, the drilling pipe/auger shall be in good condition and shall be connected by standard tool joints.
 2. The Contractor shall not use drilling pipe equipped with external air lines.

3. The drill pipe/auger shall be steam-cleaned prior to its arrival at the drilling site.
4. Drill pipe/auger suspected of being contaminated shall be removed and steam-cleaned at the Contractor's expense prior to its use at the site.
5. Pipe dope or other lubricating material such as "Gimmie the Green Stuff" or other environmentally safe material, as pre-approved by the Engineer, can be used on the threads of the drill pipe/auger and tremie.

C. Air Rotary Drilling Equipment

1. If the Contractor chooses to use the air rotary drilling method, the Contractor shall utilize an oil-less, filtered air compressor with the capability of properly drilling to the minimum depth proposed in the Contract Documents.
2. The Contractor shall use an air cyclone or other acceptable method, pre-approved by the Engineer, for the collection of drill cuttings at the point where air is returned to the surface (i.e., flow directed out of the discharge pipe).
3. The air cyclone shall function to allow the Engineer to collect representative samples of the subsurface.
4. If samples cannot be adequately collected, drilling will cease until the problem can be corrected to the satisfaction of the Engineer.

D. Conductor Casing

1. If the Contractor chooses to use a conductor casing with the air rotary drilling method, the conductor casing shall be in good condition and shall be connected by standard tool joints.
2. The conductor casing shall be decontaminated prior to its arrival at the site.
3. Conductor casing suspected of being contaminated shall be decontaminated at the Contractor's expense prior to its use at the site.
4. Pipe dope or other lubricating material such as "Gimmie the Green Stuff" or other environmentally safe material, as pre-approved by the Engineer, can be used on the threads of the conductor casing if necessary.

E. If the Contractor chooses to use a drilling method, other than auger drilling or air rotary drilling, the Contractor shall submit a written description of the proposed drilling method to the Department, prior to mobilizing the drilling equipment.

1. The Department shall review the written submittal and may amend the Contract Documents to account for the proposed drilling method.
 - a. The scope of any amendments will be limited to specifications to ensure the environmental integrity of the borehole.
2. The Department shall authorize the proposed drilling method in writing.
 - a. The Contractor may mobilize drilling equipment after written approval.
 - b. The Department's approval of a Contractor's alternative drilling method does not relieve the Contractor of his responsibility to drill the boreholes to the depths specified in the Contract Documents or to construct the monitoring well.

- c. The Department's authorization does not constitute approval or agreement that the alternative drilling method will allow the Contractor to successfully complete the Project.

2.03 BOREHOLE

- A. The purpose of the well borehole is to determine the thickness and nature of all formations penetrated, determine the location of water bearing strata, obtain other hydrological and geological information and allow for well construction.
- B. Each well borehole shall be drilled by a method chosen by the Contractor. Limitations and/or conditions for different drilling methods are specified in Section 2.02 of this Detailed Provisions.
- C. Payment for drilling and sampling of the well borehole shall be based on vertical feet drilled (first pass) measured from the ground surface. It shall include all materials, labor, tools, and equipment required to drill the borehole, collect formation samples, maintain circulation (depending on drilling method chosen) and protect the borehole from caving.
 - 1. No payment will be made for temporary casings installed at the Contractor's option.
- D. Payment will only be made for the Contractor's first pass successful drilling method.
 - 1. If the Contractor chooses drilling method(s) that are unsuccessful, the County will not make additional payment for vertical feet drilled for second, third or any subsequent passes by the Contractor to obtain the required borehole depth.
 - 2. No payment will be made for borehole corrections that may be necessary to comply with these specifications. Payment for any borehole corrections will be included in the unit price for the corresponding Borehole Drilling and Sampling.
- E. Payment for Borehole Drilling and Sampling shall be made at the unit price for Borehole Drilling and Sampling in Detailed Provisions Section 01 2900 – Payment Procedures.
- F. Payment for stand-by time will be at the unit price for the corresponding Drill Rig Standby in Detailed Provisions Section 01 2900 – Payment Procedures.
- G. Payment for rock clause drilling will be at the unit price for the corresponding Rock Clause Drilling in Detailed Provisions Section 01 2900 – Payment Procedures.

2.04 BAILER

- A. A suction bailer shall be provided with the appropriate fittings to allow for the removal of debris, which may accumulate in the bottom of the well casing.

2.05 BLANK WELL CASING

- A. The blank well casing shall be nominal 8-inch inner diameter, schedule 80 PVC as specified in ASTM D1785 (latest edition), equipped with threaded joints at the ends of the blank casing sections. The blank casings shall be factory assembled.

- B. Threaded joints shall be machined with beveled/interference compression fit shoulder seals to increase compressional strength.
- C. O-ring seals shall be provided within the threaded joints to mitigate leakage and contaminants from entering at the threaded joint.
- D. In all cases, the blank casing used in conjunction with the screen shall have the same inner diameter as the screen to ensure that the inside diameter of the blank casing matches the inside diameter of the screen.
- E. The bottom of each well casing shall be fitted with a threaded end cap. The end cap shall be of the same chemical and physical properties as the blank well casing.
- F. All casing material shall be new.
- G. Payment for blank well casing installation shall be based on measurement of vertical feet of blank well casing installed complete and in place, which includes furnishing and installing centralizer and end caps, at the unit price for Well Casing in Detailed Provisions Section 01 2900 – Payment Procedures.

2.06 SLOTTED WELL SCREENS

- A. The well screens shall be nominal 8-inch diameter, schedule 80 PVC as specified in ASTM D1785 (latest edition), equipped with threaded joints at the end of the slotted well screen section. The screen shall be factory-assembled.
- B. The slotted well screen shall be machined 0.020-inch slot (20-slot).
- C. Threaded joints shall be machined with beveled/interference compression fit shoulder seals to increase compressional strength.
- D. O-ring seals shall be provided within the threaded joints to mitigate leakage and contaminants from entering at the threaded joint.
- E. In all cases, the slotted well screens used in conjunction with the blank casing shall have the same inner diameter as the screen to ensure that the inside diameter of the blank casing matches the inside diameter of the screen.
- F. All casing material shall be new.
- G. Payment for well screen installation shall be based on measurement of vertical feet of well screen installed complete and in place at the unit price for Well Screen in Detailed Provisions Section 01 2900 – Payment Procedures.

2.07 FILTER PACK

- A. All sand/gravel to be used for the filter pack shall be hard, water or air worn gravels, and washed clean of silt, sand, dirt and foreign matter. It shall be well rounded, graded, and shall have a coefficient of uniformity less than 2.5.
- B. The gravel/sand shall be kept free of all foreign matter. Gravel/sand suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the Contractor's expense prior to the arrival of new gravel/sand.

- C. Gravel shall be non-mixed (i.e., pure silica) #3 gradation blend by Oglebay Norton Industrial Sands, Inc. (formerly known as Colorado Silica Sand, Inc.), or approved equal.
- D. The #3 gradation blend shall meet the sieve analyses parameters specified below.

Sieve #	Sieve Opening (mm)	Cumulative Percent Passing
1/2-Inch	12.5	100
4	4.75	100
6	3.35	100
8	2.36	100-98
12	1.7	89-55
16	1.18	46-10
20	0.85	13-1
30	0.60	5-0

- E. Crushed gravel will not be accepted.
- F. All gravel is subject to approval by the Engineer prior to use in the packing process.
- G. Filter pack payment will be based on measurement of vertical feet of filter pack installed from the bottom to the top of each specified interval at the unit price for Filter Pack in Detailed Provisions Section 01 2900 – Payment Procedures.

2.08 SURGE BLOCK

- A. A surge block consists of a rubber plunger specifically fabricated for an 8-inch diameter well casing.
- B. The surge block shall fit tightly within the well casing to create the necessary vacuum and pressure in the groundwater column for surging procedures.

2.09 TRANSITION SAND

- A. All sand used for the transition sand layer shall be hard, water or air worn gravels, and washed clean of silt, dirt and foreign matter.
- B. The transition sand shall be kept free of all foreign matter. Transition sand suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the Contractor's expense prior to the arrival of new transition sand.
- C. Sand shall be a non-mixed (i.e., pure silica) #60 gradation blend by Oglebay Norton Industrial Sands, Inc. or approved equal.

- D. The #60 gradation blend shall meet the sieve analyses parameters specified below.

Sieve #	Sieve Opening (mm)	Cumulative Percent Passing
20	0.85	100
30	0.60	100
40	0.425	100-94
50	0.30	60-25
70	0.212	15-5
100	0.15	4-0

- E. Crushed gravel will not be accepted.
- F. All sand is subject to approval by the Engineer prior to use in the transition sand layer.
- G. Transition sand payment will be based on measurement of vertical feet of transition sand installed from the bottom to the top of each specified interval at the unit price for Transition Sand in Detailed Provisions Section 01 2900 – Payment Procedures.

2.10 PELLET ANNULAR SEAL

- A. An approximate 5-foot thick seal consisting of dry non-coated medium-sized bentonite chips or tablets shall be installed above the screened interval, or as otherwise specified.
- B. Coated bentonite pellets, chips or tablets shall not be used to construct these seals.
- C. The bentonite chips or tablets shall be certified NSF/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects.
- D. Payment for annular seal materials will be based on measurement of vertical feet of seal installed from the bottom to top of the specified interval, at the unit price for Pellet Annular Seal in Detailed Provisions 01 2900 – Payment Procedures.

2.11 TRANSITION GROUT ANNULAR SEAL

- A. The transition grout shall be composed of a bentonite-cement mixture.
- B. Cement used for the transition grout seal shall be a Type II Portland cement conforming to ASTM C150 (latest edition).
- C. Bentonite used in the grout shall be pulverized (powder or granular) and shall be certified NSF/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects.
- D. Water used for the cement mix shall be clean and of potable quality.
- E. The transition grout shall be composed of 1-gallon of water to 1- to 1¼-pounds of bentonite powder. Cement shall be added to the bentonite grout at a ratio of 1- to 2-pounds of cement to 1-gallon of water.
- F. Transition Grout Mixture:
1. Bentonite and water shall be mixed first, prior to the addition of cement.
 2. Bentonite, water and cement shall be mixed in the ratios specified in Section 2.12E.

3. The final mixture of transition grout shall be thoroughly blended before pumping.
 4. Bentonite and cement shall be completely incorporated into the grout, no unmixed lumps of material shall exist in the grout.
- G. Payment for the transition grout annular seal will be based on measurement of vertical feet of seal installed at the unit price for Transition Seal in Detailed Provisions Section 01 2900 – Payment Procedures.
1. No stand-by time will be paid for any down-time between the placement of the transition grout annular seal and the sanitary seal.

2.12 SANITARY SEAL

- A. Cement used for the sanitary seal shall be a Type II Portland cement conforming to ASTM C150 (latest edition).
- B. The cement mix used for the sanitary seal shall be a 10.5-sack sand-cement grout. There shall be not more than two (2) parts by weight of sand to one (1) part by weight of cement. The water-cement ratio shall be 7-gallons per sack of cement (94 pounds).
- C. Water used for the cement mix shall be clean and of potable quality.
- D. Materials used as additives for Portland cement mixtures in the field shall meet the requirements of ASTM C494 (latest edition), “Standard Specifications for Chemical Admixtures for Concrete.”
- E. Special quick-setting cement, retardants to setting, and other additives, including hydrated lime to make the mix fluid (up to ten percent (10%) of the volume of cement) may be used.
- F. Sanitary Seal Mixture:
1. Water, sand and cement shall be mixed in the ratios specified in Section 2.12B.
 2. The final mixture of sanitary seal shall be thoroughly blended before pumping. Cement and sand shall be completely incorporated into the mixture, no unmixed lumps of material shall exist in the mixture.
- G. Payment for the sanitary seal will be based on measurement of vertical feet of sanitary seal installed at the unit price for Sanitary Seal in Detailed Provisions Section 01 2900 – Payment Procedures.
1. No stand-by time will be paid for any down-time between the placement of the transition seal and the installation of the sanitary seal, or during the 24 hours the sanitary seal is curing.

2.13 ABOVEGROUND MONUMENT

- A. The aboveground monument installed to protect the wellhead shall be a 16 in x 7 ft round well protector, with a hinge lockable lid and sealed discharge pipe through-hole, or County approved equal.
 - 1. Payment for the aboveground monument shall be made at the unit price for Aboveground Well Head Protection in Detailed Provisions Section 01 2900 – Payment Procedures.

PART 3 EXECUTION

3.01 GENERAL

- A. The well construction and abandonment shall be performed in accordance with:
 - 1. Water Well Standards: State of California (Bulletin 74-81 and 74-90).
 - 2. California Well Standards and Riverside County Ordinance No. 682.3.
- B. The Contractor is cautioned to properly secure/stabilize the well during all phases of construction. Improper or poor security/stabilization of the well may lead to delays.
 - 1. Such delays will be the responsibility of the Contractor and the County shall not pay any cost associated with such delays.
- C. The Contractor shall use good practice during installation, backfilling and well development to ensure the integrity of the borehole, screen and casing is maintained.
- D. A general schematic diagram of the well construction, including location of the filter pack, transitional sand, pellet annular seal, transitional grout seal and sanitary seal is provided on Sheet 5 of the Project Drawings.

3.02 BOREHOLE DRILLING

- A. The Contractor shall not start drilling without the Engineer onsite to confirm the location of the borehole.
- B. The Contractor shall provide all tools, accessories, air compressor, power, fuel, materials, supplies, lighting, other equipment and experienced personnel necessary to conduct safe and efficient drilling operations.
- C. A drilling superintendent (tool pusher) shall be available at all times at the request of the Engineer.
- D. The Contractor shall prepare to drill the borehole to the total depth specified in the Contract Documents.
 - 1. The borehole diameter shall be a minimum of 14-inches.
 - 2. The Engineer will be onsite during the drilling process to specify the exact depth of the borehole to be drilled based on drilling cuttings, the geologic log and the depth to groundwater encountered during drilling.

3. The exact depth specified by the Engineer may be more or less than the total depth specified in the Contract Documents.
- E. The Contractor shall take all measures necessary to protect the borehole from caving or raveling during drilling operations and at the conclusion of drilling operations, when the final depth has been achieved.
1. Improper or poor security/stabilization of the borehole may lead to borehole collapse and delays prior to or during well construction.
 2. Such collapse or delays will be the responsibility of the Contractor and the County shall not pay any costs associated with such delays or collapse.
- F. Soil drilling cuttings not placed in drums shall be placed on plastic sheeting that has a minimum 10-mil thickness. At the end of each day, the soil stockpile shall be covered with plastic sheeting that has a minimum 10-mil thickness. The County shall be responsible for the final handling, transportation and disposal of drilling cuttings, following the Contractor's demobilization from the site.
- G. Once groundwater is encountered in the borehole, soil drilling cuttings will be stored in 55-gallon drums. At the end of each well construction, the Contractor shall transport the drummed drilling cuttings to the soil drilling cutting storage location. The County shall be responsible for the final handling, transportation and disposal of drilling cuttings, following the Contractor's demobilization from the site.
- H. Upon completion of drilling a specific borehole to the depth specified in these Contract Documents or as directed by the Engineer, the Engineer will provide, within 24 hours, the Contractor with well construction details or request that the Contractor drill deeper.
1. The Contractor shall be paid for stand-by time for each working hour beyond the 24-hour assessment period that the Engineer does not provide the Contractor with well construction details or the request to drill deeper.
- I. The Contractor may discharge minor volumes of nuisance groundwater generated during drilling directly to the ground surface adjacent to the well site, as permitted by the State Water Resources Control Board Water Quality Order No. 2014-0057-DWQ.
- J. The Contractor shall implement appropriate best management practices (BMPs) to mitigate the discharge of sediment laden groundwater.
1. Where necessary, BMPs shall also be implemented to mitigate groundwater discharge related erosion.
 2. The discharge of groundwater shall also be controlled to prevent contact with significant materials or equipment, including those of the Contractor and County.

3.03 ROCK CLAUSE

- A. The Rock Clause shall go into effect only after the Contractor verbally notifies the Engineer that the drilling advancement rate is less than five (5) feet per hour and that the Contractor is requesting Rock Clause time.
1. The decrease in the drilling rate shall be due to natural causes such as hard formations caused by gravel and boulders.

2. The Contractor is cautioned to practice proper drilling techniques for gravel alluvium drilling environments.
 3. Reduction in drilling rate due to worn bits will not be grounds for invoking the Rock Clause.
 4. Borehole caving problems and decreased penetration rates due to improper air flow rates or choice of drilling bits are not acceptable causes to invoke the Rock Clause.
- B. A recording device such as a "geolograph" shall be required to document Rock Clause time.

3.04 SUBSURFACE FORMATION SAMPLING

- A. The Contractor shall, at each change of formation, at five-foot intervals between changes in formation, and at intervals requested by the Engineer, collect a representative sample of the interval or new formation. Each sample shall be given to the Engineer for proper logging and storage.
- B. If the Contractor chooses to drill with hollow stem auger, the Contractor shall collect relatively undisturbed soil samples with a Standard Penetration Test split spoon sampler.
- C. If the Contractor chooses to drill with a form of air rotary, the Contractor shall provide an acceptable means to the Engineer whereby the Contractor can safely obtain representative samples of formation cuttings from the air stream.
- D. The ground surface around the sampling area shall be kept graded and free from stockpiled drilling cuttings and shall be kept free of trash, equipment and other debris.
- E. If samples cannot be adequately collected, drilling will cease until the problem is corrected to the satisfaction of the Engineer.

3.05 DAILY CONSTRUCTION PROGRESS REPORT

- A. The driller shall prepare a daily record of drilling activities completed each Working Day that drilling is completed.
- B. The Daily Construction Progress Report shall identify:
 1. First pass vertical footage drilled.
 2. Approved Rock Clause hours.
 3. Approved stand-by time hours.
- C. The report shall be submitted to the Engineer for review and approval at the conclusion of each Working Day.

3.06 WELL CASING AND SCREEN INSTALLATION

- A. A typical well design will consist of a 160 to 200-foot long interval of well screen with approximately ten (10) feet of blank casing below (silt trap) and the remainder of the blank casing located above the screen and extending to the ground surface.

- B. The proposed well casing and screen lengths are specified in the Contract Documents.
 - 1. These lengths are subject to change, as specified by the Engineer, based on the subsurface conditions encountered during drilling.
- C. The Engineer will submit the final well design depths/lengths to the Contractor within 24-hours after the Engineer directs the Contractor to terminate drilling at a specific well location.
 - 1. While the well design is being completed, no additional payment for stand-by time shall be made, except where specified in Section 3.02H.1.
 - 2. The final well design will specify where the blank casing, screen intervals, filter pack intervals, seal intervals and sanitary seal will be placed in the borehole.
- D. Joints:
 - 1. All field joints, where blank casings and/or screen casing are joined together, shall be connected via the machine threaded ends.
- E. Installation of casing and screen:
 - 1. The well casing string shall be suspended at all times in tension from the surface by means of a clamp, landing plate, or equivalent method. The bottom of the casing string shall be at a sufficient distance above the bottom of the borehole to ensure that it is not supported by the bottom of the borehole.
 - 2. The Contractor will measure and record the lengths of the casing as it is being installed into the borehole.
 - a. The casing lengths will be such that the screens are placed per the design interval and the total installed length of the casing is as specified in the design.
 - 3. Centralizers:
 - a. Centralizers shall be installed around the screen section, one near the bottom and one approximately every 40-feet of screen section.
 - b. One centralizer shall be installed around the blank casing, at approximately mid-height.
 - 4. If for any reason the casing cannot be placed in the correct position, or at a depth acceptable to the Engineer, the Contractor shall take whatever measures are necessary to properly construct the well at his own expense, including abandoning the borehole.
 - 5. If any of the casings should collapse or break prior to well completion, they shall be withdrawn and replaced at the Contractor's expense.
 - 6. All Work required to be repeated because of the Contractor, and all additional materials, labor, and equipment required, shall be furnished at the expense of the Contractor and no claim for additional compensation shall be made or be allowed therefore, except as specifically provided herein.
 - 7. The well casing shall be completed at ground surface, however extra casing length should be added to allow for well head configuration and construction to

automatically supply the water tower as specified in Section 3.11 and as shown on Sheets 5 and 6 of the Project Drawings.

- F. Prior to backfilling the annular space around the casing string, the Contractor shall measure the bottom of the well casing to verify its total depth.

3.07 FILTER PACK AND TRANSITION SAND INSTALLATION

- A. Once drilling is completed, the bottom of the borehole is stabilized, if necessary, and the casing is installed within the borehole, the installation of the filter pack and transition sand can proceed.

- B. Installation of Filter Pack:

- 1. Throughout the backfilling process, the Contractor shall complete calculations to determine the amount of material necessary to backfill the specified interval.
 - a. The Contractor shall record all calculations and volumes of material used to backfill the specified interval, as well as measurements obtained after the gravel/sand placement and verify those calculations with the Engineer.
- 2. The gravel/sand filter pack shall be placed into the annulus of the well through a tremie.
- 3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
- 4. The gravel/sand shall not be allowed to freefall more than 20-feet from the bottom of the tremie to the top of the gravel/sand.
- 5. The filter pack level shall be measured throughout the backfilling process.
- 6. The gravel/sand filter pack shall be installed from the bottom of the borehole to approximately five (5) feet above the top of screen.
- 7. Upon completion of installation of each filter pack, or portion thereof, no additional Work will be performed until the depth to the top of that filter pack has been determined by use of proven, accurate equipment.

- C. Prior to installing the transition sand materials, the Contractor shall consolidate the filter pack by gently surging the well screen with a tight-fitting surge block.

- D. The Contractor shall then re-measure the top of the filter pack and install additional gravel/sand to achieve the design depth.

- E. Following the installation of the filter pack, the Contractor shall install an approximate 5-foot thick layer of transition sand.

- F. Installation of Transition Sand:

- 1. Throughout the backfilling process, the Contractor shall complete calculations to determine the amount of material necessary to backfill the specified interval.
 - a. The Contractor shall record all calculations and volumes of material used to backfill the specified interval, as well as measurements obtained after the transition sand layer placement and verify those calculations with the Engineer.

2. The transition sand shall be placed into the annulus of the well through a tremie.
3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
4. The transition sand shall not be allowed to freefall more than 20 feet from the bottom of the tremie to the top of the transition sand.
5. The transition sand level shall be measured throughout the backfilling process.
6. The transition sand layer shall be installed from the top of the filter pack to a thickness of five (5) feet.
7. Upon completion of installation of the transition sand layer, or portion thereof, no additional Work will be performed until the depth to the top of that transition sand layer has been determined by use of proven, accurate equipment.

3.08 PELLET ANNULAR SEAL INSTALLATION

- A. Once the filter pack and transition sand are installed above the screened well casing, the annular seal can be installed.
- B. The annular seal seals the annular space between the borehole wall and the well casing.
- C. The seal shall be composed of medium-sized bentonite pellets and be installed in the annulus of the well to hydraulically separate the aquifer penetrated by the well casings.
- D. Annular Seal Installation.
 1. The Contractor shall calculate the amount of seal material necessary to backfill a specified interval.
 - a. The Contractor shall record all calculations and volumes of seal mixture used, and the measurements obtained after the seal placement and verify those calculations with the Engineer.
 2. An approximate five-foot thick seal, consisting of bentonite chips or tablets, shall be installed by gravity via a tremie above the transition sand layer.
 3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
 4. Seal materials shall not be allowed to freefall more than 20 feet from the bottom of the tremie to the depth established from previous measurement.
 5. The seal level shall be measured throughout the backfilling process.
 6. The seal shall be installed from the top of the transition sand to a thickness of five (5) feet in a continuous operation.
 7. The Contractor shall measure the depth of the top of the seal after installation.
 8. Upon complete installation of the annular seal, or portion thereof, no additional Work will be performed until the depth to the top of that seal has been determined by use of proven, accurate equipment.

3.09 TRANSITION GROUT ANNULAR SEAL INSTALLATION

- A. The transition grout annular seal seals the annular space between the borehole and the well casing in the upper portion of the borehole.
- B. Transition Grout Installation.
 - 1. The Contractor shall calculate the amount of transition grout necessary to complete the annular seal.
 - a. The volume placed shall not be less than the calculated volume of the annular space between the borehole and the well casing.
 - b. The Contractor shall record all calculations and volumes used, and measurements obtained after each interval is pumped.
 - c. The Contractor shall provide the calculations and volumes to the Engineer for his review and approval.
 - 2. The transition grout shall be placed into the annulus of the well through a tremie.
 - 3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
 - 4. The tremie pipe shall extend from the ground surface to the bottom of the zone to be grouted.
 - 5. Cement grout shall be placed from bottom to top, in a continuous operation.
 - 6. The tremie pipe shall be slowly raised as the grout is placed, but the discharge end of the grout pipe must be submerged in the emplaced grout at all times until grouting is completed.
 - 7. The Contractor shall take whatever precautions are necessary to prevent borehole and/or casing collapse during placement of the transition grout.
 - a. In the event any borehole and/or casing collapses prior to completion of the transition grout, the Contractor shall take whatever steps are necessary to reopen the borehole, replace the casing and place the seal as specified.
 - b. Any such remedial action shall be conducted at the Contractor's expense.
 - 8. No activity shall occur directly adjacent to the well site, nor will stand-by time be granted, during a minimum 1-hour period immediately following the placement of the transition grout.
 - 9. The casing shall be adequately secured such that no damage or contamination will occur during this period.

3.10 SANITARY SEAL INSTALLATION

- A. The sanitary seal seals the annular space between the borehole and the well casing in the upper portion of the borehole up to the ground surface.
- B. After placement of the casings, screens, filter pack, transition sand, pellet seal and transition seal, the sanitary seal shall be installed.

C. Sanitary Seal Installation.

1. The Contractor shall calculate the amount of seal material necessary to complete the sanitary seal.
 - a. The volume placed shall not be less than the calculated volume of the annular space between the borehole and the well casing.
 - b. The Contractor shall record all calculations and volumes used, and measurements obtained after each interval is pumped.
 - c. The Contractor shall provide the calculations and volumes to the Engineer for his review and approval.
2. The sanitary seal shall be placed into the annulus of the well through a tremie.
3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
4. The tremie pipe shall extend from the ground surface to the bottom of the zone to be sealed.
5. The sanitary seal shall be placed from bottom to top, in a continuous operation.
6. The tremie pipe shall be slowly raised as the sanitary seal is placed, but the discharge end of the grout pipe must be submerged in the emplaced sanitary seal at all times until placement of the sanitary seal is completed.
7. The Contractor shall take whatever precautions are necessary to prevent borehole and/or casing collapse during placement of the sanitary seal.
 - a. In the event any borehole and/or casing collapses prior to completion of the sanitary seal, the Contractor shall take whatever steps are necessary to reopen the borehole, replace the casing and place the seal as specified.
 - b. Any such remedial action shall be conducted at the Contractor's expense.
8. No activity shall occur directly adjacent to the well site, nor will stand-by time be granted, during a minimum 24-hour period immediately following the placement of the sanitary seal.
9. The casings shall be adequately secured such that no damage or contamination will occur during this period.
10. After completion of the Sanitary Seal, the Contractor shall wait 24-hours before commencing well development procedures in accordance with Detailed Provisions Section 33 0111 – Well Development.

3.11 WELL HEAD CONFIGURATION

- A. Upon completion of well development, the Contractor shall test pump the non-potable production well to determine aquifer characteristics, well efficiency and determine a suitable submersible vertical well pump in accordance with Detailed Provisions Section 33 1136 – Submersible Vertical Well Pumps.

- B. After the non-potable production well has been tested pumped and an acceptable pump has been selected and installed in accordance with Detailed Provisions Section 33 1136 – Submersible Vertical Well Pumps, the Contractor shall complete the well head configuration.
- C. The well head configuration shall be connected to the water tower by underground discharge piping in accordance with Detailed Provisions Section 33 1600 – Water Utility Storage Tanks.
- D. The well head configuration shall include all necessary equipment and apparatuses to automatically turn on the submersible well pump and motor and supply the water tower as specified in Detailed Provisions Section 33 1600 – Water Utility Storage Tanks.
- E. The Contractor shall install an above ground monument to protect the well head.
- F. The Contractor shall excavate around the well casing to approximately 2.5 feet below ground surface, to a sufficient width, to facilitate the installation of the monument.
- G. The Contractor shall install an approximate six-inch thick layer of crushed rock base in the base area between the well casing and the excavation walls to support the monument.
 - 1. The rock base shall be compacted and leveled to provide a supportive surface.
- H. The Contractor shall install the monument on top of the crushed rock base such that the elevation of the top of the monument is approximately three (3) feet above the surrounding ground surface.
- I. The Contractor shall install an additional approximate six-inch layer of crushed rock base in the space between the monument and the well casing, and in the space between the monument and the surrounding excavation walls, to provide lateral stability to the vault.
 - 1. The rock base shall be compacted and leveled within the vault to provide a supportive surface free of trip hazards.
- J. The Contractor shall install concrete between the monument and the excavation walls, from the top of the rock base to an elevation matching the surrounding grade.
- K. Upon completion of all Work in connection with the well construction and well development, the well shall be capped by placing a hinge lockable lid with a sealed discharge pipe through-hole on the top of the casing.
- L. Contractor shall install a concrete pad measuring five feet by five feet by four inches in thickness, centered on the well head.
- M. The Contractor shall install four (4) bollards in accordance with Detailed Provisions Section 32 3913 – Manufactured Metal Bollards, around the well head concrete pad to protect the well casing from vehicular traffic.

3.12 CLEANUP

- A. Any waste that is generated by the Contractor, which is incidental to any well construction activities, shall be collected and properly disposed by the Contractor, as specified in Detailed Provisions Section 01 5600 – Project Environmental Controls and Section 01 7700 – Closeout Procedures.
- B. The procedure for collecting and handling soil drilling cuttings is specified in Section 3.02G above.

END OF SECTION 33 1114

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SPECIFICATIONS – DETAILED PROVISIONS
SECTION 33 1136: SUBMERSIBLE WELL PUMPS
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SECTION 33 1136 SUBMERSIBLE WELL PUMPS

PART 1 GENERAL

1.01 SUMMARY

- A. The Work covered by this Section shall consist of furnishing all necessary labor, materials, tools, equipment, permits and supervision to test pump the non-potable production well to determine aquifer characteristics and well efficiency and based on the results, select and install a suitable submersible vertical turbine pump and motor for a complete working system.
- B. Related Specification Sections include, but are not limited to:
 - 1. Division 01 – General Requirements
 - 2. Division 26 – Electrical
 - 3. Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities
 - 4. Section 33 0111 – Well Development
 - 5. Section 33 1114 – Non-Potable Production Wells
 - 6. Section 33 1600 – Water Utility Storage Tanks

1.02 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. American Iron and Steel Institute (AISI)
 - 2. American National Standards Institute (ANSI)
 - 3. American Society for Testing and Materials (ASTM):
 - a. ASTM A47/A47M – Standard Specification for Ferritic Malleable Iron Castings
 - b. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
 - c. ASTM A153/A153M – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 4. California Department of Water Resources (DWR):
 - a. DWR Bulletin 74-81 and 74-90: Water Well Standards
 - 5. Hydraulic Institute (HI):
 - a. HI Standards for Centrifugal, Rotary and Reciprocating Pumps, latest edition
 - 6. International Electrotechnical Commission (IEC)

7. National Electrical Contractors Association (NECA):
 - a. NECA 1 – Standard for Good Workmanship in Electrical Construction
 8. National Electrical Manufacturers Association (NEMA):
 - a. ICS 1 – Industrial Controls and Systems
 - b. ICS 2 – Controllers, Contactors and Overload Relays Rated 600 V
 - c. NEMA MG-1 – Motors and Generators
 9. National Electrical Testing Association (NETA):
 - a. ATS – Acceptance Testing Specification Electrical Power Distribution Equipment and Systems
- B. Quality Assurance:
1. Installer Qualifications:
 - a. Installer performing the Work shall possess an active C-57 Well Drilling Contractor license from the California State License Board and be registered with the Riverside County Department of Environmental Health.
 - b. Installer shall be approved by pump manufacturer and provide laborers and supervisors who are familiar with the pump installation.
- C. Pump Test:
1. The pump manufacturer shall perform the following tests on each pump before shipment from the factory:
 - a. Perform insulation resistance test (megger) on the pump to check for insulation breaks or moisture.
 - b. Check pump for correct rotation.
 - c. Confirm and publish “as-built” pump performance curve indicating the following:
 - 1) Pump Speed.
 - 2) Flow vs. head curve.
 - 3) Efficiency curve.
 - 4) Horsepower curve(s).
 - 5) Net Positive Suction Head Required (NPSHR).
 - 6) A written certified test report giving the above information shall be submitted to the County for review and approval of the pump prior to shipment.
 2. The pump shall be tested on water.
 3. Pump shall be meggered immediately after water test for insulation breaks or moisture.

4. The pump manufacturer's representative shall provide on-site check-out and start-up testing of the pumping system following installation and submit a certificate verifying proper installation to the County.

D. Warranty:

1. A two (2) year warranty shall be required on all materials and workmanship which comprise the pump system.

1.03 SUBMITTALS

A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.

B. Installer Qualifications.

C. Product Data:

1. Provide manufacturer's standard catalog pages and data sheets for all products specified in PART 2 of this Detailed Provisions Section.
2. Provide manufacturer's descriptive data and technical literature, performance charts and curves, efficiency, brake horsepower, capacity in gallons per minute, materials of construction, and dimensions for each pump model. Curves shall be based on factory tests by the manufacturer, in accordance with procedures recommended by the Hydraulic Institute. Data shall include a complete list of parts and supplies.
3. Provide pump manufacturer's sizing calculations and data for submersible pump cable.
4. Provide manufacturer's instructions describing the installation of the pumps and any recommended accessories to provide a complete pump system.

D. Shop Drawings

1. Test Pump:

- a. Assembly including pump, motor, discharge piping, etc.
- b. Technical information including applicable performance curves showing specified equipment capacity, rangeability and efficiencies.

2. Pump Control Panel:

- a. Unit ladder logic wiring for each unit depicting electrical wiring and identification of terminals where field devices or remote-control signals are to be terminated as indicated on the Project Drawings and/or loop descriptions.
- b. Schematic and connection wiring diagrams.
- c. In accordance with Detailed Provisions Section 26 2419 – Motor-Control Centers.

E. Test Results and Reports:

1. Test Pump's results and report.

2. Selected vertical turbine pump:
 - a. Submit manufacturer's performance test reports on each pump prior to delivery.
 - b. Minimum information shall include the pump and motor serial number, technical pump and motor information and a chart listing flow versus water column head versus amp draw information.
 - c. Submit field logs and start-up pump testing results.
- F. Operation and Maintenance (O&M) Manual:
 1. Provide O&M documentation, including operating conditions, frequency of required maintenance, and spare parts list.
 2. Provide operating instructions outlining the step-by-step procedures required for system start up, operation and shutdown.
 - a. The documentation shall include the manufacturer's name, model number, service manual, parts list and source of supply, and a brief description of all equipment and their basic operating features.
 3. Provide maintenance instructions listing routine maintenance procedures, potential breakdown scenarios and repair options, and a troubleshooting guide.
- G. Warranties.
- H. Certificates:
 1. Certificate from pump manufacturer certifying proper installation.
 2. Column pipe steel mill certificate.
 3. Submit certified performance at the guarantee point for each pump.

1.04 DELIVERY, STORAGE AND HANDLING

- A. All equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, and/or other contaminants.

PART 2 PRODUCTS

2.01 TEMPORARY TEST PUMP ASSEMBLY

- A. The Contractor shall furnish and install the necessary equipment capable of pumping a minimum of 100-gpm at an estimated static water level of 185-feet bgs, with the submersible test pump set at approximately 350-feet bgs.
- B. The temporary test pump assembly unit shall connect to the existing power source and contain controls, column piping, wellhead discharge piping and appurtenances necessary to conduct test pumping for a period of two (2) continuous hours.
- C. The Contractor shall provide temporary discharge piping, fittings and appurtenances of adequate capacity and length to convey water pumped during testing.

- D. Discharge piping shall be provided with a gate valve, flowmeter, pressure gauge and sand testing device.
- E. Pumping equipment shall have throttling devices so that the discharge flowrate may be reduced to 50-gpm if necessary.
- F. Basis of Design for the Test Pump Assembly:
 - 1. Submersible Pump/Motor: 6-inch Stainless Steel Submersible Vertical Turbine Pump, Model SP 230N250-7 with MS6000CRQWFT40 3Ph, 460V, 60 Hz, 25 Hp motor as manufactured by Grundfos Pumps Corporation (<http://us.grundfos.com/>) or approved equal.
 - 2. Column Piping: 3-inch diameter, standard weight Schedule 40 steel pipe and/or 3-inch diameter Schedule 80 PVC Certa-Lok pipe, or approved equal.
 - 3. Submersible Cable and Pump Control Panel: Shall be per temporary test pump/motor manufacturer recommendations.
 - 4. Submit request for substitution in accordance with Detailed Provisions Section 01 6000 – Product Requirements.

2.02 SUBMERSIBLE PUMP

- A. The pump will be driven by a motor attached below the pump section.
- B. The pump shall be supplied with motor, inlet screen, check valve, driver, flow inducer sleeve/shroud, thermal overload device, hanging hook, pump control panel and associated wires/cables.
- C. Material:
 - 1. All wetted parts shall be constructed of materials compatible with both the intended service and the corrosive effects of brackish water.
 - 2. Materials specified as AISI Type 316 stainless steel shall be deemed as the minimum acceptable.
 - 3. Bowls, Suction and Discharge Pieces:
 - a. Constructed of AISI 316 stainless steel
 - 4. Bearings:
 - a. Top and intermediate bearings shall be nitrile rubber (Buna-N).
 - 5. Impellers:
 - a. Constructed of AISI 316 stainless steel dynamically and hydraulically balanced. Impellers shall be securely fastened to the drive shaft in such a manner as to make it readily removable.
 - 6. Pump Shaft:
 - a. Constructed of AISI 329 stainless steel.

7. Check Valve:
 - a. The check valve shall be constructed of AISI 316 stainless steel. The check valve seat shall be nitrile rubber (Buna-N).
8. Impeller Seal Rings:
 - a. Impeller seal rings shall be nitrile rubber (Buna-N).
- D. Operating Conditions:
 1. Final pump size and intake depth will be determined by the County after results from the test pumping are received.
 2. Estimated Design Flow Rate: 100 gallons per minute (gpm)
 3. Estimated Design Head: 400 ft. total dynamic head (TDH)
 4. Estimated Pump Setting Depth: 350 ft. Below Ground Surface (bgs)
 5. Estimated Pump Horsepower: 25 hp
 6. Well Casing Inner Diameter (I.D.): 8-inches
 7. Total Well Depth: Approximately 405 ft. bgs
 8. Static Water Level: Approximately 185 ft. bgs
 9. Well Screen Depths: 180 to 340 ft. bgs
- E. Basis of Design:
 1. Pump shall be a 6-inch stainless steel pump, Model SP 230N250-7 as manufactured by Grundfos Pumps Corporation (<http://us.grundfos.com/>) or approved equal. Submersible pump, motor, and motor controller shall be a “package” unit as furnished and recommended by single manufacturer.

2.03 SUBMERSIBLE MOTOR

- A. Submersible pump shall be driven by a continuous-duty motor designed for underwater operation and conform to the latest NEMA specifications for submersible motors.
- B. Motors shall have normal starting torque, low-starting-current characteristics, and shall be of sufficient size so that the nameplate horsepower rating will not be exceeded throughout the entire published pump characteristic curve.
- C. Motor bearings shall provide smooth operations under the conditions encountered for the life of the motor. Adequate thrust bearings shall be provided in the motor to carry the weight of all rotating parts and shall be capable of withstanding upthrust imposed during pump starting.
- D. Materials:
 1. All external surfaces in contact with water shall be constructed of AISI 904L stainless steel.
 2. Shaft seal shall be a Silicon Carbide/Silicon Carbide (SiC/SiC) material. The output shaft shall be of AISI 318 LN stainless steel.

3. Radial bearings shall be silicon carbide/tungsten carbide. Thrust bearing shall be ceramic/carbon.
4. Rubber materials shall be nitrile rubber (Buna-N).
- E. Motors shall include a built-in temperature transmitter for protection against overheating. Pump control panel shall include read out and/or monitor to display motor temperature.
- F. Motors shall include built-in cooling chambers at the top and bottom of the motor, and by an internal circulation of motor liquid.
- G. The frame of the pump interconnector and shaft shall conform to the latest revision of NEMA standards for submersible motors especially made for water lubrication.
- H. Motor leads shall be of sufficient length so that they may be spliced above the bowl assembly and the leads shall be protected by an ANSI 316 stainless steel cable guard held in place with stainless steel banding.
 1. The guard shall be secured to the pump with ANSI 316 stainless steel bands.
- I. Motors shall conform to NEMA MG-1.
- J. Operating Condition:
 1. 25 horsepower (hp), 460 volts, three-phase, 60 Hz, 1.15 SF
- K. Basis of Design:
 1. Motor shall be Model MS6000CRQWFT40 3x460/60 25 Hp as manufactured by Grundfos Pumps Corporation (<http://us.grundfos.com/>) or approved equal. Submersible pump, motor, and motor controller shall be a "package" unit as furnished and recommended by single manufacturer.

2.04 SUBMERSIBLE CABLE

- A. The pump manufacturer shall supply power cable from the submersible pump to reach the pump control panel. Cable shall be sized to limit the voltage drop to no more than two percent (2%) at the motor terminals. The cable shall have three (3) separate conductors and a ground and shall be included in a single continuous jacketed assembly. The insulation shall be suitable for 600 VAC, suitable for continuous immersion and impervious to oil and water.
- B. One (1) continuous length of cable shall connect the submersible motor leads to the above ground well head junction box. The cable should be adequately secured to the column pipe by synthetic vinyl tape and plastic ties, or other non-metallic means as approved by the County, at 10-foot intervals. An additional ten (10) feet of cable shall be housed beneath the wellhead for future splicing.
- C. One (1) continuous length of cable shall be installed from the wellhead junction box to pump control panel and may either be submersible cable as specified above or cable as specified in Detailed Provisions Section 26 0519 – Wire and Cable: 600 Volt and Below. Underground cable from wellhead junction box to pump control panel shall be installed in concrete-encased Schedule 80 PVC conduit with detectable warning tape

installed above encasement (see Detailed Provisions Section 26 0543 – Electrical: Exterior Underground). Aboveground and underground conduit shall be as specified in Detailed Provisions Section 26 0533 – Raceways and Boxes.

D. Mechanical Shielding:

1. Electrical cables shall be protected by a corrosion-resistant cable guard where they pass the pump bowls. This guard shall be secured to the pump with Type 303 stainless steel bands.

E. Splices:

1. Only one (1) splice will be permitted in the submersible cable from the pump to the wellhead junction box. This splice, at the motor pigtail, shall be completed in a staggered manner so that no individual conductor splice shall be directly opposite another.
2. The conductors of the pigtail and power cable shall be joined with rosin core soldered copper butt connectors. The insulating overly shall be adhesive heat shrink insulation as manufactured by 3M Company (<http://www.3m.com>) or approved equal. The insulation shall be a minimum of 12-inch in length overlayed with vinyl tape and “Scotch-kote” as made by 3M Company or approved equal. The entire splice shall be banded to the drop pipe with protected ANSI 316 stainless steel banding and vinyl tape.
3. Termination of the cable at the wellhead junction box shall be made with electrical split bolts and rubber tape rated for 600 VAC. Each 600 VAC surface splice shall be overlaid with vinyl and “Scotch-Kote”. Wire nuts are not acceptable.

2.05 COLUMN/DROP PIPE AND FITTINGS

- A. Column piping for the well shall consist of new 3-inch diameter hot-dipped galvanized standard weight Schedule 40 steel pipe conforming to ASTM A53 in combination with new 3-inch diameter Schedule 80 PVC Certa-Lok pipe (www.northamericanpipe.com).
 1. A Certa-Lok adapter will be used to transition from the steel piping to the PVC Certa-Lok piping.
- B. New steel pipe sections shall be approximately 21-feet long and shall be threaded and coupled.
- C. Steel mill certifications shall be submitted to the County for new steel pipe. Pipe may be of either domestic or import origin provided mill certificates are provided. Each section of pipe shall be permanently stenciled by the pipe manufacturer with the full specification reference.
- D. New steel piping shall be wrapped with minimum 2-inch wide and 10-mil thick, adhesive backed PVC tape such as Christy’s Pipe Wrap, Winmore UPC, Polyken 900, Scotchwrap 50, or approved equal.
- E. Steel pipe fittings shall be 150-pound standard malleable iron fittings conforming to American National Standards, dimensions ANSI B16.3, threads ANSI B1.20.1.

Fittings material shall conform to ASTM A47/A47M Grade 32510, hot dipped galvanized ASTM A153/A153M.

- F. Each connection of steel pipe shall be coated with a pipe dope that is approved in water systems by the National Sanitation Foundation (NSF). Lead based doping compounds are not permissible.
- G. The Contractor shall furnish and install all fittings to adapt the column pipe to the pump assembly, wellhead, and transition from the new steel pipe to the new PVC Certa-Lok piping.
- H. Steel pipe and fittings shall be secured to prevent unthreading during pump start-up. A minimum of ten (10) ft-lbs per pump motor horsepower is recommended, however, this is intended only as a guideline and Contractor shall be required to conform to pipe manufacturer torque recommendations.

2.06 SOUNDING TUBE

- A. Contractor shall furnish and install one (1) sounding tube in the well.
- B. The Sounding Tube shall be:
 - 1. Flush threaded 1¼-inch PVC, Schedule 40 pipe.
 - 2. Banded to the column piping using plastic ties, or other non-metallic means as approved by the County, at intervals not greater than 20 feet.
 - 3. Extend from the top of the well seal to ten (10) feet below the pump depth.
 - 4. Shall be plugged with a removable cap to prevent contamination and access for using electric sounder.

2.07 PUMP CONTROL PANEL

- A. New electrical control panel shall be a NEMA Type 4 enclosure and include all components as recommended by the pump manufacturer. Panel shall be in conformance with Detailed Provisions Section 26 2419 – Motor-Control Centers.
- B. As a minimum, the panel shall include the following components:
 - 1. Solid state starter/pump controller (rated for 25 hp) as manufactured by pump motor manufacturer.
 - 2. Fusible disconnect switch in conformance with Detailed Provisions Section 26 2800 – Overcurrent and Short Circuit Protective Devices and Section 26 2816 – Safety Switches.
 - 3. Integrated surge protection device in conformance with Detailed Provisions Section 26 4313 – Low Voltage Surge Protection Devices (SPD). Lightning arrester shall be furnished as recommended by pump motor manufacturer.
 - 4. Thermal overload and dry-running protection with motor temperature readout. Grundfos MP 204 electronic motor protector with Grundfos IO 112 measuring module or approved equal may be used to provide thermal overload and dry running

protection, and in combination with Tempcon temperature transmitter and Pt100 sensor provide temperature readout at pump control panel.

5. HOA (hand-off-auto) switch, dry contacts, run light, and run time meter in conformance with Detailed Provisions Section 26 2419 – Motor-Control Centers and Section 26 0916 – Control Equipment Accessories.
6. Panel shall be independently mounted using steel-slotted support system supported by concrete post footings. Post footings shall be 6-inch diameter and minimum 18-inches deep. Concrete compressive strength shall be a minimum of 3,000 psi. Panel shall be supported and anchored to concrete post footings in accordance with Detailed Provisions Section 26 0529 – Hangers and Supports for Electrical Systems.

2.08 WELL HEAD SANITARY SEAL

- A. New well head seal shall be installed to accommodate column piping, submersible pump cable, sounding tubes and well vent.
- B. The well seal shall be constructed as to prevent foreign matter from entering the well.
- C. The sanitary seal shall be installed to meet the requirements of California Department of Water Resources Bulletins 74-81 and 74-90, and all requirements of the County of Riverside Department of Environmental Health Services.
- D. Existing gate valve, pipe, well vent, fittings, electrical junction box and selectable run timer switch located at the wellhead may be salvaged and reinstalled by the Contractor upon inspection and approval of the County.

PART 3 EXECUTION

3.01 TEST PUMPING

- A. Furnish and install test pumping assembly (pump, motor, column piping, cables, wellhead discharge piping, pump control panel and appurtenances) using existing power source.
- B. The Contractor shall conduct a two (2) hour pumping test of the well at thirty (30) minute intervals to produce four (4) operating points at the following flow rates: 75-gpm, 100-gpm, 125-gpm and 150-gpm.
- C. The following measurements shall be taken and recorded by the Contractor for the four (4) operating points of the pump:
 1. Flow Rate and Discharge Pressure at Wellhead.
 2. Static Water Level and Pumping Water Level.
 3. Amperage and Voltage.
 4. Sand Content.

- D. Groundwater from test pumping shall be discharged into adjacent borrow pit located directly north of the non-potable production well using temporary piping/hose provided by the Contractor.
- E. Contractor shall provide measures to dissipate energy of discharge flow to prevent erosion.
- F. Discharge of the pump shall be throttled with a gate valve and measured with a totalizing meter and stopwatch, circular orifice meter, or Venturi meter as approved by the County.
- G. The Contractor shall be responsible for furnishing all temporary equipment, materials, labor, and instruments to conduct testing.
- H. The Contractor shall prepare and submit field log containing all test pumping measurements and results to the County.
- I. A new submersible pump and motor equipment shall not be ordered until the County accepts the test pumping results and determines which pump will be suitable for the project based on the temporary pump results and performance.

3.02 INSTALLATION

- A. Provide a responsible Superintendent, whom is able to communicate effectively with the County's representatives and be on-site at all times while the Work is in progress.
- B. The Contractor shall furnish and install all fittings to adapt the column pipe to the pump assembly, wellhead, and transition from the new steel pipe to the new PVC Certa-Lok piping.
- C. Provide all materials necessary to ensure proper installation of the pumping equipment and proper alignment of the column piping.
- D. All pumping equipment shall be installed in accordance with the pump manufacturer's written instructions and recommendations. Pump intake shall be installed at an elevation approved by the County.
- E. The new steel piping shall be installed from the wellhead down to a depth of approximately 42-feet bgs.
- F. An approximately 6-foot long Certa-Lok adapter will be used to transition the steel piping to new 3-inch PVC Certa-Lok piping.
- G. The new 3-inch PVC Certa-Lok piping shall extend 300-feet to a depth of approximately 348 feet bgs and connect to the pump assembly.
- H. The pump shall be installed at approximately 348 feet bgs.
 - 1. The final pump depth shall be selected by the Engineer after the test pump results.
- I. The sounding tube and electrical cables shall be banded to the column piping as the pump is being installed down the well casing.

3.03 INSPECTIONS AND TESTING

- A. Provide pre-delivery pump manufacturer testing information as specified in Section 1.02.C of this specification section. Testing information shall be accepted by the County prior to shipment.
- B. Contractor shall perform an insulation resistance test (megger) on the pump motor with pigtail and pump motor with submersible pump cable attached. Minimum resistance readings as measured with a 500-volt megger after one (1) minute of applied voltage shall be as follows:
 - 1. Motor only with pigtail – ten (10) meg ohms.
 - 2. Motor with submersible cable attached and installed in well – two (2) meg ohms.
- C. After completing all of the Work, the Contractor shall perform efficiency tests to determine that the pump is operating in a satisfactory manner free from vibration and noise. Tests shall assure that the units and appurtenances have been installed correctly, that there is no objectionable heating, vibration, or noise, and that all manual and automatic controls function properly.
 - 1. If a deficiency is revealed during any test, such deficiency shall be corrected by the Contractor and the test shall be re-conducted. The Contractor shall perform all rework, and bear all costs associated with rework necessary to correct errors and omissions to bring the Work into compliance with the Contract Documents.
 - 2. All tests performed shall in accordance with HI, NETA, and NEMA standards with results provided to the County in writing.
- D. Pump start-up and efficiency testing shall be conducted in the presence of the County and pump manufacturer's representative. Unless recommended otherwise by the pump manufacturer, the Contractor shall perform a one (1) hour start-up test conducted at fifteen (15) minute intervals at the following flow rates: 75 gpm, 100 gpm, 125 gpm and 150 gpm.
 - 1. The Contractor shall record the following information in a field log for each flow rate interval: flow rate, water level (static and pumping), discharge pressure at wellhead, sand content, voltage and amperage readings. Discharge of the pump shall be throttled with a gate valve and measured with a totalizing meter and stopwatch, circular orifice meter, or Venturi meter as approved by the County.
 - 2. Water from start-up testing shall be discharged into adjacent borrow pit located directly north of non-potable production well using temporary piping/hose provided by the Contractor.
 - 3. The Contractor shall provide measures to dissipate energy of discharge flow to prevent erosion.
 - 4. Contractor shall be responsible for furnishing all temporary piping, hoses, meters, and instruments to conduct testing.

- E. At a minimum, County staff shall be present at the following installation/inspection points:
 - 1. Verification of pump/motor model and serial number.
 - 2. Meggering of the pump motor with pigtail and pump motor with submersible cable attached.
 - 3. Verification of column pipe materials and coupling methods.
 - 4. Verification of pump control panel and components.
 - 5. Underground electrical conduit installation. After installing conduit, the Contractor shall allow the County two (2) Working Days to survey conduit locations prior to concrete encasement and backfilling.
 - 6. Start-up testing.
- F. The Contractor is responsible for notifying the County 48-hours in advance of setting the pump and initiating start-up.
- G. Contractor shall keep accurate records of each pumping test and furnish copies of all records to the County and pump manufacturer upon completion of the test. The records shall also be available to the County for inspection at any time during testing activities.
- H. Contractor shall submit to the County pump manufacturer certification of the installation, testing, and start-up of pump system.
- I. Contractor shall procure pump manufacturer services to provide a minimum four (4) hour training of County staff.
- J. Contractor shall submit for the County's approval, Operations and Maintenance Manuals for the pump system in accordance with Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

3.04 CLEANUP

- A. Any waste that is generated by the Contractor, which is incidental to any well construction activities shall be collected and properly disposed by the Contractor, as specified in Detailed Provisions Section 01 5600 – Project Environmental Controls and Section 01 7700 – Closeout Procedures.

END OF SECTION 33 1136

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SPECIFICATIONS – DETAILED PROVISIONS

SECTION 33 1153: GROUNDWATER MONITORING WELLS

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SECTION 33 1153 GROUNDWATER MONITORING WELLS

PART 1 GENERAL

1.01 SUMMARY

- A. The Work covered by this Section shall consist of furnishing all necessary labor, materials, equipment, tools, permits, and supervision for the Construction of groundwater monitoring wells at approximate locations shown on the Project Drawings.
- B. Related Contract Document Sections include, but are not limited to:
 - 1. Detailed Provisions Section 01 1100 – Summary of Work
 - 2. Detailed Provisions Section 01 2900 – Payment Procedures
 - 3. Detailed Provisions Section 02 0100 – Maintenance of Existing Conditions
 - 4. Detailed Provisions Section 32 3913 – Manufactured Metal Bollards
 - 5. Detailed Provisions Section 33 0111 – Well Development

1.02 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. The “Greenbook” Standard Specifications for Public Works Construction.
 - 2. Water Well Standards: State of California (Bulletin 74-81 and 74-90).
 - 3. California Well Standards and Riverside County Ordinance No. 682.2.
- B. Quality Assurance:
 - 1. All Work shall be performed by a Contractor with a State of California C-57 Well Drilling License and registered with the Riverside County Department of Environmental Health.
 - a. To register with the Department of Environmental Health please visit: www.rivcoeh.org/OurServices/Wells.
 - 2. All Work shall be done to the satisfaction of the County and applicable regulatory agencies.

1.03 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Well Construction Permit:
 - 1. The Engineer shall obtain a Well Construction Permit from the Riverside County Department of Environmental Health for the subject project.

2. The Contractor shall sign the well construction permit prepared by the Engineer and abide by the permit condition.
3. The Contractor shall keep a copy of the well construction permit onsite at all times.

C. Product Details:

1. Submit for County approval product details of the:
 - a. Blank Well Casing and Well Screens.
 - b. Filter Pack Gradation and Supplier.
 - c. Transition Sand Gradation and Supplier.
 - d. Bentonite to be used for Annular Seal.
 - e. Bentonite powder and Cement to be used to create Transition Seal.
 - f. Certified cement mix design receipts and delivery receipts for cement placed for Sanitary Seal, if applicable.
 - g. Above Ground Monument:
 - 1) The Contractor shall submit a schematic drawing of the above-ground monument and documentation from the manufacturer that the above-ground monument meets the requirements of this Section.

D. Measuring Device:

1. The Contractor shall submit details of the measuring device to be used to measure the level of the filter pack, transition pack, transition sand, and pellet annular seal throughout the backfilling process.
2. The Contractor shall provide documentation acceptable to the Engineer that the measurement method is proven to be accurate.

E. Alternative Drilling Method, if applicable.

F. Daily Construction Progress Report.

G. Material Calculations for:

1. Filter Pack and Transition Sand.
2. Pellet Annular Seal.
3. Transitional Grout Seal.
4. Sanitary Seal.

H. Well Report:

1. The Contractor shall provide the Department with a copy of the completed California Department of Water Resources (DWR) Well Completion Report for each well installed, within two (2) weeks after the well has been completed.

1.04 DELIVERY, STORAGE AND HANDLING

A. Delivery, Storage and Handling shall be made in accordance with the following:

1. Maintain end caps through shipping, storage and handling to prevent damage and to prevent entrance of dirt, debris and moisture. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
3. Use slings to handle materials if size requires handling by crane or lift. Rig materials to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
4. Store plastic piping protected from direct sunlight and provide support to prevent sagging and bending.

PART 2 PRODUCTS

2.01 GENERAL

- A. All construction materials shall be new prior to delivery onsite.
- B. Construction and equipment substitutions require written notification at the time of the bid and shall not be accepted anytime thereafter, unless by written authorization from the Engineer.
- C. All equipment supplied by the Contractor shall be available for inspection by the Engineer prior to the beginning of well construction operations.
 1. If, in the opinion of the Engineer, any of the equipment is not suitable for well construction operations, either because of mechanical problems, excessive noise, deviation from the specifications, or the build-up of substances which could cause borehole contamination (i.e., from oil, diesel, hydraulic leaks or exhaust residue, etc.), the Contractor shall adjust, replace or decontaminate it with suitable equipment at the Contractor's expense.

2.02 DRILLING METHODS

- A. **The drilling rig and drilling method is at the Contractor's discretion.** All associated drilling equipment shall be in good condition and have sufficient capacity to drill to the depths specified in the Contract Documents.

The borehole for the groundwater monitoring well shall be drilled at the Site. The table below summarizes the drilling method, total depth and depth to bedrock for each groundwater monitoring well installed previously at the Site. Refer to Appendix D – Existing Site Groundwater Data for a copy of the groundwater well boring logs and a site map showing where the existing groundwater wells are located at the site.

Well ID	Drilling Method	Total Depth of Borehole	Depth to Bedrock from Ground Surface
BG-01	Air-rotary casing hammer	256 feet bgs	No bedrock
BG-02	Air-rotary casing hammer	218 feet bgs	No bedrock
BG-03	Air-rotary casing hammer	209.5 feet bgs	No bedrock
BG-05A	Air-rotary casing hammer	187.5 feet bgs	No bedrock
BG-06	Dull-wall direct-drive hammer	180 feet bgs	No bedrock

1. The mast and all running gear (hoists, cable, etc.) of the drill rig shall have a proven, sufficient and demonstrated capacity to lift three (3) times the buoyant weight of the drilling string.

B. Drill Pipe/Auger

1. If the Contractor chooses to use the drilling pipe/auger drilling method, the drilling pipe/auger shall be in good condition and shall be connected by standard tool joints.
2. The Contractor shall not use drilling pipe equipped with external air lines.
3. The drill pipe/auger shall be steam-cleaned prior to its arrival at the drilling site.
4. Drill pipe/auger suspected of being contaminated shall be removed and steam-cleaned at the Contractor's expense prior to its use at the site.
5. Pipe dope or other lubricating material such as "Gimmie the Green Stuff" or other environmentally safe material, as pre-approved by the Engineer, can be used on the threads of the drill pipe/auger and tremie.

C. Air Rotary Drilling Equipment

1. If the Contractor chooses to use the air rotary drilling method, the Contractor shall utilize an oil-less, filtered air compressor with the capability of properly drilling to the minimum depth proposed in the Contract Documents.

2. The Contractor shall use an air cyclone or other acceptable method, pre-approved by the Engineer, for the collection of drill cuttings at the point where air is returned to the surface (i.e., flow directed out of the discharge pipe).
 3. The air cyclone shall function to allow the Engineer to collect representative samples of the subsurface.
 4. If samples cannot be adequately collected, drilling will cease until the problem can be corrected to the satisfaction of the Engineer.
- D. Conductor Casing
1. If the Contractor chooses to use a conductor casing with the air rotary drilling method, the conductor casing shall be in good condition and shall be connected by standard tool joints.
 2. The conductor casing shall be decontaminated prior to its arrival at the site.
 3. Conductor casing suspected of being contaminated shall be decontaminated at the Contractor's expense prior to its use at the site.
 4. Pipe dope or other lubricating material such as "Gimmie the Green Stuff" or other environmentally safe material, as pre-approved by the Engineer, can be used on the threads of the conductor casing if necessary.
- E. If the Contractor chooses to use a drilling method, other than auger drilling or air rotary drilling, the Contractor shall submit a written description of the proposed drilling method to the Department, prior to mobilizing the drilling equipment.
1. The Department shall review the written submittal and may amend the Contract Documents to account for the proposed drilling method.
 - a. The scope of any amendments will be limited to specifications to ensure the environmental integrity of the borehole.
 2. The Department shall authorize the proposed drilling method in writing.
 - a. The Contractor may mobilize drilling equipment after written approval.
 - b. The Department's approval of a Contractor's alternative drilling method does not relieve the Contractor of his responsibility to drill the boreholes to the depths specified in the Contract Documents or to construct the monitoring well.
 - c. The Department's authorization does not constitute approval or agreement that the alternative drilling method will allow the Contractor to successfully complete the Project.

2.03 BOREHOLE

- A. The purpose of the well borehole is to determine the thickness and nature of all formations penetrated, determine the location of water bearing strata, obtain other hydrological and geological information and allow for well construction.

- B. Each well borehole shall be drilled by a method chosen by the Contractor. Limitations and/or conditions for different drilling methods are specified in Section 2.02 of this Detailed Provisions.
- C. Payment for drilling and sampling of the well borehole shall be based on vertical feet drilled (first pass) measured from the ground surface. It shall include all materials, labor, tools, and equipment required to drill the borehole, collect formation samples, maintain circulation (depending on drilling method chosen) and protect the borehole from caving.
 - 1. No payment will be made for temporary casings installed at the Contractor's option.
- D. Payment will only be made for the Contractor's first pass successful drilling method.
 - 1. If the Contractor chooses drilling method(s) that are unsuccessful, the County will not make additional payment for vertical feet drilled for second, third or any subsequent passes by the Contractor to obtain the required borehole depth.
 - 2. No payment will be made for borehole corrections that may be necessary to comply with these specifications. Payment for any borehole corrections will be included in the unit price for the corresponding Borehole Drilling and Sampling.
- E. Payment for Borehole Drilling and Sampling shall be made at the unit price for Borehole Drilling and Sampling in Detailed Provisions Section 01 2900 – Payment Procedures.
- F. Payment for stand-by time will be at the unit price for the corresponding Drill Rig Standby in Detailed Provisions Section 01 2900 – Payment Procedures.
- G. Payment for rock clause drilling will be at the unit price for the corresponding Rock Clause Drilling in Detailed Provisions Section 01 2900 – Payment Procedures.

2.04 HOLDING TANKS

- A. The Contractor shall use a drum(s) or tank(s) to store groundwater generated during well construction activities.
- B. The Contractor shall anticipate/provide adequate containment volume (e.g., number of drums or tanks) to maintain efficient operations.
- C. The water shall be temporarily stored on the landfill property.

2.05 BAILER

- A. A suction bailer shall be provided with the appropriate fittings to allow for the removal of debris, which may accumulate in the bottom of the well casing.

2.06 BLANK WELL CASING

- A. The blank well casing shall be nominal 4-inch inner diameter, schedule 80 PVC as specified in ASTM D1785 (latest edition), equipped with threaded joints at the ends of the blank casing sections. The blank casings shall be factory assembled.

- B. Threaded joints shall be machined with beveled/interference compression fit shoulder seals to increase compressional strength.
- C. O-ring seals shall be provided within the threaded joints to mitigate leakage and contaminants from entering at the threaded joint.
- D. In all cases, the blank casing used in conjunction with the screen shall have the same inner diameter as the screen to ensure that the inside diameter of the blank casing matches the inside diameter of the screen.
- E. The bottom of each well casing shall be fitted with a threaded end cap. The end cap shall be of the same chemical and physical properties as the blank well casing.
- F. All casing material shall be new.
- G. Payment for blank well casing installation shall be based on measurement of vertical feet of blank well casing installed complete and in place, which includes furnishing and installing centralizer and end caps, at the unit price for Well Casing in Detailed Provisions Section 01 2900 – Payment Procedures.

2.07 SLOTTED WELL SCREENS

- A. The well screens shall be nominal 4-inch diameter, schedule 80 PVC as specified in ASTM D1785 (latest edition), equipped with threaded joints at the end of the slotted well screen section. The screen shall be factory-assembled.
- B. The slotted well screen shall be machined 0.020-inch slot (20-slot).
- C. Threaded joints shall be machined with beveled/interference compression fit shoulder seals to increase compressional strength.
- D. O-ring seals shall be provided within the threaded joints to mitigate leakage and contaminants from entering at the threaded joint.
- E. In all cases, the slotted well screens used in conjunction with the blank casing shall have the same inner diameter as the screen to ensure that the inside diameter of the blank casing matches the inside diameter of the screen.
- F. All casing material shall be new.
- G. Payment for well screen installation shall be based on measurement of vertical feet of well screen installed complete and in place at the unit price for Well Screen in Detailed Provisions Section 01 2900 – Payment Procedures.

2.08 FILTER PACK

- A. All sand/gravel to be used for the filter pack shall be hard, water or air worn gravels, and washed clean of silt, sand, dirt and foreign matter. It shall be well rounded, graded, and shall have a coefficient of uniformity less than 2.5.
- B. The gravel/sand shall be kept free of all foreign matter. Gravel/sand suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the Contractor's expense prior to the arrival of new gravel/sand.

- C. Gravel shall be non-mixed (i.e., pure silica) #3 gradation blend by Oglebay Norton Industrial Sands, Inc. (formerly known as Colorado Silica Sand, Inc.), or approved equal.
- D. The #3 gradation blend shall meet the sieve analyses parameters specified below.

Sieve #	Sieve Opening (mm)	Cumulative Percent Passing
1/2-Inch	12.5	100
4	4.75	100
6	3.35	100
8	2.36	100-98
12	1.7	89-55
16	1.18	46-10
20	0.85	13-1
30	0.60	5-0

- E. Crushed gravel will not be accepted.
- F. All gravel is subject to approval by the Engineer prior to use in the packing process.
- G. Filter pack payment will be based on measurement of vertical feet of filter pack installed from the bottom to the top of each specified interval at the unit price for Filter Pack in Detailed Provisions Section 01 2900 – Payment Procedures.

2.09 SURGE BLOCK

- A. A surge block consists of a rubber plunger specifically fabricated for a 4-inch diameter well casing.
- B. The surge block shall fit tightly within the well casing to create the necessary vacuum and pressure in the groundwater column for surging procedures.

2.10 TRANSITION SAND

- A. All sand used for the transition sand layer shall be hard, water or air worn gravels, and washed clean of silt, dirt and foreign matter.
- B. The transition sand shall be kept free of all foreign matter. Transition sand suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the Contractor's expense prior to the arrival of new transition sand.
- C. Sand shall be a non-mixed (i.e., pure silica) #60 gradation blend by Oglebay Norton Industrial Sands, Inc. or approved equal.

- D. The #60 gradation blend shall meet the sieve analyses parameters specified below.

Sieve #	Sieve Opening (mm)	Cumulative Percent Passing
20	0.85	100
30	0.60	100
40	0.425	100-94
50	0.30	60-25
70	0.212	15-5
100	0.15	4-0

- E. Crushed gravel will not be accepted.
- F. All sand is subject to approval by the Engineer prior to use in the transition sand layer.
- G. Transition sand payment will be based on measurement of vertical feet of transition sand installed from the bottom to the top of each specified interval at the unit price for Transition Sand in Detailed Provisions Section 01 2900 – Payment Procedures.

2.11 PELLET ANNULAR SEAL

- A. An approximate 5-foot thick seal consisting of dry non-coated medium-sized bentonite chips or tablets shall be installed above the screened interval, or as otherwise specified.
- B. Coated bentonite pellets, chips or tablets shall not be used to construct these seals.
- C. The bentonite chips or tablets shall be certified NSF/ANSI Standard 60, Drinking Water Treatment Chemicals - Health Effects.
- D. Payment for annular seal materials will be based on measurement of vertical feet of seal installed from the bottom to top of the specified interval, at the unit price for Pellet Annular Seal in Detailed Provisions 01 2900 – Payment Procedures.

2.12 TRANSITION GROUT ANNULAR SEAL

- A. The transition grout shall be composed of a bentonite-cement mixture.
- B. Cement used for the transition grout seal shall be a Type II Portland cement conforming to ASTM C150 (latest edition).
- C. Bentonite used in the grout shall be pulverized (powder or granular) and shall be certified NSF/ANSI Standard 60, Drinking Water Treatment Chemicals – Health Effects.
- D. Water used for the cement mix shall be clean and of potable quality.
- E. The transition grout shall be composed of 1-gallon of water to 1- to 1¼-pounds of bentonite powder. Cement shall be added to the bentonite grout at a ratio of 1- to 2-pounds of cement to 1-gallon of water.
- F. Transition Grout Mixture:
1. Bentonite and water shall be mixed first, prior to the addition of cement.

2. Bentonite, water and cement shall be mixed in the ratios specified in Section 2.12E.
 3. The final mixture of transition grout shall be thoroughly blended before pumping.
 4. Bentonite and cement shall be completely incorporated into the grout, no unmixed lumps of material shall exist in the grout.
- G. Payment for the transition grout annular seal will be based on measurement of vertical feet of seal installed at the unit price for Transition Seal in Detailed Provisions Section 01 2900 – Payment Procedures.
1. No stand-by time will be paid for any down-time between the placement of the transition grout annular seal and the sanitary seal.

2.13 SANITARY SEAL

- A. Cement used for the sanitary seal shall be a Type II Portland cement conforming to ASTM C150 (latest edition).
- B. The cement mix used for the sanitary seal shall be a 10.5-sack sand-cement grout. There shall be not more than two (2) parts by weight of sand to one (1) part by weight of cement. The water-cement ratio shall be 7-gallons per sack of cement (94 pounds).
- C. Water used for the cement mix shall be clean and of potable quality.
- D. Materials used as additives for Portland cement mixtures in the field shall meet the requirements of ASTM C494 (latest edition), “Standard Specifications for Chemical Admixtures for Concrete.”
- E. Special quick-setting cement, retardants to setting, and other additives, including hydrated lime to make the mix fluid (up to ten percent (10%) of the volume of cement) may be used.
- F. Sanitary Seal Mixture:
1. Water, sand and cement shall be mixed in the ratios specified in Section 2.13B.
 2. The final mixture of sanitary seal shall be thoroughly blended before pumping. Cement and sand shall be completely incorporated into the mixture, no unmixed lumps of material shall exist in the mixture.
- G. Payment for the sanitary seal will be based on measurement of vertical feet of sanitary seal installed at the unit price for Sanitary Seal in Detailed Provisions Section 01 2900 – Payment Procedures.
1. No stand-by time will be paid for any down-time between the placement of the transition seal and the installation of the sanitary seal, or during the 24 hours the sanitary seal is curing.

2.14 ABOVEGROUND MONUMENT

- A. The aboveground monument installed to protect the wellhead shall be a 12 in x 7 ft round well protector, with a hinge lockable lid, or County approved equal.
 - 1. Payment for the aboveground monument shall be made at the unit price for Aboveground Well Head Protection in Detailed Provisions Section 01 2900 – Payment Procedures.

PART 3 EXECUTION

3.01 GENERAL

- A. The well construction shall be performed in accordance with:
 - 1. Water Well Standards: State of California (Bulletin 74-81 and 74-90)
 - 2. California Well Standards and Riverside County Ordinance No. 682.3.
- B. The Contractor is cautioned to properly secure/stabilize the well during all phases of construction. Improper or poor security/stabilization of the well may lead to delays.
 - 1. Such delays will be the responsibility of the Contractor and the County shall not pay any cost associated with such delays.
- C. The Contractor shall use good practice during installation, backfilling and well development to ensure the integrity of the borehole, screen and casing is maintained.
- D. A general schematic diagram of the well construction, including location of the filter pack, transitional sand, pellet annular seal, transitional grout seal and sanitary seal is provided in Sheet 5 of the Project Drawings.

3.02 BOREHOLE DRILLING

- A. The Contractor shall not start drilling without the Engineer onsite to confirm the location of the borehole.
- B. The Contractor shall provide all tools, accessories, air compressor, power, fuel, materials, supplies, lighting, other equipment and experienced personnel necessary to conduct safe and efficient drilling operations.
- C. The Contractor shall prepare to drill the borehole to the total depth specified in the Contract Documents.
 - 1. The borehole diameter shall be a minimum of 8-inches.
 - 2. The Engineer will be onsite during the drilling process to specify the exact depth of the borehole to be drilled based on drilling cuttings, the geologic log and the depth to groundwater encountered during drilling.
 - 3. The exact depth specified by the Engineer may be more or less than the total depth specified in the Contract Documents.

- D. The Contractor shall take all measures necessary to protect the borehole from caving or raveling during drilling operations and at the conclusion of drilling operations, when the final depth has been achieved.
 - 1. Improper or poor security/stabilization of the borehole may lead to borehole collapse and delays prior to or during well construction.
 - 2. Such collapse or delays will be the responsibility of the Contractor and the County shall not pay any costs associated with such delays or collapse.
- E. Soil drilling cuttings not placed in drums shall be placed on plastic sheeting that has a minimum 10-mil thickness. Soil drilling cuttings placed on plastic sheeting may be placed near the borehole, as long as the location does not interfere with daily landfilling activities. The County shall be responsible for the final handling, transportation and disposal of drilling cuttings, following the Contractor's demobilization from the site.
- F. Once groundwater is encountered in the borehole, soil drilling cuttings will be stored in 55-gallon drums. At the end of each well construction, the Contractor shall transport the drummed drilling cuttings to the soil drilling cutting storage location. The County shall be responsible for the final handling, transportation and disposal of drilling cuttings, following the Contractor's demobilization from the site.
- G. Upon completion of drilling a specific borehole to the depth specified in these Contract Documents or as directed by the Engineer, the Engineer will provide, within twenty-four (24) hours, the Contractor with well construction details or request that the Contractor drill deeper.
 - 1. The Contractor shall be paid for stand-by time for each working hour beyond the 24-hour assessment period that the Engineer does not provide the Contractor with well construction details or the request to drill deeper.
- H. The Contractor may discharge minor volumes of nuisance groundwater generated during drilling directly to the ground surface adjacent to the well site, as permitted by the State Water Resources Control Board Water Quality Order No. 2014-0057-DWQ.
- I. The Contractor shall implement appropriate best management practices (BMPs) to mitigate the discharge of sediment laden groundwater.
 - 1. Where necessary, BMPs shall also be implemented to mitigate groundwater discharge related erosion.
 - 2. The discharge of groundwater shall also be controlled to prevent contact with significant materials or equipment, including those of the Contractor and County.

3.03 ROCK CLAUSE

- A. The Rock Clause shall go into effect ONLY after the Contractor verbally notifies the Engineer that the drilling advancement rate is less than five (5) feet per hour and that the Contractor is requesting Rock Clause time.
 - 1. The decrease in the drilling rate shall be due to natural causes such as hard formations caused by gravel and boulders.

2. The Contractor is cautioned to practice proper drilling techniques for gravel alluvium drilling environments.
 3. Reduction in drilling rate due to worn bits will not be grounds for invoking the Rock Clause.
 4. Borehole caving problems and decreased penetration rates due to improper air flow rates or choice of drilling bits are not acceptable causes to invoke the Rock Clause.
- B. A recording device such as a "geolograph" shall be required to document Rock Clause time.

3.04 SUBSURFACE FORMATION SAMPLING

- A. The Contractor shall, at each change of formation, at five-foot intervals between changes in formation, and at intervals requested by the Engineer, collect a representative sample of the interval or new formation. Each sample shall be given to the Engineer for proper logging and storage.
- B. If the Contractor chooses to drill with hollow stem auger, the Contractor shall collect relatively undisturbed soil samples with a Standard Penetration Test split spoon sampler.
- C. If the Contractor chooses to drill with a form of air rotary, the Contractor shall provide an acceptable means to the Engineer whereby the Contractor can safely obtain representative samples of formation cuttings from the air stream.
- D. The ground surface around the sampling area shall be kept graded and free from stockpiled drilling cuttings and shall be kept free of trash, equipment and other debris.
- E. If samples cannot be adequately collected, drilling will cease until the problem is corrected to the satisfaction of the Engineer.

3.05 DAILY CONSTRUCTION PROGRESS REPORT

- A. The driller shall prepare a daily record of drilling activities completed each Working Day that drilling is completed.
- B. The Daily Construction Progress Report shall identify:
 1. First pass vertical footage drilled.
 2. Approved Rock Clause hours.
 3. Approved stand-by time hours.
- C. The report shall be submitted to the Engineer for review and approval at the conclusion of each Working Day.

3.06 WELL CASING AND SCREEN INSTALLATION

- A. A typical well design will consist of a 20 to 30-foot long interval of well screen with approximately five (5) feet of blank casing below (silt trap) and the remainder of the blank casing located above the screen and extending to the ground surface.

- B. The proposed well casing and screen lengths are specified in the Contract Documents.
 - 1. These lengths are subject to change, as specified by the Engineer, based on the subsurface conditions encountered during drilling.
- C. The Engineer will submit the final well design depths/lengths to the Contractor within 24-hours after the Engineer directs the Contractor to terminate drilling at a specific well location.
 - 1. While the well design is being completed, no additional payment for stand-by time shall be made, except where specified in Section 3.02G.1.
 - 2. The final well design will specify where the blank casing, screen intervals, filter pack intervals, seal intervals and sanitary seal will be placed in the borehole.
- D. Joints:
 - 1. All field joints, where blank casings and/or screen casing are joined together, shall be connected via the machine threaded ends.
- E. Installation of casing and screen:
 - 1. The well casing string shall be suspended at all times in tension from the surface by means of a clamp, landing plate, or equivalent method. The bottom of the casing string shall be at a sufficient distance above the bottom of the borehole to ensure that it is not supported by the bottom of the borehole.
 - 2. The Contractor will measure and record the lengths of the casing as it is being installed into the borehole.
 - a. The casing lengths will be such that the screens are placed per the design interval and the total installed length of the casing is as specified in the design.
 - 3. Centralizers:
 - a. Two centralizers shall be installed around the screen section, one near the bottom and one approximately mid-height.
 - b. One centralizer shall be installed around the blank casing, at approximately mid-height.
 - 4. If for any reason the casing cannot be placed in the correct position, or at a depth acceptable to the Engineer, the Contractor shall take whatever measures are necessary to properly construct the well at his own expense, including abandoning the borehole.
 - 5. If any of the casings should collapse or break prior to well completion, they shall be withdrawn and replaced at the Contractor's expense.
 - 6. All Work required to be repeated because of the Contractor, and all additional materials, labor, and equipment required, shall be furnished at the expense of the Contractor and no claim for additional compensation shall be made or be allowed therefore, except as specifically provided herein.

7. The well casing shall be completed at ground surface.
 - a. Wells requiring above ground well head protection shall have extra casing length added to allow for construction as specified in Section 3.11 and as shown on Sheet 5 of the Project Drawings.
- F. Prior to backfilling the annular space around the casing string, the Contractor shall measure the bottom of the well casing to verify its total depth.

3.07 FILTER PACK AND TRANSITION SAND INSTALLATION

- A. Once drilling is completed, the bottom of the borehole is stabilized, if necessary, and the casing is installed within the borehole, the installation of the filter pack and transition sand can proceed.
- B. Installation of Filter Pack:
 1. The gravel/sand, if stockpiled onsite, shall be kept free of all foreign matter.
 2. Gravel/sand suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the contractor's expense prior to the arrival of new gravel/sand on site.
 3. Throughout the backfilling process, the Contractor shall complete calculations to determine the amount of material necessary to backfill the specified interval.
 - a. The Contractor shall record all calculations and volumes of material used to backfill the specified interval, as well as measurements obtained after the gravel/sand placement and verify those calculations with the Engineer.
 4. The gravel/sand filter pack shall be placed into the annulus of the well through a tremie.
 5. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
 6. The gravel/sand shall not be allowed to freefall more than 20-feet from the bottom of the tremie to the top of the gravel/sand.
 7. The filter pack level shall be measured throughout the backfilling process.
 8. The gravel/sand filter pack shall be installed from the bottom of the borehole to approximately five (5) feet above the top of screen.
 9. Upon completion of installation of each filter pack, or portion thereof, no additional Work will be performed until the depth to the top of that filter pack has been determined by use of proven, accurate equipment.
- C. Prior to installing the transition sand materials, the Contractor shall consolidate the filter pack by gently surging the well screen with a tight-fitting surge block.
- D. The Contractor shall then re-measure the top of the filter pack and install additional gravel/sand to achieve the design depth.
- E. Following the installation of the filter pack, the Contractor shall install an approximate 5-foot thick layer of transition sand.

F. Installation of Transition Sand:

1. The transition sand, if stockpiled onsite, shall be kept free of all foreign matter.
2. Transition sand suspected of being contaminated with dust, oil or other contaminants will not be accepted and shall be removed at the contractor's expense prior to the arrival of new gravel/sand on site.
3. Throughout the backfilling process, the Contractor shall complete calculations to determine the amount of material necessary to backfill the specified interval.
 - a. The Contractor shall record all calculations and volumes of material used to backfill the specified interval, as well as measurements obtained after the transition sand layer placement and verify those calculations with the Engineer.
4. The transition sand shall be placed into the annulus of the well through a tremie.
5. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
6. The transition sand shall not be allowed to freefall more than 20 feet from the bottom of the tremie to the top of the transition sand.
7. The transition sand level shall be measured throughout the backfilling process.
8. The transition sand layer shall be installed from the top of the filter pack to a thickness of five (5) feet.
9. Upon completion of installation of the transition sand layer, or portion thereof, no additional Work will be performed until the depth to the top of that transition sand layer has been determined by use of proven, accurate equipment.

3.08 PELLET ANNULAR SEAL INSTALLATION

- A. Once the filter pack and transition sand are installed above the screened well casing, the annular seal can be installed.
- B. The annular seal seals the annular space between the borehole wall and the well casing.
- C. The seal shall be composed of medium-sized bentonite pellets and be installed in the annulus of the well to hydraulically separate the aquifer penetrated by the well casings.
- D. Annular Seal Installation.
 1. The Contractor shall calculate the amount of seal material necessary to backfill a specified interval.
 - a. The Contractor shall record all calculations and volumes of seal mixture used, and the measurements obtained after the seal placement and verify those calculations with the Engineer.
 2. An approximate five-foot thick seal, consisting of bentonite chips or tablets, shall be installed by gravity via a tremie above the transition sand layer.
 3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.

4. Seal materials shall not be allowed to freefall more than 20 feet from the bottom of the tremie to the depth established from previous measurement.
5. The seal level shall be measured throughout the backfilling process.
6. The seal shall be installed from the top of the transition sand to a thickness of five (5) feet in a continuous operation.
7. The Contractor shall measure the depth of the top of the seal after installation.
8. Upon complete installation of the annular seal, or portion thereof, no additional Work will be performed until the depth to the top of that seal has been determined by use of proven, accurate equipment.

3.09 TRANSITION GROUT ANNULAR SEAL INSTALLATION

- A. The transition grout annular seal seals the annular space between the borehole and the well casing in the upper portion of the borehole.
- B. Transition Grout Installation.
 1. The Contractor shall calculate the amount of transition grout necessary to complete the annular seal.
 - a. The volume placed shall not be less than the calculated volume of the annular space between the borehole and the well casing.
 - b. The Contractor shall record all calculations and volumes used, and measurements obtained after each interval is pumped.
 - c. The Contractor shall provide the calculations and volumes to the Engineer for his review and approval.
 2. The transition grout shall be placed into the annulus of the well through a tremie.
 3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
 4. The tremie pipe shall extend from the ground surface to the bottom of the zone to be grouted.
 5. Cement grout shall be placed from bottom to top, in a continuous operation.
 6. The tremie pipe shall be slowly raised as the grout is placed, but the discharge end of the grout pipe must be submerged in the emplaced grout at all times until grouting is completed.
 7. The Contractor shall take whatever precautions are necessary to prevent borehole and/or casing collapse during placement of the transition grout.
 - a. In the event any borehole and/or casing collapses prior to completion of the transition grout, the Contractor shall take whatever steps are necessary to reopen the borehole, replace the casing and place the seal as specified.
 - b. Any such remedial action shall be conducted at the Contractor's expense.

8. No activity shall occur directly adjacent to the well site, nor will stand-by time be granted, during a minimum 1-hour period immediately following the placement of the transition grout.
9. The casing shall be adequately secured such that no damage or contamination will occur during this period.

3.10 SANITARY SEAL INSTALLATION

- A. The sanitary seal seals the annular space between the borehole and the well casing in the upper portion of the borehole up to the ground surface.
- B. After placement of the casings, screens, filter pack, transition sand, pellet seal and transition seal, the sanitary seal shall be installed.
- C. Sanitary Seal Installation.
 1. The Contractor shall calculate the amount of seal material necessary to complete the sanitary seal.
 - a. The volume placed shall not be less than the calculated volume of the annular space between the borehole and the well casing.
 - b. The Contractor shall record all calculations and volumes used, and measurements obtained after each interval is pumped.
 - c. The Contractor shall provide the calculations and volumes to the Engineer for his review and approval.
 2. The sanitary seal shall be placed into the annulus of the well through a tremie.
 3. The Contractor shall ensure that the well casing and tremie are sufficiently aligned to prevent binding while raising the tremie during the backfilling process.
 4. The tremie pipe shall extend from the ground surface to the bottom of the zone to be sealed.
 5. The sanitary seal shall be placed from bottom to top, in a continuous operation.
 6. The tremie pipe shall be slowly raised as the sanitary seal is placed, but the discharge end of the grout pipe must be submerged in the emplaced sanitary seal at all times until placement of the sanitary seal is completed.
 7. The Contractor shall take whatever precautions are necessary to prevent borehole and/or casing collapse during placement of the sanitary seal.
 - a. In the event any borehole and/or casing collapses prior to completion of the sanitary seal, the Contractor shall take whatever steps are necessary to reopen the borehole, replace the casing and place the seal as specified.
 - b. Any such remedial action shall be conducted at the Contractor's expense.
 8. No activity shall occur directly adjacent to the well site, nor will stand-by time be granted, during a minimum 24-hour period immediately following the placement of the sanitary seal.

9. The casings shall be adequately secured such that no damage or contamination will occur during this period.

3.11 ABOVE GROUND WELL HEAD PROTECTION

- A. The Contractor shall install an above ground monument surrounded by cement-filled bollards to protect the well head.
- B. Upon completion of well development, the Contractor shall excavate around the well casing to approximately 2.5 feet below ground surface, to a sufficient width, to facilitate the installation of the monument.
- C. The Contractor shall cut off the well casing such that the casing extends approximately 24 inches above the top of surrounding ground surface.
 1. The cut edges shall be regular in appearance and Contractor shall file the edges to remove all burrs and sharp corners from the edge.
 2. Contractor shall equip each cut well casing with a fitted J-plug.
- D. The Contractor shall install an approximate six-inch thick layer of crushed rock base in the base area between the well casing and the excavation walls to support the monument.
 1. The rock base shall be compacted and leveled to provide a supportive surface.
- E. Contractor shall install the monument on top of the crushed rock base such that the elevation of the top of the monument is approximately three (3) feet above the surrounding ground surface.
- F. Contractor shall install an additional approximate six-inch layer of crushed rock base in the space between the monument and the well casing, and in the space between the monument and the surrounding excavation walls, to provide lateral stability to the vault.
 1. The rock base shall be compacted and leveled within the vault to provide a supportive surface free of trip hazards.
- G. Contractor shall install concrete between the monument and the excavation walls, from the top of the rock base to an elevation matching the surrounding grade.
- H. Contractor shall install a concrete pad measuring 4-feet by 4-feet by 4-inches in thickness, centered on the monument.
 1. The concrete pad shall consist of structural concrete installed in a single pour at the same time the concrete is placed surrounding the monument.
- I. The Contractor shall install four (4) bollards in accordance with Detailed Provisions Section 32 3913 – Manufactured Metal Bollards, around the well monument to protect the well casing from vehicular traffic.
- J. After completion of the aboveground well head protection, the Contractor shall wait 24-hours before commencing well development procedures in accordance with Detailed Provisions Section 33 0111 – Well Development.

- K. Upon completion of all Work in connection with the well construction and well development, the well shall be capped by placing a lockable J-plug on the top of the casing.

3.12 CLEANUP

- A. Any waste that is generated by the Contractor, which is incidental to any well construction activities, shall be collected and properly disposed by the Contractor, as specified in Detailed Provisions Section 01 5600 – Project Environmental Controls and Section 01 7700 – Closeout Procedures.
- B. The procedure for collecting and handling soil drilling cuttings is specified in Section 3.02G above.

END OF SECTION 33 1153



SPECIFICATIONS – DETAILED PROVISIONS
SECTION 33 1600: WATER UTILITY STORAGE TANKS
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SECTION 33 1600 WATER UTILITY STORAGE TANKS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Contractor shall provide all design, labor, equipment, tools, material, fabrication, erection, installation, and training for a portable elevated steel water storage tank and tower including, but not limited to, risers, piping, drains, level indicators, and automatic fill system controls.

B. Related Detailed Provisions Sections include, but are not limited to:

1. Division 01 – General Requirements.
2. Division 26 – Electrical.
3. Section 31 2133 – Trenching, Backfilling, and Compacting for Utilities.

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. American Society of Mechanical Engineers (ASME):
 - a. ASME B16.5 – Pipe Flanges and Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard.
 - b. ASME B16.9 – Factory-Made Wrought Buttwelding Fittings.
 - c. ASME B36.10M – Welded and Seamless Wrought Steel Pipe.
2. American Society for Testing and Materials (ASTM):
 - a. ASTM A36/A36M – Standard Specification for Carbon Structural Steel.
 - b. ASTM A135/A135M – Standard Specification for Electric-Resistance-Welded Steel Pipe.
 - c. ASTM A795/A795M – Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
 - d. ASTM A234/A234M – Standard Specification for Piping Fittings for Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 - e. ASTM D1785 – Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - f. ASTM D2564 – Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - g. ASTM F656 – Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

3. American Water Works Association (AWWA):
 - a. AWWA C606 – Standard for Grounded and Shouldered Joints.
4. Department of Transportation (DOT)
 - a. DOT 406
5. International Code Council (ICC)
6. Underwriters Laboratories, Inc. (UL).
 - a. All electrical components shall be UL listed.

1.03 PORTABLE WATER TOWER DESCRIPTION

- A. The portable water tower(s) shall be designed in accordance with the following:
 1. Portable water tower tank shall be constructed using A36 structural steel.
 2. Exterior of portable water tower tank shall be coated with primer and epoxy paint.
 3. Interior of portable water tower tank shall be coated with a rust-resistant three-coat epoxy coating system to prevent corrosion.
 4. Minimum Capacity: 12,000-gallons
 5. Portable Water Tower Accessories:
 - a. Steel-Fitted Heads
 - b. 10-inch Diameter Discharge Tube (approximately 12' from Grade)
 - c. Dual 3-inch Fill Pipe with Approved Air Gaps, Valves, Float Assemblies, and Camlock on End of Pipe
 - d. Mechanical Float System (Fill Controlled by Water Depth)
 - e. Automatic Shut Off Valve
 - f. Tank Access Hatch
 - g. OSHA-Approved Access Ladder
 - h. Optional Items That Can Be Removed After Delivery and Installation for a Cost Credit to the County:
 - 1) Fifth Wheel Hitch
 - 2) Removeable Hydraulic Pump and Motor
 - 3) Heavy-Duty Long-Life Axle, Suspension, and Air Brake System
 - 4) Dual Wheels and Tires
 6. Wiring, conduit connections, and necessary switch controls for the water in the portable water tower to automatically fill via the groundwater well pumping system.

1.04 SUBMITTALS

- A. Submittal Procedures: See Detailed Provisions Section 01 3300 – Submittal Procedures for requirements for the mechanics and administration of the submittal process.
- B. Product Data:
 - 1. Provide manufacturer’s standard catalog pages and data sheets for all products including, but not limited to:
 - a. Portable Water Tower and Accessories
 - b. Piping
 - c. Valves
 - d. Tank Coating System
 - e. Electrical Equipment
- C. Shop Drawings:
 - 1. Dimensioned portable water tower fabrication drawings indicating all accessories and appurtenances with detailed plan and elevation views.
 - 2. Single-Line diagram(s) for electrical equipment.
- D. Samples:
 - 1. For County’s exterior tank coating color selection, submit standard color samples from manufacturer’s full line of colors.
- E. Foundation Design (if applicable):
 - 1. Must be stamped by a professional structural engineer registered in the State of California.
- F. Closeout Submittals:
 - 1. Operation and Maintenance (O&M) Manual Content: Provide O&M manual documentation as required by Detailed Provisions Section 01 7823 – Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers or approved equals are acceptable:
 - 1. Portable Water Tower and Accessories:
 - a. Valew 12,000-Gallon Portable Water Tower, www.valew.com
 - b. Rain for Rent 12,000-Gallon Portable Water Tower, www.rainforrent.com
 - c. Klein KPT-120, www.kleinproducts.com

- B. Submit request for substitution in accordance with Detailed Provisions Section 01 6000 – Product Requirements.

2.02 PIPING

A. Steel Pipe:

1. Schedule 40, black-steel pipe: ASTM A135; ASTM A795; or ASME B36.10. Pipe ends may be factory or field formed to match joining method. Steel pipe shall be epoxy lined and coated.
2. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
3. Steel Welded Fittings: ASTM A234 and ASME B16.9
4. Grooved-End Pipe Couplings for Steel Piping: AWWA C606 and UL 213, ridged pattern, unless otherwise indicated for steel pipe dimensions. Include ferrous housing selections, EPDM-rubber gasket, and bolts and nuts.

B. PVC Pipe:

1. Schedule 40: ASTM D1785. Joints shall be solvent-welded per ASTM D2564 with using primer per ASTM F656.

2.03 ELECTRICAL EQUIPMENT

- A. Contractor shall provide and install all necessary electrical equipment such that the portable water tower tank automatically fills when the water level in the tank falls below a specified height. Electrical equipment shall include, but is not limited to: wiring and wiring connections, electrical conduit, switch controls, and enclosures. The portable water tower tank shall be filled via a well pump as stated in Detailed Provision Sections 33 1114 – Non-Potable Production Wells and shown on the Project Drawings.
- B. Electrical equipment shall be installed as specified in Detailed Provisions Division 26 – Electrical.

2.04 FOUNDATION (IF APPLICABLE)

- A. The Contractor shall be responsible for the design and installation of the reinforced concrete foundation for the portable water tower and/or water tower restraint system. Design calculations and foundation drawings must be stamped by a professional structural engineer registered in the State of California.

PART 3 EXECUTION

3.01 PORTABLE WATER TOWER INSTALLATION

- A. Install equipment as shown on approved Shop Drawings and per portable water tower manufacturer's recommendations.
- B. Portable water tower shall be installed to accommodate a minimum vertical clearance from grade to 10-inch discharge pipe of 12-feet.

- C. Once portable water tank is installed, the Contactor can remove the fifth wheel hitch, removable hydraulic pump and motor, axle, suspension, and air brake system, and the wheels for a cost credit to the County.

3.02 PIPING INSTALLATION

- A. Install piping and fittings in accordance with pipe manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

- A. Functional and performance testing of the water storage and distribution system shall be conducted by the Contractor in the presence of a County Representative.

END OF SECTION 33 1600

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Appendix A

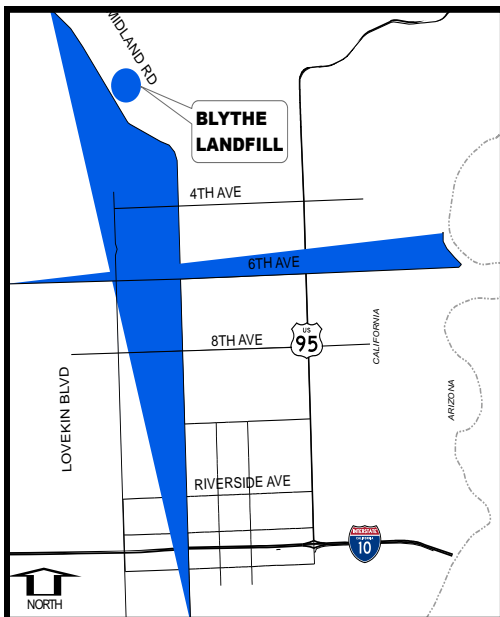
Landfill Site Safety Rules

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Blythe Sanitary Landfill

NOTE: Landfill may be closed due to rain, snow or excessive winds or other hazardous conditions as determined by County.

Location: 1000 Midland Road Blythe, CA 92225



Directions:

From East: Proceed west on I-10, exit Lovekin Boulevard north. Veer west onto Midland road, the landfill is on the right side of the road.

From West, travel east on I-10, exit Lovekin Boulevard north. Veer west onto Midland road, the landfill is on the right side of the road.

- ✓ **Obey County personnel and signs. It is for your safety.**
- ✓ **Anyone under 16 years of age and pets must remain in vehicle.**
- ✓ **High visibility safety vest must be worn at all times.**
- ✓ **Stay within 5 feet of your vehicle while unloading and 15 feet away from heavy equipment.**
- ✓ **No alcohol, drugs, weapons, salvaging, or loitering.**
- ✓ **The landfill closes promptly at 4:00, late customers will be turned away. Onsite customers unloading after 4:15 will be charged late fees.**

Acceptable Items

- Solid Waste
- Household Refuse
- Yard Trimmings
- Furniture
- Tires
- Appliances (i.e. Microwaves, Refrigerators, Washers, Dryers, etc.)
- TV's and Computers
- Electronic Waste

Unacceptable Items

- Hazardous Waste
- Household Hazardous Waste (i.e. Cleaners, Chemicals, Pesticides, Pool Chemicals, Paints, Aerosol Cans, Propane Tanks, etc.)
- Explosives or Ammunition
- Untreated Medical/ Infectious Waste (including Sharps)
- Asbestos (including floor tile and roofing material containing asbestos)

Hours of Operation:

**Monday through Friday and the first Saturday of the month
8:00 am to 4:00 pm**

**The landfill is closed the following holidays:
New Years Day
Memorial Day
Independence Day
Labor Day
Thanksgiving Day
Christmas Day**

Landfill Fees: <http://www.rcwaste.org/opencms/landfill/fees.html>

Payment Options: Cash, Riverside County Deferred Payment Business Accounts, or Rural Cards (see <http://www.rcwaste.org/opencms/landfill/payment.html>)

Household Hazardous Waste information: <http://www.rcwaste.org/opencms/hhw/flyers/master.pdf>

Business Hazardous Waste information: <http://www.rcwaste.org/opencms/hw/business.html>



Riverside County Department of Waste Resources
14310 Frederick Street, Moreno Valley, CA 92553
Ph 951-486-3200 www.rcwaste.org

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Appendix B

MDAQMD Rule 403 Fugitive Dust Control

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Rule 403

Fugitive Dust Control

(A) General

(1) Purpose

- (a) The purpose of this rule is to reduce the amount of PM₁₀ entrained in the ambient air from anthropogenic Fugitive Dust sources within the District by requiring actions to prevent, reduce, or mitigate Fugitive Dust.

(2) Applicability

- (a) This Rule shall apply to the following Active Operations:
 - (i) A project or Facility with a Disturbed Surface Area of at least twenty acres (including Mining, Stone, Asphalt, and Clay Facilities);
 - (ii) Residential Construction/Demolition Activity with a Disturbed Surface Area of at least ten (10) acres;
 - (iii) Non-residential Construction/Demolition Activity with a Disturbed Surface Area of at least five (5) acres;
 - (iv) Moving, depositing, or relocating more than 2,500 cubic yards per day of Bulk Materials on at least three consecutive days;
 - (v) Solar Projects capable of generating at least one (1) megawatt of electrical energy or covering at least one (1) acre;
 - (vi) Heavily-Traveled unpaved roads used for industrial activity; and
 - (vii) Any other project or facility where visible fugitive dust beyond the property line of the emissions source causes injury, detriment, nuisance, or annoyance to any considerable number of persons or the general public, or so designated by the APCO.
- (b) In addition, this Rule also applies to the Owner/Operator of Disturbed Surface Areas.

(B) Definitions

The definitions contained in District Rule 102 – *Definition of Terms* shall apply unless the term is otherwise defined herein:

- (1) “Active Operation” – Activity capable of generating Fugitive Dust, including, but not limited to: Bulk Material storage, handling and processing; Earth-Moving Activity; Construction/Demolition Activity; and movement of vehicles on

Unpaved roads, unpaved access areas, unpaved traffic areas, disturbed surface areas, and unpaved equipment storage areas.

- (2) “Bulk Material” – Sand, gravel, soil, aggregate, and any other organic or inorganic solid matter capable of releasing Fugitive Dust when stored, disturbed, or handled, and is generally un-packaged.
- (3) “Construction/Demolition Activity” – Any on-site mechanical activity preparatory to or related to building, altering, rehabilitating, demolishing, or improving property that results in Disturbed Surface Area, including, but not limited to, the following activities: grading; excavation; loading; crushing; cutting; planing; shaping; or ground breaking.
- (4) “Disturbed Surface Area” – Portion of the earth’s surface that has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition, thereby increasing the potential for emission of Fugitive Dust. Does not include areas restored to a natural state with vegetative ground cover and soil characteristics similar to adjacent or nearby natural conditions; paved or otherwise covered by a permanent structure; and sustained a vegetative ground cover over at least 70 percent of an area for period of at least six months. Includes projects with planned or forecasted disturbances.
- (5) “Dust Control Plan” (DCP) – A document that describes what fugitive dust control measures will be taken for the full duration of a project to comply with this Rule.
- (6) “Earth-Moving Activity” – The use of any equipment for any activity where soil is being moved or uncovered, and shall include, but is not limited to the following: grading, earth cutting and filling, loading or unloading of dirt or other Bulk Materials, adding to or removing from Open Storage Piles of Bulk Materials, landfilling, and soil mulching.
- (7) “Fugitive Dust” – Any solid particulate matter that becomes airborne, without first passing through a stack or duct, directly or indirectly as a result of anthropogenic activities.
- (8) “Heavily-Traveled” – Typically carrying more than 800 vehicle trips per day.
- (9) “High Winds” – When the wind speed instantaneously exceeds 40 kilometers (25 miles) per hour, or when the average wind speed is greater than 24 kilometers (15 miles) per hour. The average wind speed determination shall be on a 15-minute average at the nearest District-approved meteorological station.
- (10) “Hygroscopic Materials” – Any materials that are readily capable of absorbing moisture from the air. Chemical/organic stabilization/suppression materials control PM₁₀ emissions from fugitive dust by applying any non-toxic chemical or organic dust suppressant, other than water, which meets any specifications, criteria, or tests required by any federal, state, or local water agency and is not prohibited for use by any applicable law, rule, or regulation.

- (11) “Mining, Stone, Asphalt, and Clay Facilities” – Any company, business, facility, process, or operation which uses or processes crustal materials including stone, asphalt and clay materials and is classified under Standard Industrial Classification (SIC) 10, 14, 29, and 32.
- (12) “Open Storage Pile” – Any accumulation of Bulk Material not fully enclosed, covered, or chemically Stabilized with five percent (5%) or greater Silt content. Pile Silt content shall be assumed to be five percent (5%) or greater, unless a person can show, by sampling and analysis in accordance with ASTM method C-136 or other equivalent method approved in writing by the APCO and the California Air Resources Board, that the Silt content is less.
- (13) “Paved Road” – An improved street, highway, alley, public way, or easement that is covered by typical roadway materials excluding access roadways that connect a facility with a public Paved Road and are not open to through traffic. Public Paved Roads are those open to public access and that are owned by any federal, state, county, municipal, or any other governmental or quasi-governmental agencies. Private Paved Roads are any paved Roads not defined as public.
- (14) “Publicly Maintained” – Under the jurisdiction of, physically maintained by, and owned by Federal, State, county, municipal, or other governmental or quasi-governmental agencies.
- (15) “Road Surface Silt Loading” – A measurement of the amount of loose material accumulated on a road surface in terms of weight of material per unit area. For the purposes of this Rule, Road Surface Silt Loading shall be calculated in ounces of silt per square yard and be determined by sweeping or vacuuming at least 5 pounds of material from representative strips of known area of the surface and establishing the 75 micrometers or silt fraction through the use of a No. 200 sieve (USEPA AP-42 “Compilation of Air Pollutant Emission Factors” Section 11.2.6, ASTM Standard D-75 “Standard practice for Sampling Aggregates,” and ASTM Standard C-136 “Sieve Analysis of Fine and Course Aggregates”).
- (16) “Silt” – Any aggregate material with a particle size less than 75 micrometers in diameter which passes through a No. 200 sieve.
- (17) “Stabilize” – To reduce the Visible Fugitive Dust generating capability of a surface by paving, chemically treating, watering, or compacting. For purposes of this definition, a surface with a Visible Crust is deemed Stabilized. Chemical treatment must be performed with a non-toxic chemical dust suppressant substance not disapproved for such use by the applicable Regional Water Quality Control Board, the California Air Resources Board, the United States Environmental Protection Agency, or any applicable law, rule, or regulation, and should moreover meet any specifications, criteria, or tests required by any federal, state, or local water agency.
- (18) “Trackout” – Visible Bulk Material deposited upon public roadways as a result of Active Operations, including any Bulk Material that adheres to and agglomerates

on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a Paved Road and can be removed by a vacuum sweeper or a broom sweeper under normal conditions.

- (19) “Unpaved” – Not covered by one or more of the following: concrete, asphaltic concrete, recycled asphalt, or asphalt. Public unpaved roads are any unpaved roadway owned by Federal, State, county, municipal, or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public. This definition excludes horse trails, hiking paths, bicycle paths, or other similar pathways used exclusively for purposes other than travel by motorized vehicles.
- (20) “Visible Crust” – Having a surface that “passes” the dropped ball test method pursuant to Attachment C of this Rule.
- (21) “Visible Fugitive Dust” – Dust emissions from a fugitive source as dark as or darker in shade than that shade designated No. 1 on the Ringelmann Chart or equivalent, as published by the United States Bureau of Mines, or of equivalent opacity, for a period or periods aggregating more than three (3) minutes in any one (1) hour.

(C) Requirements

- (1) Any person shall not cause or allow the emissions of Fugitive Dust from any transport, handling, construction or storage activity so that the Visible Fugitive Dust remains visible in the atmosphere beyond the property line of the emission source, except during High Winds.
- (2) A person shall take every reasonable precaution to minimize Fugitive Dust emissions from wrecking, excavation, grading, clearing of land, and solid waste disposal operations.
- (3) A person shall not cause or allow PM₁₀ to exceed 100 micrograms per cubic meter when determined as the difference between upwind and downwind samples collected on federal reference method samplers at the property line for a minimum of five hours, except during High Winds. Installation of samplers or monitors to determine compliance with this subsection shall be required at the APCO’s discretion.
- (4) Cities, Towns, and the County of San Bernardino shall collectively:
 - (a) Stabilize sufficient Publicly Maintained Heavily Traveled Unpaved Roads to reduce fugitive dust entrainment and wind erosion by at least 1,541 tons per year of PM₁₀ emissions relative to 1990.
- (5) The Owner/Operator of a site undergoing weed abatement activity shall not:
 - (a) Disrupt the soil crust to the extent that Visible Fugitive Dust is created due to wind erosion.

- (6) The Owner/Operator of any Construction/Demolition activities subject to this Rule in accordance with subsection (A)(2) of this Rule shall:
- (a) Obtain and maintain a District-approved Dust Control Plan as set forth by Section (D) of this Rule; and
 - (b) Use periodic watering for short-term stabilization of Disturbed Surface Area to minimize visible fugitive dust emissions. For the purposes of this Rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance; and
 - (c) Take actions sufficient to prevent project-related Trackout onto paved surfaces; and
 - (d) Cover loaded haul Vehicles while operating on Publicly Maintained paved surfaces; and
 - (e) Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days, except when such delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate Visible Fugitive Dust emissions; and
 - (f) Cleanup project-related Trackout or spills on Publicly Maintained paved surfaces within twenty-four hours; and
 - (g) Reduce non-essential Earth-Moving Activity under High Wind conditions. For purposes of this Rule, a reduction in Earth-Moving Activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance; and
 - (h) Maintain the natural topography to the extent possible during grading and other earth movement; and
 - (i) Provide a construction schedule that specifies construction of parking lots and paved roads first, where feasible, and upwind structures prior to downwind structures; and
 - (j) Cover or otherwise contain Bulk Material carried on haul trucks operating on paved roads; and
 - (k) Remove Bulk Material tracked onto paved road surfaces.
- (7) In addition to the provisions of subsections (C)(6) of this Rule, the Owner/Operator of a Construction/Demolition source disturbing 10 or more acres shall:

- (a) Provide Stabilized access route(s) to the project site as soon as is feasible. For purposes of this Rule, as soon as is feasible shall mean prior to the completion of Construction/Demolition activity;
 - (b) Maintain natural topography to the extent possible;
 - (c) Construct parking lots and paved roads first, where feasible; and
 - (d) Construct upwind portions of project first, where feasible;
- (8) The Owner/Operator of a Mining, Stone, Asphalt, and/or Clay Facility shall:
- (a) Obtain and maintain a District-approved Dust Control Plan as set forth by Section (D) of this Rule; and
 - (b) Stabilize industrial Unpaved Roads carrying more than ten vehicle trips per day with the majority of those vehicles weighing 30 tons or more;
 - (c) Enclose exterior belt conveyors sufficiently to cover the top and sides of the Bulk Material being transferred (including portable belt conveyors where feasible), or employ an alternate suppression system sufficient to prevent Visible Fugitive Dust;
 - (d) Manage or treat Bulk Material Open Storage Piles sufficiently to prevent Visible Fugitive Dust emissions. For purposes of this Rule, active watering during visible dusting episodes shall be sufficient to maintain compliance;
 - (e) Cover loaded Bulk Material haul vehicles while traveling upon publicly maintained paved surfaces. For the purposes of this Rule, maintain at least six (6) inches of freeboard on haul vehicles when transporting Bulk Material (equivalent to the vehicle freeboard requirements of the California Vehicle Code (§23114));
 - (f) Employ a dust suppression system at Bulk Material transfer points sufficient to prevent Visible Fugitive Dust;
 - (g) Stabilize or eliminate Bulk Material Open Storage piles that have been or are expected to be inactive for at least one (1) year;
 - (h) Stabilize as much unpaved operations area as is feasible;
 - (i) Vacuum sweep Bulk Material spills on paved surfaces weekly or more often, as needed;
 - (j) Prevent facility-related Bulk Material Trackout on Publicly Maintained paved surfaces;

- (k) Clean up facility-related Bulk material Trackout and spills on Publicly Maintained roads within twenty-four hours; and
 - (l) Employ belt cleaners and/or conveyor return scrapers to minimize conveyor spillage where feasible (including portable conveyor belts).
- (9) The Owner/Operator of any Solar Project subject to this Rule in accordance with Subsection (A)(2) of this Rule shall:
- (a) Obtain and maintain a District-approved Dust Control Plan as set forth by Section (D) of this Rule; and
 - (b) Not cause or allow PM₁₀ to exceed 100 micrograms per cubic meter when determined as the difference between upwind and downwind samples collected on federal reference method samplers at the property line for more than four (4) hours in any consecutive 24 hours, except during High Winds.

A written request to remove said monitors may be sent to the APCO after thirty-six consecutive months of data demonstrate compliance, and subsequently removed upon APCO approval of such written request.

- (10) Searles Valley Minerals or its successor shall comply with the following requirements:
- (a) Obtain and maintain a District-approved Dust Control Plan as set forth by Section (D) of this Rule; and
 - (b) Treat and maintain a minimum of 12 miles of heavily traveled unpaved roads on Searles Dry Lake in a manner sufficient to maintain Road Surface Silt Loading less than or equal to 0.58 ounces per square yard:
 - (i) For purposes of this subsection, weekly brackish watering of non-Heavily Traveled Searles Dry Lake unpaved roads is presumed to be sufficient to maintain Road Surface Silt Loadings less than or equal to 0.58 ounces per yard.
 - (ii) Searles Valley Minerals or its successor shall maintain records of treatment activity sufficient to establish location, type, and timing of such treatment.
 - (c) Treat and maintain a minimum of eight (8) miles of heavily traveled unpaved roads on the Searles Dry Lake, in a manner sufficient to maintain Road Surface Silt Loading less than or equal to 0.17 ounces per square yard.
 - (i) For the purposes of this subsection, treatment with salt and weekly brackish watering is sufficient to maintain Road Surface Silt Loadings less than or equal to 0.17 ounces per square yard.

- (ii) Searles Valley Minerals or its successor shall maintain records of treatment activity sufficient to establish location, type, and timing of treatment.
- (d) Clean paved roads used for industrial activity on a biweekly basis or more often as needed to ensure that spilled and tracked-on Bulk material is removed rapidly.
 - (i) Searles Valley Minerals or its successor shall maintain records of cleaning activities sufficient to establish location, time, and amount of cleaning activities.
- (e) Treat or clean heavily traveled paved roads and areas used for industrial activity in a manner sufficient to maintain Road Surface Silt Loading less than or equal to 2.94 ounces per square yard.
 - (i) For purposes of this subsection, mechanical sweeping, and collection on a biweekly basis is sufficient to maintain Road Surface Silt loadings less than or equal to 2.94 ounces per square yard.
 - (ii) Searles Valley Minerals or its successor shall maintain records of mechanical sweeping and collection sufficient to establish location, time, and amount of vacuum sweeping.
- (f) Enclose exterior belt conveyors greater than thirty feet in length sufficient to cover the top and sides of Bulk Material being transferred.
- (g) Permanently eliminate at least 2,750 square feet of Bulk Material storage pile surface area that was exposed during 1990:
 - (i) Searles Valley Minerals or its successor shall maintain records of storage pile reduction or limitation shall be maintained sufficient to identify the location, type (including storage pile silt content) and timing of storage pile modification.
- (h) Cover or otherwise contain Bulk Material carried on haul trucks while operating on paved roads:
 - (i) Fly and bottom ash haul trucks maintaining the moisture content of at least 12 percent need not be covered.
- (i) Treat and maintain Heavily Traveled Unpaved/Paved Road access points in a manner sufficient to maintain a Road Surface Silt loading of 2.94 ounces per square yard on the Paved Road surface adjacent to the Unpaved Road:
 - (i) For purposes of this subsection, mechanical sweeping and collection on a biweekly basis is sufficient to maintain Road

Surface Silt loadings less than or equal to 2.94 ounces per square yard.

- (ii) Searles Valley Minerals or its successor shall maintain records of activities performed to maintain the specified Road Surface Silt Loading sufficient to establish location, time, and type of treatment.

(D) Dust Control Plans

- (1) Any Owner/Operator required by Section (C) above or as directed by the APCO in writing shall obtain and maintain a District-approved Dust Control Plan (DCP).
- (2) The Owner/Operator shall submit a DCP as per Attachment A of this Rule to the APCO prior to the start of any Active Operations. An Owner/Operator may submit one (1) DCP covering multiple projects/facilities/sites at different sites where Active Operations will commence within the next 12 months provided the DCP includes each project/facility/site size, location, and types of activities to be performed. The DCP shall specify the expected start and completion date of each project.
- (3) The Owner/Operator shall install and maintain project/facility/site signage that meets the minimum standards of Attachment B prior to the start of any Active Operations.
- (4) Active Operations shall not commence until the APCO has approved the DCP.
- (5) The APCO shall approve, disapprove, or conditionally approve the DCP within ten days of DCP submittal. The approved DCP shall remain valid until the termination of all Active Operations. Failure to comply with the provisions of an approved DCP is deemed to be a violation of this rule.
- (6) The Owner/Operator shall submit a copy of the DCP approval to the land use agency upon request.
- (7) The Owner/Operator shall provide written notification to the APCO not less than ten days prior to the commencement of Active Operations via delivery, facsimile, mail or confirmed email. Prior to the start of any Active Operations, the Owner/Operator must meet with a District staff on-site to review DCP requirements and confirm compliance with this rule.
- (8) The Owner/Operator must notify the District within ten days if a significant change occurs to the project/facility/site or operations covered by the DCP. An appropriately modified DCP must be submitted to the District within thirty days of the change.
- (9) An approved DCP shall be valid for a period of one (1) year from the date of approval of the DCP. DCPs must be resubmitted annually to recertify the measures included in the DCP, at least sixty days prior to the expiration date, or the DCP shall become disapproved as of the expiration date. If all Fugitive Dust

sources and corresponding control measures or special circumstances remain identical to those identified in the previously approved DCP, the resubmittal may contain a simple statement of 'no change', in which case all corresponding resubmittal fees shall be waived.

- (10) The Owner/Operator shall notify the APCO in writing within thirty days after a project/facility/site no longer qualifies as an Active Operation.
- (11) Any person subject to a DCP requirement shall be assessed the following fees that must be paid in full for the DCP to be processed and approved:
 - (a) Any person subject to a DCP submittal pursuant to this Rule shall be assessed applicable filing and evaluation fees pursuant to Regulation III - *Fees*.
 - (b) The submittal of an annual statement of 'no change,' pursuant to this Rule, shall not be subject to filing fees pursuant to Regulation III - *Fees*.
 - (c) The performance of a DCP site inspection or DCP site stability inspection will incur inspection fees pursuant to Regulation III - *Fees*.
- (12) Failure to comply with any provisions in an approved or conditionally approved DCP shall be a violation of this Rule.

(E) Exemptions

- (1) The requirements of this Rule shall not apply to:
 - (a) Agricultural Operations, as defined by California Health & Safety Code §41074(b), including such operations on Unpaved Roads;
 - (b) Construction/Demolition projects disturbing less than one-half total acre or 21,780 square feet;
 - (c) Active Operations required by federal or state endangered species legislation, rule, policy or biological opinion, or any Active Operation, Open Storage Pile, or Disturbed Surface Area for which necessary Visible Fugitive Dust preventive or mitigative actions are in conflict with the Federal Endangered Species Act (50 CFR §402.01);
 - (d) Active Operations conducted during emergency life-threatening situations, or in conjunction with any officially (by local, regional, state or federal government) declared disaster or state of emergency;
 - (e) Active Operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer services during periods of unplanned service outages and emergency disruptions;

- (f) Non-periodic (occurring no more than three (3) times per year and lasting less than thirty cumulative days per year) or emergency maintenance of flood control channels and water spreading basins;
- (g) Emergency fire suppression operations ordered, performed or sanctioned by Federal, state, or local government (including, but not limited to, creation of fuel breaks);
- (h) The removal of debris due to storms, earthquakes, or other emergency situations.
- (i) APCO-approved motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this approval, the APCO must receive notification in writing at least 72 hours in advance of any such activity.
- (j) Officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational parks, and county regional parks.
- (k) Paved and Unpaved roads under the jurisdiction of and maintained by a public authority and open to public travel.
- (l) Activities within the fence line of Edwards Air Force Base, China Lake Naval Air Weapons Station, National Training Center Fort Irwin, Marine Corps Logistics Base, Marine Corps Air Ground Combat Center (or any other military installation so designated by the APCO), so long as those activities do not create Visible Fugitive Dust beyond the fence line.
- (m) Weed abatement operations disturbing less than one (1) acre on a lot that includes a residence;
- (n) Dust generated by mowing performed for weed abatement purposes;

(F) Record Keeping

- (1) The Owner/Operator of an Active Operation shall maintain the following records (as applicable) on site, or readily accessible, for at least two (2) years after the date of each entry (or through the completion of the project). Such records shall be provided to the District upon request:
 - (a) The District-approved DCP; and,
 - (b) Supporting documents to demonstrate compliance with the requirements of this Rule only for those days that a control measure was implemented, such as operational records, information regarding operations, source tests, laboratory analyses, monitoring data, and other appropriate information in a manner and form sufficient in demonstrating compliance with the DCP.

(G) Compliance Schedule

- (1) All Active Operations subject to this Rule existing as of October 26, 2020 shall submit a DCP to the APCO within sixty days of October 26, 2020. Existing Active Operations covered by a DCP approved by the APCO prior to October 26, 2020 shall submit a DCP in accordance with this Rule at the direction of the APCO.
- (2) All new Active Operations subject to this Rule shall submit a DCP to the APCO prior to the commencement of Active Operations.
- (3) Any Project or Facility required to install PM₁₀ monitors by this Rule shall have those monitors installed and operating within six (6) months of October 26, 2020, or within six (6) months of written notification of such a requirement by the APCO.

(H) Contingency Measures

The requirements of this section only apply if the USEPA makes a finding, as evidenced by publication in the Federal Register, that there has been a violation of the PM₁₀ National Ambient Air Quality Standard (NAAQS) within MDAQMD boundaries.

- (1) Contingent Requirements
 - (a) Cities, Towns, and the County of San Bernardino shall:
 - (i) Stabilize sufficient Unpaved Roads to generate at least 2,267 tons per year of fugitive PM₁₀ emission reductions.

Attachment A

Mandatory Fugitive Dust Control Plan Elements

- (a) Project, facility, or site name, address, major cross streets, and city.
- (b) Land use agency name and assessor's parcel number (if necessary to locate the project/site/facility).
- (c) Mailing address, telephone number, mobile phone number and email address for:
 - (i) Project or facility owner
 - (ii) Project general contractor
 - (iii) Project or facility contact person
 - (iv) Project or facility 24-hour contact person¹ (if separate from the above)
 - (v) Dust Control Plan preparer (if separate from the above), specifying contact person
- (d) Total area of disturbed land surface (in acres), total area of entire project or facility site (in acres), and total disturbed area to be left inactive for more than seven (7) days (in acres).
- (e) Expected start and completion dates of Active Operations. For phased projects attach a map indicating phase areas and specify date ranges for each phase area.
- (f) Specify location(s) of required fugitive dust contact information signage, including posting loaded haul truck speed limit signage on permanent private roads.
- (g) Specify fugitive dust control measures that will be used to Stabilize each of the following activities (as applicable):
 - (i) Structural demolition; Pre-activity; Active Operations; Inactive operations (including after work hours, weekends and holidays); Temporary Stabilization of disturbed areas to be left inactive for more than seven days; Unpaved access areas, unpaved haul roads, unpaved traffic areas, and unpaved equipment storage areas (including a suggested 15 miles per hour speed limit for loaded haul trucks which may be exceeded if Visible Fugitive Dust is not generated); Wind events; Outdoor handling of Bulk Materials; Outdoor storage of Bulk Materials; On-site transportation of Bulk Materials; Off-site transportation of Bulk Materials; and Outdoor transport using chutes and conveyors.
- (h) Specify water application equipment and/or dust suppressant types, number, capacity, water and/or dust suppressant application frequency, hours of operation, including water

¹ 24 hour contact person is an individual available by telephone at any hour of the day or night and capable of marshaling a response to a dust complaint

and/or dust suppressant application equipment and/or dust suppressants available for use after normal working hours, on weekends and holidays with name and phone number of after-hours contact, and for an alternate after-hours contact. Specify water supply and/or dust suppressant type, number, capacity and source, including distance to off-site source and specifying details of approval for access to off-site source (owner, contact name and telephone number).

- (i) Applicable dust suppressants are inclusive of water, Hygroscopic Materials, or chemical/organic stabilization/suppression materials.
- (i) Specify dust suppressants other than water that will be used (if applicable), including area of application, product name, contractor name and telephone number, application rate, application frequency, application equipment type and capacity. Attach product specifications, instructions and environmental impacts (and approvals or certifications related to the appropriate and safe use for ground application).
- (j) Specify other dust control methods as applicable, including physical barriers, speed limit signs, use of vegetation, gravel, and pavement. Physical barriers, if used, will include a minimum of four feet of wind fencing on the entire perimeter of the project, which will be maintained as needed to be kept intact and to remove windblown dropout.
- (k) Specify contingency measures that will be implemented if any of the above become inoperable or are found to be insufficient. Active Operations will cease whenever visible dust emissions cannot be effectively controlled.
- (l) Specify long-term stabilization methods. Including the stabilization of storage piles and disturbed surfaces which are idle for two weeks or more.
- (m) Specify carryout and trackout prevention and cleanup procedures as applicable, including grizzlies, gravel pads, paved access areas, wheel washers, haul truck housekeeping, cleanup method and frequency.
- (n) If required by the APCO or this Rule, specify the type of PM₁₀ monitors, the upwind location, the downwind location, the monitoring frequency, and the data storage method, and acknowledge that all monitored PM₁₀ data shall be provided to District personnel upon request.
- (o) Specify any actions or procedures required by other District Rules (as and if applicable) if not already listed above.
- (p) A responsible official certification including printed name, title, signature, date of signature, telephone number, mobile number and email address.

Attachment B

Signage Minimum Requirements

This signage allows the public to contact the responsible party if Fugitive Visual Dust emissions or Trackout of material is observed from a project or facility.

Sign size	48" x 96"
-----------	-----------

Sign Template

<i>Permit # (if applicable)</i>	4"
<i>Site Name</i>	4"
<i>Project Name</i>	4"
IF YOU SEE DUST COMING FROM THIS SITE CALL	4"
<i>Contact: (XXX) XXX-XXXX</i>	6"
If You Do Not Receive a Response, Please Call The Mojave Desert AQMD at 1-800-635-4617	3"

Signage must be located within 50 feet of each public site entrance.

One sign is sufficient for multiple site entrances with the approval of the APCO.

Text height shall be at a minimum as shown on right side of sign template above.

Sign background must contrast with lettering, typically black text with white background.

Sign should be one-inch AC laminated plywood board.

The lower edge of the sign board must be a minimum of six feet and a maximum of seven feet above grade.

The telephone number listed for the contact must be a local or a toll-free number and shall be accessible 24 hours per day. The contact name requirement may be waived with the approval of the APCO.

If contactor phone number changes the sign must be updated with new contact information within 30 days.

Original signage used during site construction will satisfy the signage requirement during operations and can remain if contact information is current and the sign is in satisfactory condition.

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Attachment C

Dropped Ball Test Method

Equipment: One steel ball, 0.625 inches in diameter (5/8 inch), 16.33 grams
 A ruler or measuring tape
 (Optional) A cardboard frame with a one foot by one foot opening

Step 1. Select a one foot by one foot survey area that is representative, or typical, of the crusted surface. Remove any blow sand from the survey area (loose grains which have not originated from the surface you are testing).

Step 2. Hold the small steel ball one foot above the survey area, using the ruler or tape to ensure that the ball is at the correct height. Drop the ball into the survey area.

Step 3. Observe the ground around the dropped ball closely.

A. Did the ball sink into the surface so that it is partially or fully surrounded by loose grains of dirt?

B. Did the ball drop out of view entirely?

Pick up the ball from the survey area and observe the impact location closely.

C. Are loose grains of dirt visible?

If any of the three questions posed in this step can be answered “yes” then this location on the surface does not pass the dropped ball test.

Step 4. Select two additional areas within the survey area to drop the ball. Repeat Steps 2 and 3 on each location. If more than one location within the survey area fails Step 3, the survey area fails the dropped ball test.

Step 5. Select at least two other representative survey areas. Pick the areas randomly and spaced out.

Step 6. Examine results. If all survey areas have passed Step 4 the surface is stable and has a Visible Crust.

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Appendix C

Project Drawings (Reduced Size - 11"x17")

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BLYTHE SANITARY LANDFILL

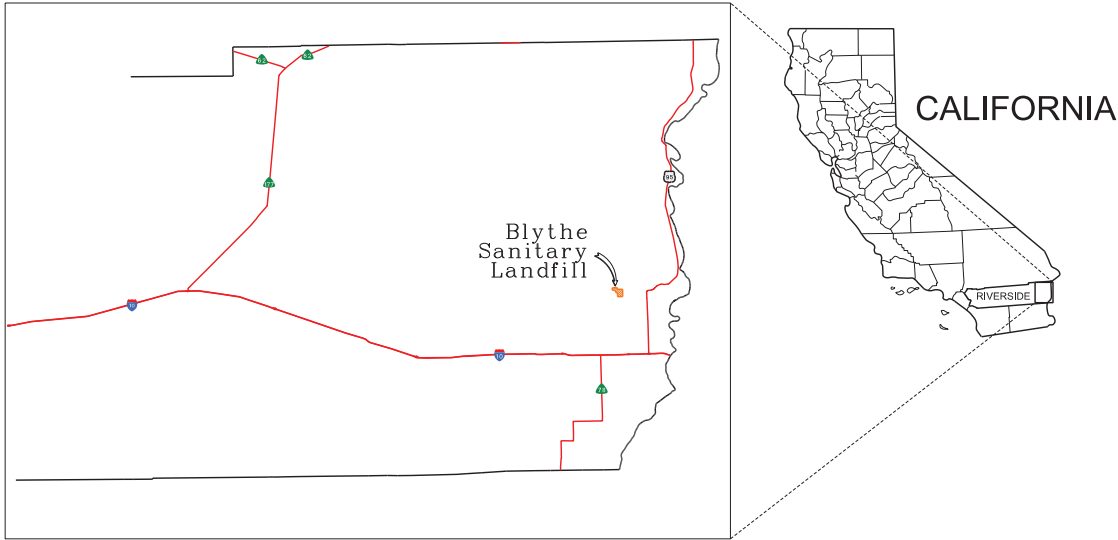
CONSTRUCTION PLANS FOR THE

CONSTRUCTION OF GROUNDWATER WELLS

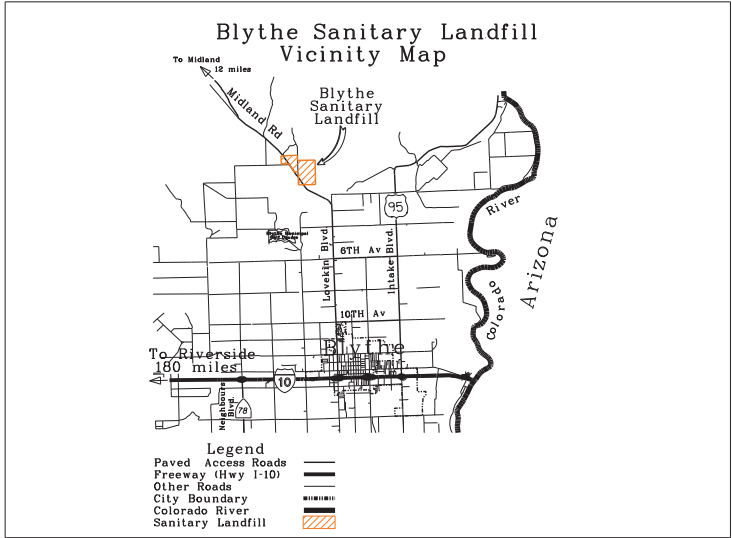
JULY 2022

PREPARED BY
DEPARTMENT OF WASTE RESOURCES
HANS KERNKAMP, GENERAL MANAGER AND CHIEF ENGINEER
14310 FREDERICK STREET
MORENO VALLEY, CALIFORNIA 92553
TEL. (951) 486-3200 FAX (951) 486-3205





LOCATION MAP
N.T.S.

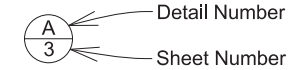


VICINITY MAP
N.T.S.

LEGEND

- Property line
- Topo Contours (April 2022)
- Flow Line / Flow Direction
- Landfill Operations Permit Limit

DETAIL CALLOUTS



FILL PATTERNS

- Sanitary Seal
- Transition Seal / Concrete
- Pellet Seal
- Filter Pack
- Engineered Fill

ABBREVIATIONS

- Approx. Approximate
- C Cut
- CL or CL Center Line
- DIA Diameter
- E Easting
- EL Elevation
- Exist. Existing
- F Fill
- FL or FL Flow Line
- Gal. Galvanized Steel
- GB Grade Break
- LF Linear Feet
- L Length
- MIN. Minimum
- N Northing
- NAD North American Datum
- NTS Not To Scale
- PL or PL Property Line
- R.C.E. Registered Civil Engineer
- RCFC Riverside County Flood Control
- RS Reinforced Shotcrete
- SCH. Schedule
- TOE Toe of Slope
- TS Top of Slope
- TYP Typical
- Vert. Vertical
- WWF Welded Wire Fabric

INDEX OF DRAWINGS

SHEET	FILE NAME	TITLE	SCALE
1	bly_CGWW_s01 Title.dgn	Title Sheet	NTS
2	bly_CGWW_s02 Index.dgn	Index, Legend, & Vicinity Map	NTS
3	bly_CGWW_s03 Site Map.dgn	Site Map	1" = 300'
4	bly_CGWW_s04 Production Well.dgn	Production Well Location	1" = 30'
5	bly_CGWW_s05 Well Details.dgn	Well Details	NTS
6	bly_CGWW_s06 Water Tower.dgn	Water Tower & Trench Details	NTS
7	bly_CGWW_s07 Site Photos.dgn	Site Photos	NTS

GENERAL NOTES

- Details of construction, materials and workmanship not shown in these drawings shall conform to the pertinent requirements of the Standard Specifications and any applicable Contract Specifications.
- Contractor shall provide all utilities (water, electrical, and telephone service) as necessary to successfully complete any and all construction activities.
- All existing utilities such as fences, monitoring wells, pipelines, gas lines, probes, etc. shall be protected from damage or replaced at Contractor's expense.
- All existing and proposed dimensions shall be verified by the Contractor prior to starting work. The County shall be notified immediately of any discrepancies.
- Topography is developed by digital photogrammetric methods and field topographic survey.
- Grid ticks are based on North American datum of 1983 (NAD 83). California coordinate system Zone VI NAD 83 is to be used for all on-site survey work.
- Topographic features of the Blythe Landfill site, both contours and plan data, are based on R.C.F.C. photogrammetric mapping dated June 2020.

DEPARTMENT OF WASTE RESOURCES

Hans Kernkamp
APPROVED: General Manager - Chief Engineer R.C.E. C-45868 Exp. 12/31/22

Digitally signed by Hans Kernkamp
Date: 2022.07.18 16:13:18 -07'00'
SUBMITTED: Principal Engineer R.C.E. C-72000 Exp. 6/30/24



NO.	REVISIONS	BY	APPROVED	DATE

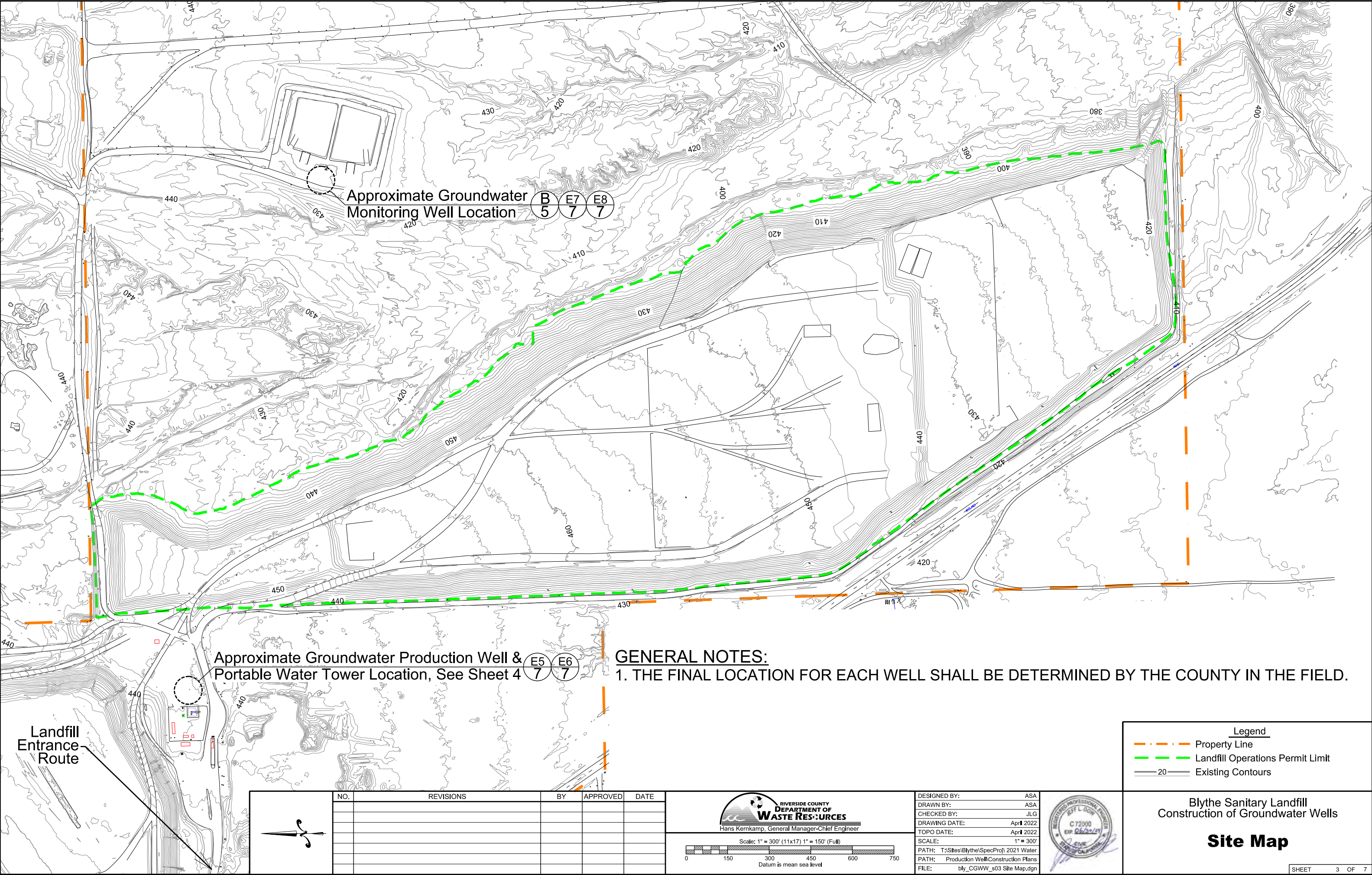


Hans Kernkamp, General Manager-Chief Engineer

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DRAWN BY:	ASA
CHECKED BY:	JLG
DRAWING DATE:	April 2022
SCALE:	NTS
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PATH:	Production Well\Construction Plans\
FILE:	bly_CGWW_s02 Index.dgn



Blythe Sanitary Landfill
Construction of Groundwater Wells
Index, Legend & Vicinity Map



GENERAL NOTES:

1. THE FINAL LOCATION FOR EACH WELL SHALL BE DETERMINED BY THE COUNTY IN THE FIELD.

Legend

- Property Line
- Landfill Operations Permit Limit
- Existing Contours

NO.	REVISIONS	BY	APPROVED	DATE

RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Hans Kernkamp, General Manager-Chief Engineer

Scale: 1" = 300' (11x17) 1" = 150' (Full)

Datum is mean sea level

DESIGNED BY:	ASA
DRAWN BY:	ASA
CHECKED BY:	JLG
DRAWING DATE:	April 2022
TOPO DATE:	April 2022
SCALE:	1" = 300'
PATH:	T:\Sites\Blythe\SpecProj\ 2021 Water
PATH:	Production Well\Construction Plans
FILE:	bly_CGWW_s03 Site Map.dgn



Blythe Sanitary Landfill
Construction of Groundwater Wells

Site Map

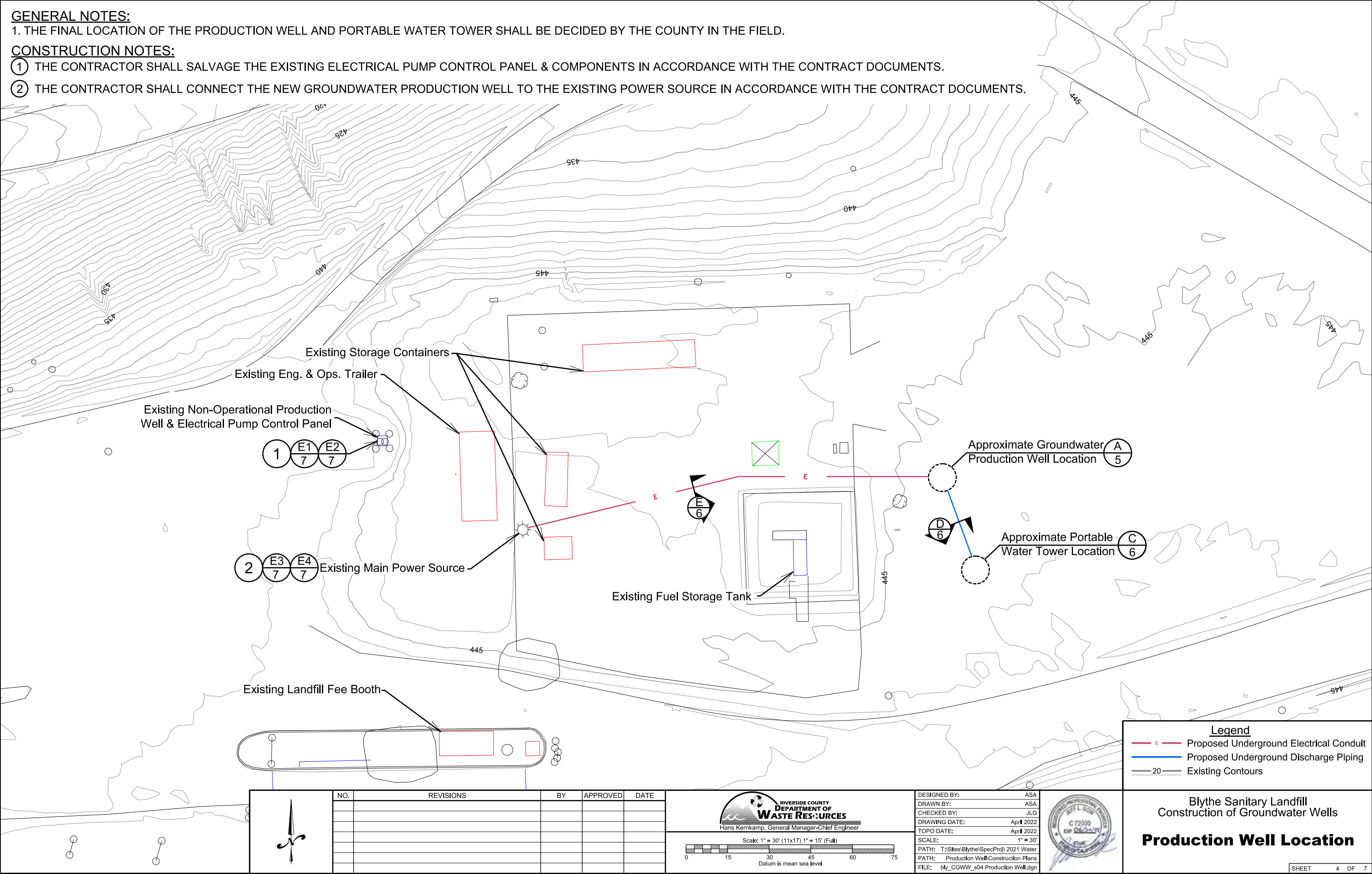
SHEET 3 OF 7

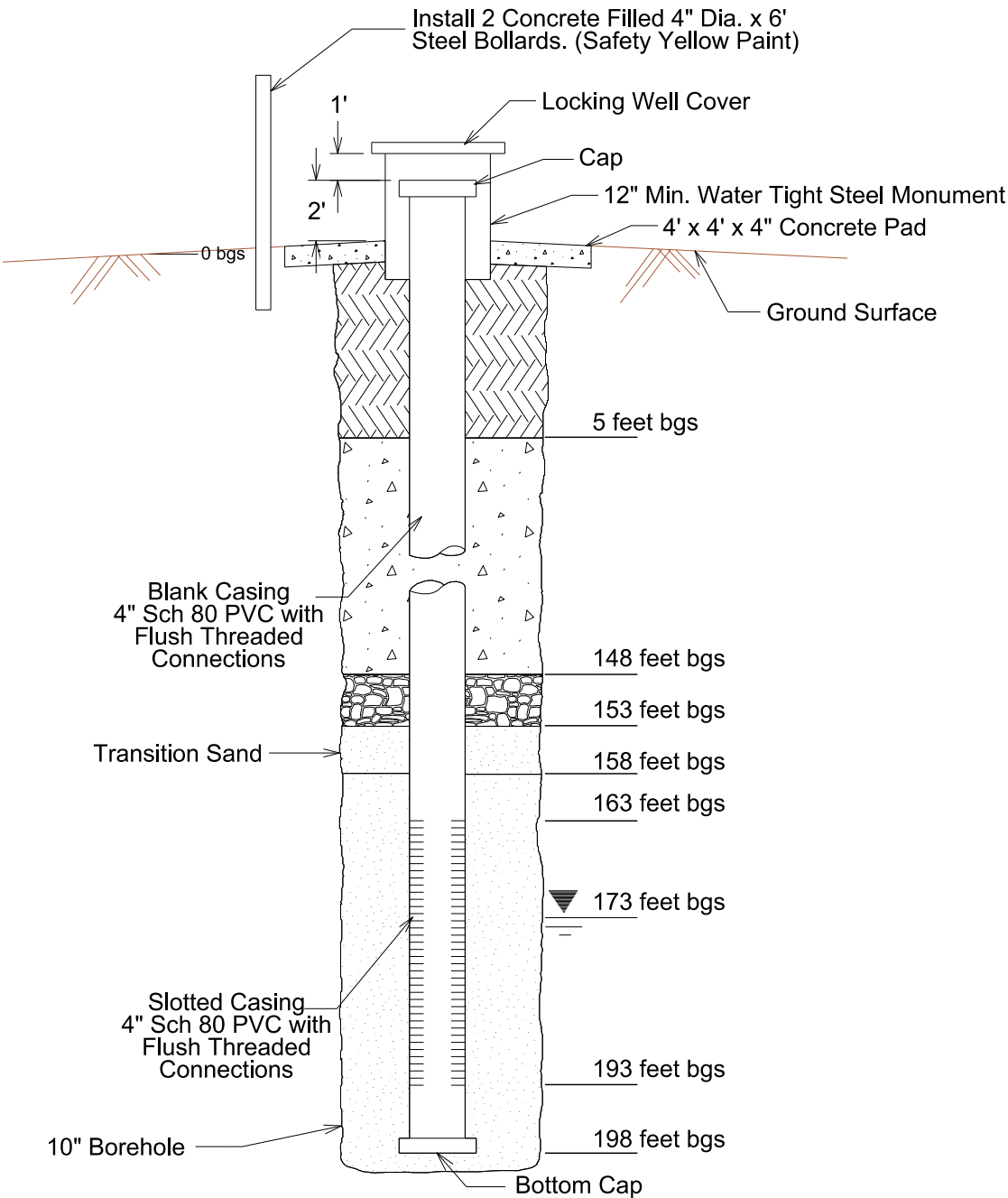
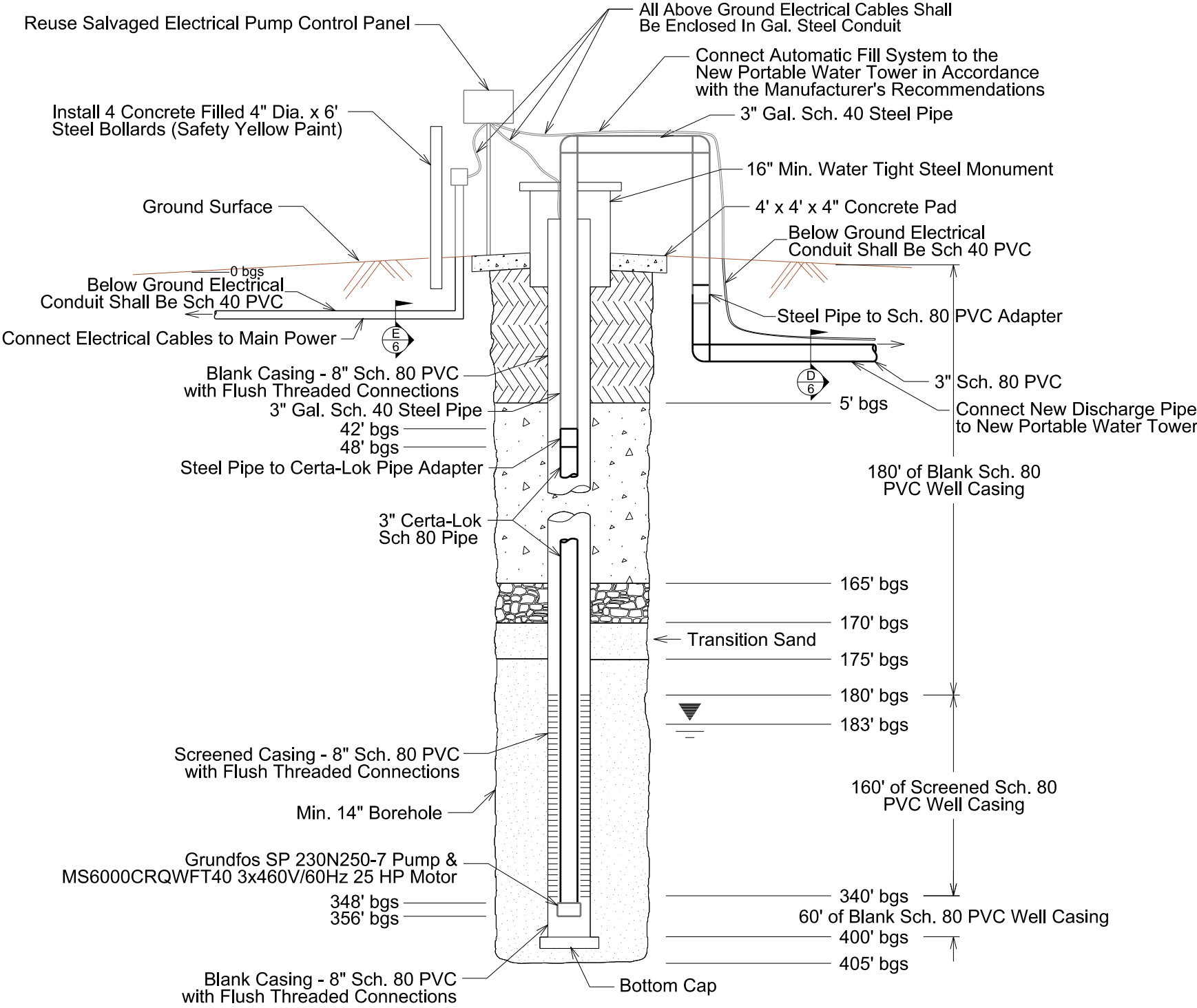
GENERAL NOTES:

1. THE FINAL LOCATION OF THE PRODUCTION WELL AND PORTABLE WATER TOWER SHALL BE DECIDED BY THE COUNTY IN THE FIELD.

CONSTRUCTION NOTES:

- ① THE CONTRACTOR SHALL SALVAGE THE EXISTING ELECTRICAL PUMP CONTROL PANEL & COMPONENTS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- ② THE CONTRACTOR SHALL CONNECT THE NEW GROUNDWATER PRODUCTION WELL TO THE EXISTING POWER SOURCE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.



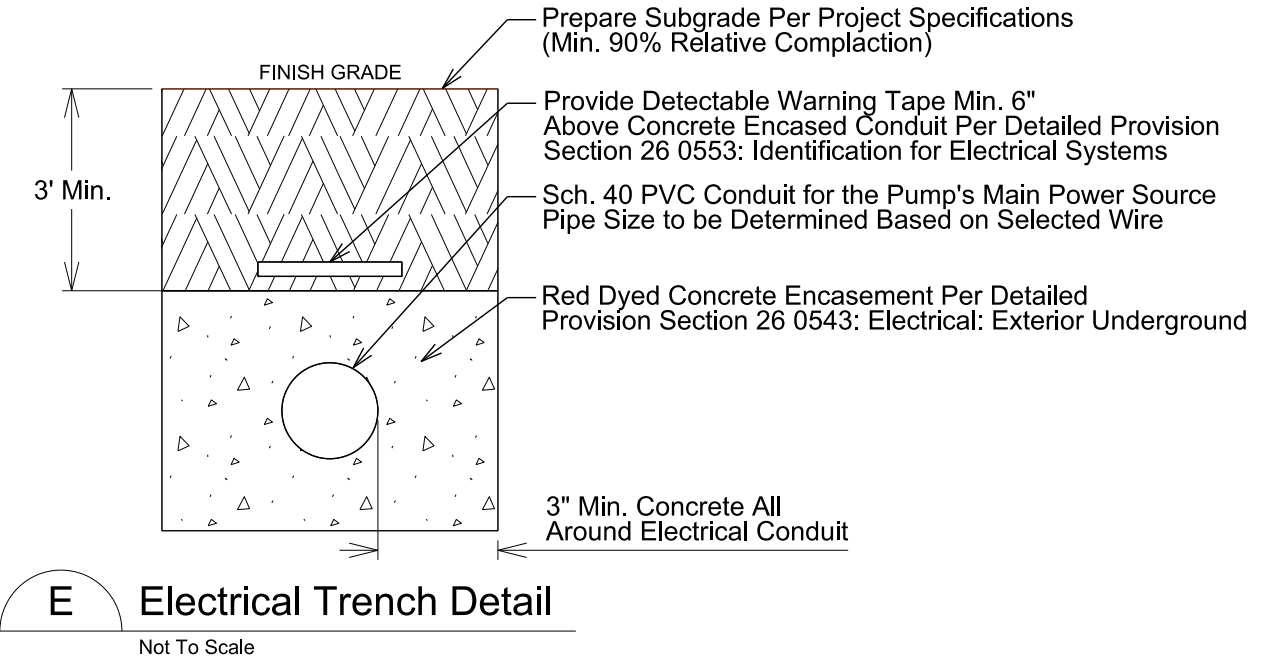
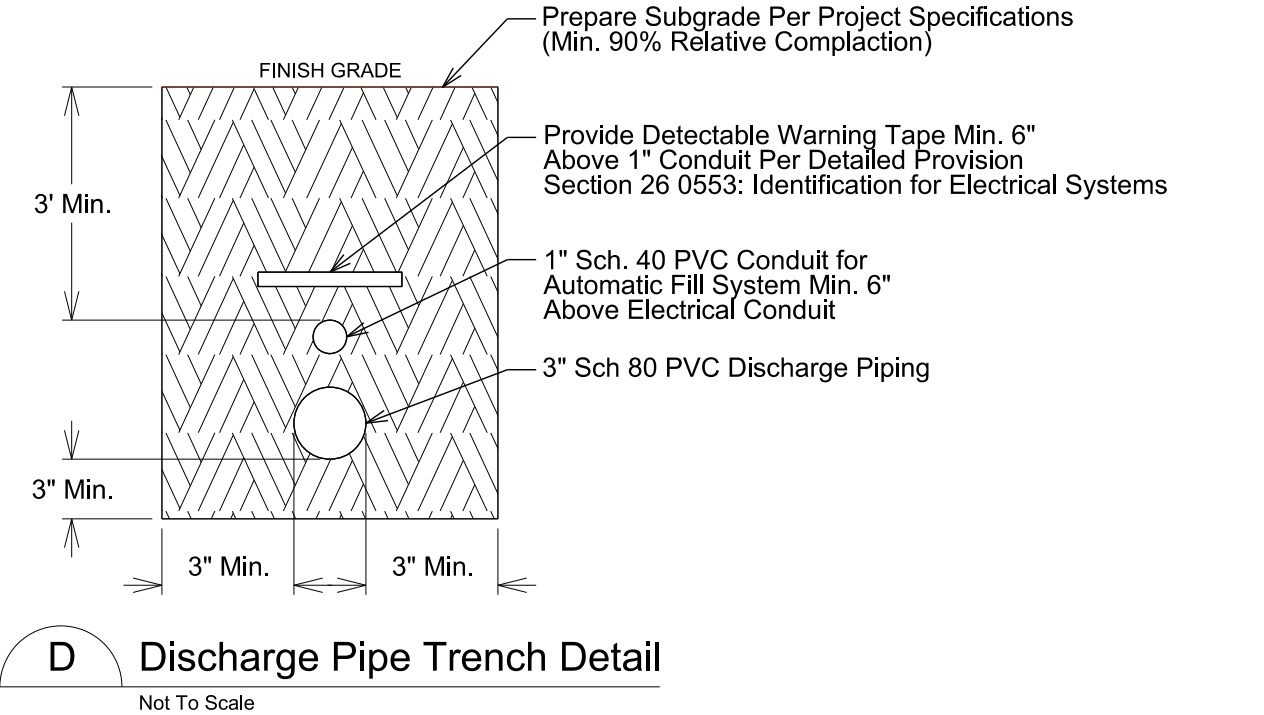
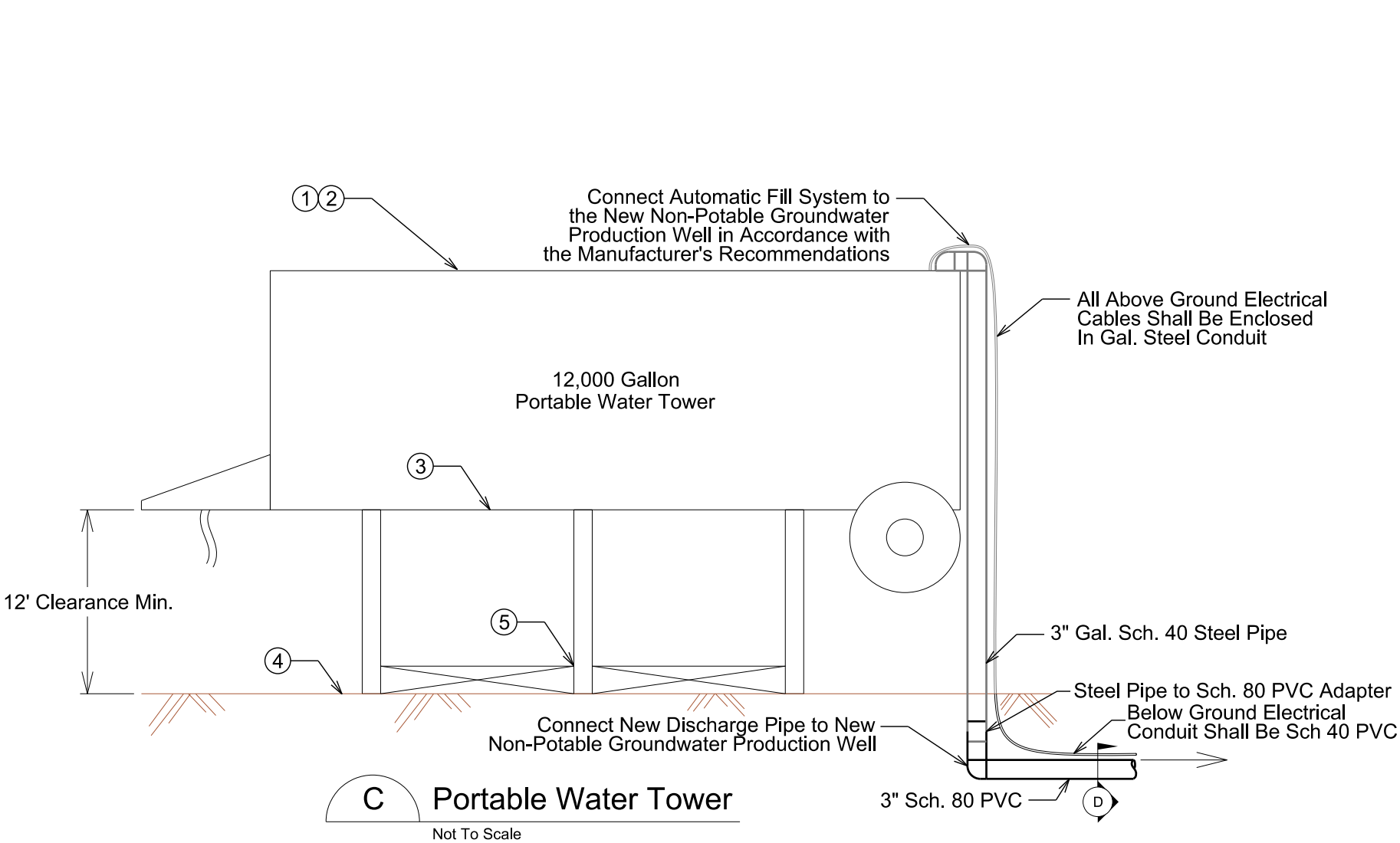


A Non-Potable Production Well
Not To Scale

B Groundwater Monitoring Well
Not To Scale

CONSTRUCTION NOTES:

- ① THE CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) 12,000-GALLON PORTABLE WATER TOWER AT THE LOCATION IDENTIFIED IN THE FIELD BY THE COUNTY IN ACCORDANCE WITH DETAILED PROVISIONS SECTION 33 1600: WATER UTILITY STORAGE TANKS. THE PORTABLE WATER TOWER SHALL, AT A MINIMUM, INCLUDE: STEEL FITTED HEADS, A 10-INCH DIAMETER DISCHARGE TUBE (MIN. 12-FOOT FROM GRADE), DUAL 3-INCH FILL PIPE WITH APPROVED AIR GAPS, VALVES, FLOAT ASSEMBLIES AND CAMLOCK ON END OF PIPE, A MECHANICAL FLOAT SYSTEM (FILL CONTROLLED BY WATER DEPTH), AN AUTOMATIC SHUT OFF VALVE, A TANK ACCESS HATCH, AND AN OSHA-APPROVED ACCESS LADDER. OPTIONAL ITEMS THAT CAN BE REMOVED BEFORE OR AFTER DELIVERY AND INSTALLATION FOR A COST CREDIT TO THE COUNTY SHALL INCLUDE BUT NOT BE LIMITED TO: A FIFTH WHEEL HITCH, A REMOVEABLE HYDRAULIC PUMP AND MOTOR, A HEAVY-DUTY LONG-LIFE AXLE, SUSPENSION, AND AIR BRAKE SYSTEM, AND DUAL WHEELS AND TIRES.
- ② EXTERIOR OF PORTABLE WATER TOWER TANK SHALL BE COATED WITH PRIMER AND WHITE EPOXY PAINT.
- ③ INTERIOR OF PORTABLE WATER TOWER TANK SHALL BE COATED WITH A RUST-RESISTANT TWO- OR THREE-COAT EPOXY COATING SYSTEM TO PREVENT CORROSION.
- ④ THE COUNTY SHALL PERFORM ROUGH GRADING OF SUBGRADE PRIOR TO PLACEMENT OF THE PORTABLE WATER TOWER.
- ⑤ THE CONTRACTOR SHALL SECURE THE PORTABLE WATER TOWER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.





E1 Salvage Existing Electrical Control Panel
Not To Scale

E2 Salvage Existing Electrical Control Panel
Not To Scale

E3 Existing Main Electrical Power Source
Not To Scale

E4 Existing Main Electrical Power Source
Not To Scale



E5 New Production Well & Water Tower Location
Not To Scale

E6 New Production Well & Water Tower Location
Not To Scale

E7 New Groundwater Monitoring Well Location
Not To Scale

E8 New Groundwater Monitoring Well Location
Not To Scale

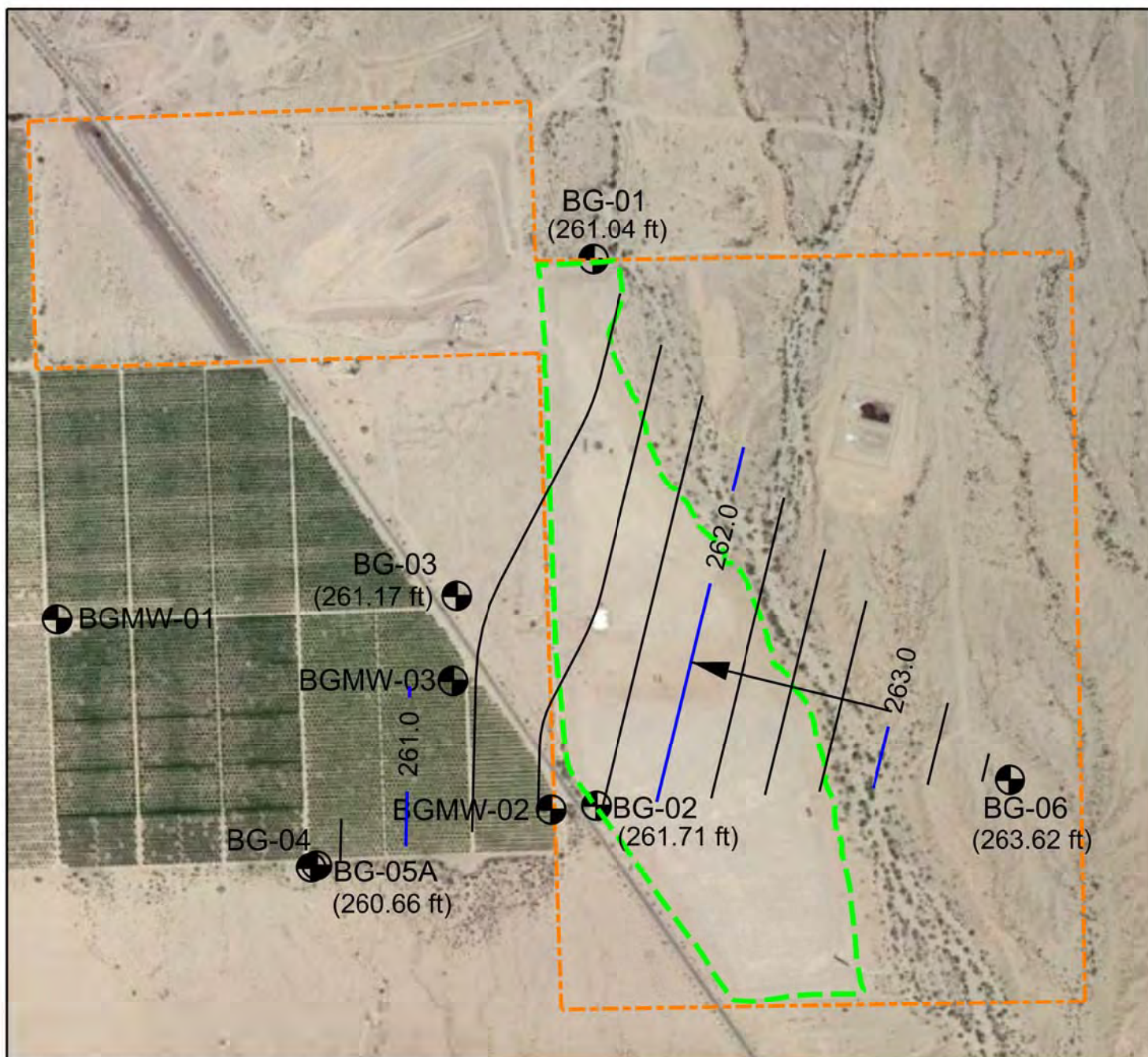
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								CHECKED BY:	JLG		
								DRAWING DATE:	April 2022		
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									bly_CGWW_s07 Site Photos.dgn		

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Appendix D

Existing Site Groundwater Data

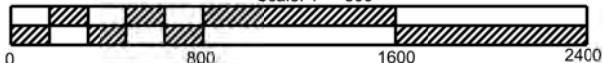
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Note: Approximate location for BGMW-1, BGMW-2 and BGMW-3. These wells were not utilized to create the groundwater contours.

Well I.D.	Coordinate		Wellhead Elevation	Ground Elevation
	Northing	Easting		
BG-01	2204284.371	7056088.156	441.50	436.95
BG-02	2201397.570	7056100.817	423.28	419.27
BG-03	2202508.135	7055364.261	432.80	432.45
BG-04	2201068.580	7054592.477	418.92	415.93
BG-05A	2201080.319	7054621.768	418.62	415.84
BG-06	2201533.571	7058288.536	416.75	414.51

Scale: 1" = 800'



Legend

- Groundwater Monitoring Well
- Landfill Footprint
- Property Line
- Groundwater Contours
- Groundwater Flow
- Groundwater Elevation Measurement in Parenthesis



Blythe Sanitary Landfill - Third Quarter 2020 Groundwater Monitoring Well Locations and Groundwater Contour Map

Map 1

File Directory: /waste_1/enviro/sites/blythe/water/wtrpls/bl2009wtrpt.dgn

Date: December 2020

Groundwater Elevations: September 2020

Photo Date : April 2011

Scale : Bar Scale

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FIELD LOG OF BORING NO. BG-1SHEET NO. 1 OF 7

PROJECT NO. 86-41-415-01-04 DATE(S) 10/22/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION North end of landfill
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN./HOUR _____
DRILLING CO. Datum Exploration TIME 0730 1103
SETUP START STOP
DRILLING METHOD & DIAM. SS-16 w/10" casing hammer DRIVING WEIGHT _____ AVERAGE DROP _____

"N" VALUE (S.P.T.) SAMPLE NO. BULK AND RANGE CORE	DEPTH	BLOWS PER LENGTH, IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	LEL/O ₂ /H ₂ S	REMARKS
	0					Tan Sand & gravel, fine grained, gravel to 3/4" dia.	SP/GP		injecting wtr., from irrigation canal.
	2								
	4								
	6						SP/GP		
	8								
	10				Tan	Sand, silty w/ gravel to 1/2" dia.	SP		
	12								
	14				Tan	Sand, slightly silty w/ gravel to 1/2" dia.	SP		
	16								
	18					@ 18', gravel		0/22.2/0	
	20					Gravel, fine to med. grained, sandy, some silt.	GP		injecting wtr.
	22								
	24				Tan	Gravel, fine to med. to 1/2" dia. sandy.	GP		
	26								
	28								
	30				Tan	Sand & gravel, sand, fine to crs., gravel to 1/2" dia.	SP/GP		
	32								
	34								
	36								
	38							-1/22.0/0	
	40								

BG-1

FIELD LOG OF BORING NO. BG-1SHEET NO. 2 OF 7

PROJECT NO. 86-41-415-01-04 DATE(S) 10/22/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION North side of landfill
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN./HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. SS-16 w/10" casing hammer DRIVING WEIGHT _____ AVERAGE DROP _____

DEPTH	LOG VALUE (SPT) SAMPLE NO. BULK AND RANGE	BLOWS PER FEET	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	LEL/O ₂ /H ₂ S	REMARKS
40									
42					Tan	Gravel, sandy, clasts to 1/2" dia.			injecting wtr. during drilling.
44									
46					Tan	Sand & gravel.	SP/GP		
48									
50					Tan	Sand & gravel, silty, med. to crs. sand	SP/GP		
52									
54									
56								0/22.2/0	
58									
60					Tan	Gravel, w/sand, to 1/2" dia.	GP		Injecting wtr.
62									
64									
66									
68									
70					Tan	Sand, fine grained w/ fine gravel (to 3/8" dia.)	SP/GP		
72									
74									
76									10/22/87
78									10/23/87
80									

BG-1

FIELD LOG OF BORING NO. BG-1SHEET NO. 4 of 7

PROJECT NO. 86-41-415-01-04 DATE(S) 10/28/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN/HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. SS-16 w/10" casing hammer DRIVING WEIGHT _____ AVERAGE DROP _____

DEPTH	LOG VALUE (S-P-T) SAMPLE NO. CORE	BLOWS PER LENGTH - 10'	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV SAND FINES	REMARKS
120					Grv.	Sand & gravel w/ silt	SP		injecting wtr.
122					Grn. to Dk. Brn.				
124									
126					Grv. Grn. to Dk. Brn.	Sand & gravel, med. to crs. grained, sand w/some silt/clay.	SP/ GP		
128									
130						Sand & Gravel.	SP/ GP		Hole making wtr? No wtr. injected.
132									
134									
136						@ about 135' sandstone, fine grnd., tan, w/ crs. sand & some gravel, mostly v. fine sandstone.	SM		
138					Tan	Sandstone, fine grained, w/ occ. gravel, mostly v. fine grnd. sandstone	SM/ SP		@ 1120 stopped to let hole recover wtr. Tried to chk. static w/ probe but too much mud on casing, stone dropped did show water.
140						No recovery.			
142									
144									
146					Tan	Sandstone w/occ. siltstone, & some gravel, mostly v. fine grained SS.	SP		
148									
150						Sandstone, fine grnd. & crs. grnd. sand, fine sand is tan, crs. sand is black, grn, white, red-brn., mostly v. fine grained sandstone..	SP		drillers stopped to get more wtr. for injection.
152									
154									
156					Tan	Sandstone, v. fine grained w/crs. & v. crs. sand.			@ 156' drill open hole.
158									
160									

FIELD LOG OF BORING NO. BG-1SHEET NO. 5 of 7

PROJECT NO. 86-41-415-01-04 DATE(S) 10/28/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN/HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. SS-16 DRIVING WEIGHT _____ AVERAGE DROP _____

DEPTH	W-VALUE (SPT) BULK SAMPLE NO. CORE	DEPT.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAY-SAND FINES	REMARKS
160									
162									
164									
166									
168									
170									
172									
174									
176									
178									
180									
182									
184									
186									
188									
190									
192									
194									
196									
198									
200									



FIELD LOG OF BORING NO. BG-1

SHEET NO. 7 of 7

PROJECT NO. 86-41-415-01-04 DATE(S) 10/29/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION _____
ASSISTANT _____ WATER LEVEL 188.5 @ 0645 AFTER _____ MIN./HOURS
10/31/87
DRILLING CO. Datum Exploration TIME _____
SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. _____ DRIVING WEIGHT _____ AVERAGE DROP _____

INCH VALUE (5-9-1)	SAMPLE NO. BULK AND RANGE	DEPTH	BLOWS PER LENGTH - IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV SAND/FINES	REMARKS
240						Tan	Sand, v. fine to fine, w/ crs. sand. Sand slightly cemented.			
242										
244										
246										
248										
250						Tan	@ 250-251, sand & gravel. Sand, v. fine grained, w/ crs. grains.			
252										
254										
256							TD = 256'			
258										About 12' of hole caved while driller added water to help clean hole.
260										
262										
264										
266										
268										
270										
272										
274										
276										
278										
280										



WELL COMPLETION LOG OF BORING NO. BG-1

SHEET NO 1 OF 1

PROJECT NO 86-41-415-01-04 DATE(S) 10/31-11/3/87 ELEVATION
PROJECT NAME Riverside County SWAT - Blythe REFERENCE
FIELD ENGINEER Scott Heule LOCATION
ASSISTANT WATER LEVEL 188.5 @ 0645 10/31 AFTER MIN/HOURS
180.3 @ 0750 11/3
DRILLING CO Datum Exploration TIME SETUP START STOP
DRILLING METHOD & DIAM SS-16 10" casino hammer DRIVING WEIGHT AVERAGE DROP

IN. VALUE (6 P.T.)	BULK SAMPLE NO CORE	DEPTH	BLOWS PER LENGTH, IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
0										
5										
10										
15										
20										
25										
30										
35										
40										
45										
50										
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										

Completion Log BG-1

WELL COMPLETION LOG OF BORING NO. BG-1SHEET NO. 2 of 3

PROJECT NO. 86-41-415-01-04 DATE(S) 10/31-11/3/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Hewie LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN/HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM 10" DRIVING WEIGHT _____ AVERAGE DROP _____

10" VALUE (S.P.T.)	BULK SAMPLE NO AND RANGE	DEPTH	BLOWS PER LENGTH IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAY SAND FINES	REMARKS
		100					Centralizer			
		105								
		110								
		115								
		120					Volclay Grout			
		125					10" dia. borehole			
		130								
		135					4" dia. blank PVC casing			
		140								
		145								
		150					To 156' drilled w/ casing.			
		155					Below 156' drilled w/o casing then added after drill- ing.			
		160								
		165								
		170								
		175					173' top of sand pack.			
		180					#2/12 Lonester sand			
		185								
		190					187' top of perms.			
		195					4" dia. sch. 80, .02 slot perf. PVC casing			
		200								

Completion Log BG-1

WELL COMPLETION LOG OF BORING NO. BG-1SHEET NO. 3 OF 3

PROJECT NO. 86-41-415-01-04 DATE(S) 10/31 - 11/3/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN/HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM _____ DRIVING WEIGHT _____ AVERAGE DROP _____

W-VALUE (S.P.T.)	SAMPLE NO. BULK AND RANGE	DEPTH	BLOWS PER LENGTH - IN	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
		200								
		205					4" dia sch. 80, .02 slot per PVC casing 207' PVC TD.			
		210					#2/12 Lonestar sand			
		215								
		220					10" dia. borehole			
		225								
		230								
		235								
		240					Temp. 10' casing driven to 237'.			10 sacks #2/12 sand to backfill rathole below casing (Lonestar).
		245								
		250								19 sacks #2/12 Lonestar to bring sand up to 173'.
		255					Hole T.D. = 256'			
		260								
		265								
		270								
		275								
		280								
		285								
		290								
		295								
		300								



FIELD LOG OF BORING NO. BG-2

SHEET NO. 1 OF 6

PROJECT NO. 86-41-415-01-04 DATE(S) 10/20/87 & 11/6-7/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION Southwest corner of landfill
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN/HOUR
DRILLING CO. Datum Exploration TIME 0930 1224
SETUP START STOP
DRILLING METHOD & DIAM. SS-16 w/10" casing hammer DRIVING WEIGHT _____ AVERAGE DROP _____

DEPTH	SAMPLE NO. BULK AND RANGE	CORE	BLOWS PER FEET (10 IN.)	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	SYMBOL	hNu		REMARKS
									Lel/O	H/S	
0				Dry	Soft	Tan	Sand, fine grained	SP			
2											
4											
6											injecting wtr.
8											
10						Tan	Sand, fine grained, some med.	SP			
12											
14											
16						Tan	Sand, fine grained.	SP			
18									0/22.0/0		Stop
20						Tan	Sand, fine to med. grained, occ. scattered phls.	SP			10/20/87 move to BG-1
22											11/6/87
24											
26					Stiff	Tan	Sand, fine to med. grained & clay, silty	SP/CL			
28											
30						Tan	Sand, silty, fine to med. grained.	SP/SM			stop for the day 11/7/87
32											
34											
36						Tan	Sand, slightly silty, fine to med. grained.	SM/SP			
38											
40											



FIELD LOG OF BORING NO. BG-2

SHEET NO. 2 OF 6

PROJECT NO. 86-41-415-01-04 DATE(S) 11/7/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN./HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. SS-16 w/ 10" casing, hammer DRIVING WEIGHT _____ AVERAGE DROP _____

W. VALUE (S.P.T.)	SAMPLE NO. BULK AND RANGE	DEPTH	BLOWS PER LENGTH, IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
40							No returns.			injecting city wtr.
42										
44										
46					Soft	Tan	Sand, fine to med. grained, slightly silty, occ. crs. sand (poor return - no sample)	SP		
48										
50					Soft	Tan	Sand, fine grained, slightly silty. (poor return)			
52										
54										
56						Tan	Sand, fine to med. grained, occ. cemented in thin layers, slightly silty. (poor return)	SP		
58										
60					Soft	Tan	Sand, fine to v. fine grained, w/ silt, occ. pbls. & cemented layers.	SP/ SM		
62										
64										
66							@ 67' gravel, w/ v. crs. sand.	GP		
68										
70						Tan to Red Brn.	Gravel to 1/2" and v. crs. sand, w/ occ. clay, silty - clay lenses.	GP & ML/ CL		
72										
74						Tan	Gravel, w/ v. fine sand, sometimes cemented, silt & clay lenses.	GP & ML		
76						Tan	@ 77' sand & gravel, silty, sand mostly fine grained.	SM/ GM		
78										11/8/87
80										

FIELD LOG OF BORING NO. BG-2SHEET NO. 3 OF 6

PROJECT NO. 86-41-415-01-04 DATE(S) 11/8/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Neule LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN./HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. SS-16 w/ 10" casing hammer DRIVING WEIGHT _____ AVERAGE DROP _____

DEPTH	NO. VALUE (S.P.T.)	SAMPLE NO. BULK AND RANGE	BLOWS PER LENGTH IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND-FINES	REMARKS
80							No returns, drills like sand, little to no gravel, possibly cemented sand.			injecting city water
82										
84										
86							Sand w/ gravel, little to no returns, probably cemented, casing drives hard.			
88										
90						Tan	Sand/clay, and gravel, sand is v. fine grained, clay stiff.	BC/ GP		
92										
94						Tan	Sand, cemented occ., sandy clay & gravel.			
96										
98										
100						Tan	Sand, slightly silty, fine grained w/ crs. grained colored sand & light gravel.	SM/ SP		
102										easy drilling, difficult driving pipe.
104						Tan	Poor returns, appears to be sand, fine grained w/ clay lenses & crs. grained colored sand & small gravel, & silty sand/sandy silt.	SM		
106										
108										
110						Tan	Sand, fine grained w/ some silt & colored crs. grained sand.	SM/ SP		
112										
114										
116										
118										
120						Tan	@ 120' sand, fine grained, slightly silty, occ. cemented, occ. silty sand or clay lenses.			

FIELD LOG OF BORING NO. BG-2SHEET NO. 5 OF 6PROJECT NO. 86-41-415-01-04DATE(S) 11/10/87

ELEVATION _____

PROJECT NAME Riverside County SWAT - Blythe

REFERENCE _____

FIELD ENGINEER Scott Heule

LOCATION _____

ASSISTANT _____

WATER LEVEL _____

AFTER _____

MIN./HOURS _____

DRILLING CO. Datum Exploration

TIME _____

SETUP _____

START _____

STOP _____

DRILLING METHOD & DIAM SS-15 w/ 10" casing hammer

DRIVING WEIGHT _____

AVERAGE DROP _____

DEPTH	W. VALUE (S.P.)	BULK AND RANGE	DEPTH	BLOWS PER LENGTH IN	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
160											
162								Gravel			injecting city water
164											
166								Gravel, probably some cobbles, round.	GP		
168											
170								Sand & some fine gravel, sand is mostly fine grained, silty w/ crs. colored sand.	SM		
172											
174											
176											
178											
180								Sand, crs. & fine grained w/ sandy clay/silt.	SM/ML		Begin drilling open hole. ▼
182							Tan	@ 182' becoming silty/clayey, v. fine & crs. sand or sandy silt/clay.	ML		
184											
186											
188											
190											
192											
194											
196											
198											
200											



FIELD LOG OF BORING NO. BG-2

SHEET NO. 6 OF 6

PROJECT NO. 86-41-415-01-04 DATE(S) 11/10/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION _____
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN/HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. SS-16 w/10" casing hammer DRIVING WEIGHT _____ AVERAGE DROP _____

IN. VALUE (S.P.L.)	BULK SAMPLE NO. CORE	DEPTH	BLOWS PER LENGTH - IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
200	BG-2, 200'					Tan	Sand/silt, v. fine to med. sand, sandy silt, silty sand.	SM/ ML		Open hole
202										
204										
206										
208										
210						Tan	Sand, silty, fine w/ med. to crs. grained.	SM		
212										
214										
216										
218										Let hole set for 12 min, then blew, appears to be making water.
220							TD = 218 feet			
222										
224										
226										
228										
230										
232										
234										
236										
238										
240										



WELL COMPLETION LOG OF BORING NO. BG-2

SHEET NO. 1 OF 3

PROJECT NO. B6-41-415-01-04 DATE(S) 11/11-23/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION west side of landfill
ASSISTANT _____ WATER LEVEL 161' 0745 11/11 AFTER _____ MIN./HOURS
161' 0715 11/12
DRILLING CO. Datum Exploration TIME _____
SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM _____ DRIVING WEIGHT _____ AVERAGE DROP _____

IN" VALVE & P.T.I.	BULK SAMPLE NO. CORE	DEPTH	BLOWS PER LENGTH - IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAY SAND FINES	REMARKS
		0								
		5								
		10								
		15								
		20								
		25								
		30					Volclay Grout			
		35								
		40					4" PVC Blank			
		45								
		50								
		55					10" dia. borehole			
		60								
		65								
		70					PVC centralizer			
		75								
		80								
		85								
		90								
		95								
		100								

WELL COMPLETION LOG OF BORING NO. BG-2SHEET NO. 2 OF 3

PROJECT NO. 86-41-415-01-04 DATE(S) 11/11-23/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION West side of landfill
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN./HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM _____ DRIVING WEIGHT _____ AVERAGE DROP _____

IN" VALUE (S.P.T.)	SAMPLE NO. BULK AND RANGE	DEPTH	BLOWS PER LENGTH - IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
110										
105										
110										
115							Volclay Grout			
120										
125							10" dia. borehole			
130										
135										
140							139'			
145							31 Sacks Lonestar #2/12			
150										
155							156'			
160							4" dia. Sch. 80 PVC .02 slot			
165										
170							Centralizer			
175							176'			
180										Drilled Open Hole
185										
190										
195										
200										



WELL COMPLETION LOG OF BORING NO. BG-2

SHEET NO. 3 of 3

PROJECT NO. 86-41-415-01-04 DATE(S) 11/11-23/87 ELEVATION _____
PROJECT NAME Riverside County SWAT - Blythe REFERENCE _____
FIELD ENGINEER Scott Heule LOCATION West side of landfill
ASSISTANT _____ WATER LEVEL _____ AFTER _____ MIN./HOURS
DRILLING CO. Datum Exploration TIME _____ SETUP _____ START _____ STOP _____
DRILLING METHOD & DIAM. _____ DRIVING WEIGHT _____ AVERAGE DROP _____

DEPTH	IN" VALUE (S-1)	SAMPLE NO BULK AND RANGE	BLOWS PER LENGTH IN.	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION	GROUP SYMBOL	PERCENT GRAV. SAND FINES	REMARKS
210										
205										
210										
215										
220										
225										
230										
235										
240										
245										
250										
255										
260										
265										
270										
275										
280										
285										
290										
295										
300										

BG-2 Completion Log

LOG OF BORING BG-3

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE	
	FOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS
0'									SP
5'			0		5'	1	☒		
10'			0		10'	2	☒		
15'			0		15'	3	☒		
20'			0		20'	4	☒		
25'			0		25'	5	☒		
30'			0		30'	6	☒		
35'			0		35'	7	☒		
40'			0		40'	8	☒		

CONTINUED ON NEXT PAGE

DESCRIPTION

Yellowish red Silty very fine to fine SAND with little coarse Sand and fine Gravel, dry, no odor

Light brown fine SAND, trace fine Gravel, damp, no odor

Light brown fine SAND, damp, no odor

As above

As above

As above

As above

As above

WELL

PVC Cap

Locking Steel Protective Casing

Neat Cement Surface Seal

Neat Cement 0' - 10'

Cement/Bentonite Grout 10' - 150'

5" Diameter Schedule 80 PVC Blank Casing 0' - 159'

LOG OF BORING BG-3

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA P.D. (cpm)			SAMPLE DATA				SOIL TYPE		DESCRIPTION	WELL (continued)
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
40'									SP	As above	
45'									GP	No retrieval	
50'			0		50'	10	☒			Light brown Sandy fine GRAVEL, damp, no odor	
55'			0		55'	11	☒		SP	Light brown fine SAND, damp, no odor	
60'			0		60'	12	☒			Light brown Gravelly very fine to fine SAND, damp, no odor	
65'		0			65'	13	☒		SW	Light brown fine to coarse SAND, some Gravel, damp, no odor	
70'					70'	14				Grades to orange brown	
75'					75'	15	☒			As above	
80'			0		80'	16	☒			As above	

CONTINUED ON NEXT PAGE

Cement/
Bentonite Grout
10' - 150'

5" Diameter
Schedule 80 PVC
Blank Casing
0' - 150'

LOG OF BORING BG-3

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth in Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE		DESCRIPTION	WELL (continued)
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
80'									SW		
85'					85'	17	☒			Trace Silt	
90'					90'	18	☒			As above	
95'	0				95'	19	☒			As above	
100'					100'	20	☒			No Silt	
105'					105'	21	☒			As above	
110'					110'	22	☒			As above	
115'					115'	23	☒			As above	
120'					120'	24	☒			As above	

CONTINUED ON NEXT PAGE

Cement/
Bentonite Grout
10' - 150'

5" Diameter
Schedule 80 PVC
Blank Casing
0' - 159'

LOG OF BORING BG-3

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE	
	BORE-LOG	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS
120'	0								SW
125'					125'	25	☒		As above
									SP
130'					130'	26	☒		As above
135'	0				135'	27	☒		As above
140'					140'	28	☒		As above
145'					145'	29	☒		Increasing coarse Sand and Gravel
150'	0				150'	30	☒		SW
155'					155'	31	☒		As above
160'	0				160'	32	☒		

CONTINUED ON NEXT PAGE

DESCRIPTION

WELL (continued)

As above

Grades to fine SAND with some Gravel to 1"

As above

As above

As above

Increasing coarse Sand and Gravel

Brown to orange Gravelly fine SAND with some medium to coarse Sand, no odor

As above

Cement/
Bentonite Grout
10' - 150'

5" Diameter
Schedule 80 PVC
Blank Casing
0' - 159'

Bentonite Seal
150' - 155'

Lonestar
#2/16 Sand
155' - 210'

5" Diameter
Schedule 80 PVC
0.20 inch
Slotted Screen
159' - 209 1/2'

LOG OF BORING BG-3

GROUNDWATER CHARACTERIZATION

BLYTHER LANDFILL

BLYTHER, CALIFORNIA

For County of Riverside Waste Management Department

Depth in Feet	ANALYTICAL DATA P.D. (cont)			SAMPLE DATA			SOIL TYPE		DESCRIPTION	WELL (continued)
	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
160'								SW		
165'				165'	33	⊗			Trace Silt	
170'		0		170'	34	⊗			As above	
175'		0		175'	35	⊗			Water encountered at 174'	
180'				180'	36	⊗			As above	
185'				185'	37	⊗		SM	Brown Silty fine SAND with some Gravel, medium and coarse Sand	
190'		0		190'	38	⊗			As above	
195'				195'	39	⊗			As above	
200'				200'	40	⊗		SP	As above	

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Lonestar
#2/16 Sand
155' - 210'

5" Diameter
Schedule 80 PVC
0.020 inch
Slotted Screen
159' - 209 1/2'

LOG OF BORING BG-3

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

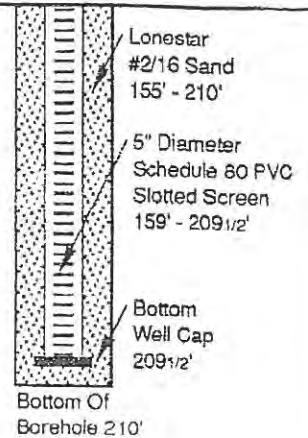
Depth in Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE	
	BORING	SAMPLING	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS
200'						40	☒		SP
205'	0		0			41	☒		
210'									

As above

DESCRIPTION

Brown fine to medium SAND with trace Silt and Gravel

WELL (continued)



SAMPLING METHOD: Sprague & Henwood
 DRILLING METHOD: Air Rotary Casing Hammer
 DATE STARTED: 2/19/92
 DATE COMPLETED: 3/6/92

Boring completed at a depth of 210 feet below ground surface on March 3, 1992.
 Ground water encountered at 174 feet below ground surface.
 Logged by: JJM / PAM; Reviewed by: SAS
 Monitoring well installed in boring to a depth of 209-1/2 feet below ground surface.

Dames & Moore

LOG OF BORING BG-4

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA P.I.D. (ppm)			SAMPLE DATA				SOIL TYPE	
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS
0'									SP
5'			6		5'	1	☒		
10'			7		10'	2	☒		
15'			0		15'	3	☒		
20'			0		20'	4	☒		CL
25'			0		25'	5	☒		SP
30'		0			30'	6	☒		
35'			0		35'	7	☒		
40'			0		40'	8	☒		

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DESCRIPTION

Light brown fine SAND, dry, no odor

As above

Light brown medium SAND, damp, no odor

CL

Brown CLAY, some Silt, damp

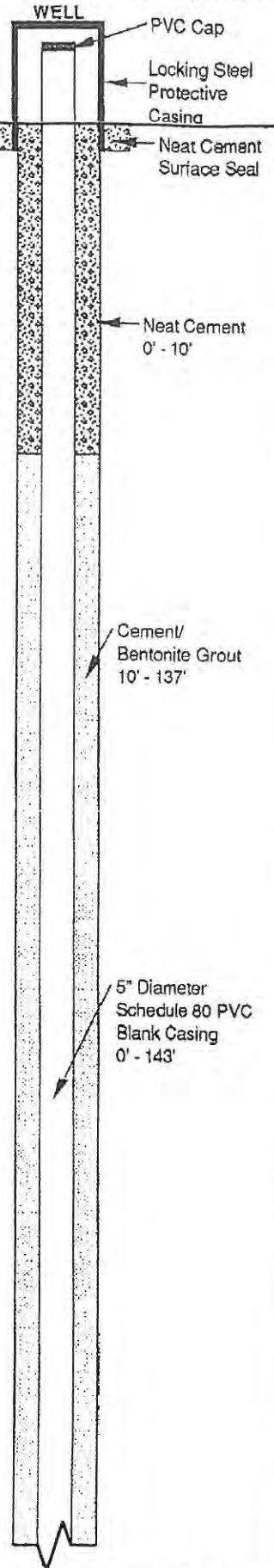
SP

Light brown fine SAND, damp, no odor

Light brown medium SAND, moist, no odor

As above

Light brown fine SAND, damp, no odor



LOG OF BORING BG-4

GROUNDWATER CHARACTERIZATION

BLYTE LANDFILL

BLYTE, CALIFORNIA

For County of Riverside Waste Management Department

Depth in Feet	ANALYTICAL DATA P.D. (ppm)			SAMPLE DATA				SOIL TYPE		DESCRIPTION	WELL (continued)
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
40'									SP		
45'		0			50'	9	<input checked="" type="checkbox"/>			Light brown medium SAND, damp, no odor	
50'			0		50'	10	<input checked="" type="checkbox"/>			As above	
55'			0		55'	11	<input checked="" type="checkbox"/>			As above	
60'		5.7			60'	12	<input checked="" type="checkbox"/>			Light brown medium SAND with little fine Gravel, Silt, and Clay, damp, no odor	
65'			8.7		65'	13	<input checked="" type="checkbox"/>			Brown medium SAND, damp, no odor	
70'			5.1		70'	14	<input checked="" type="checkbox"/>			Increasing trace Gravel, 1/2" in size	
75'		0			75'	15	<input checked="" type="checkbox"/>		GW	Brown Sandy fine to coarse GRAVEL, damp, dense, no odor	
80'			0		80'	16	<input checked="" type="checkbox"/>			As above	

CONTINUED ON NEXT PAGE

Cement/
Bentonite Grout
10' - 137'

5" Diameter
Schedule 80 PVC
Blank Casing
0' - 143'

LOG OF BORING BG-4

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth in Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE		DESCRIPTION	WELL (continued)
	S.T.D. (ppm)			BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
	E.P.T. HOLL	SAMPLE	CUTTINGS								
85'									GW		
85'			0		85'	17	☒			As above	
90'		0			90'	18	☒			As above	
95'			0		95'	19	☒			As above	
100'			0		100'	20	☒		SP	Brown Gravelly medium SAND, damp, no odor	
105'		0			105'	21	☒		ML	Brown SILT, some Clay and Sand, damp, no odor	
110'			0		110'	22	☒		SP	Brown fine SAND, damp, no odor	
115'			0		115'	23	☒			As above	
120'		0			120'	24	☒			Brown fine SAND, damp, no odor	

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Cement/
Bentonite Grout
10' - 137'

5" Diameter
Schedule 80 PVC
Blank Casing
0' - 143'

CONTINUED ON NEXT PAGE

Cement/
Bentonite Grout
10' - 137'

5" Diameter
Schedule 80 PVC
Blank Casing
0' - 143'

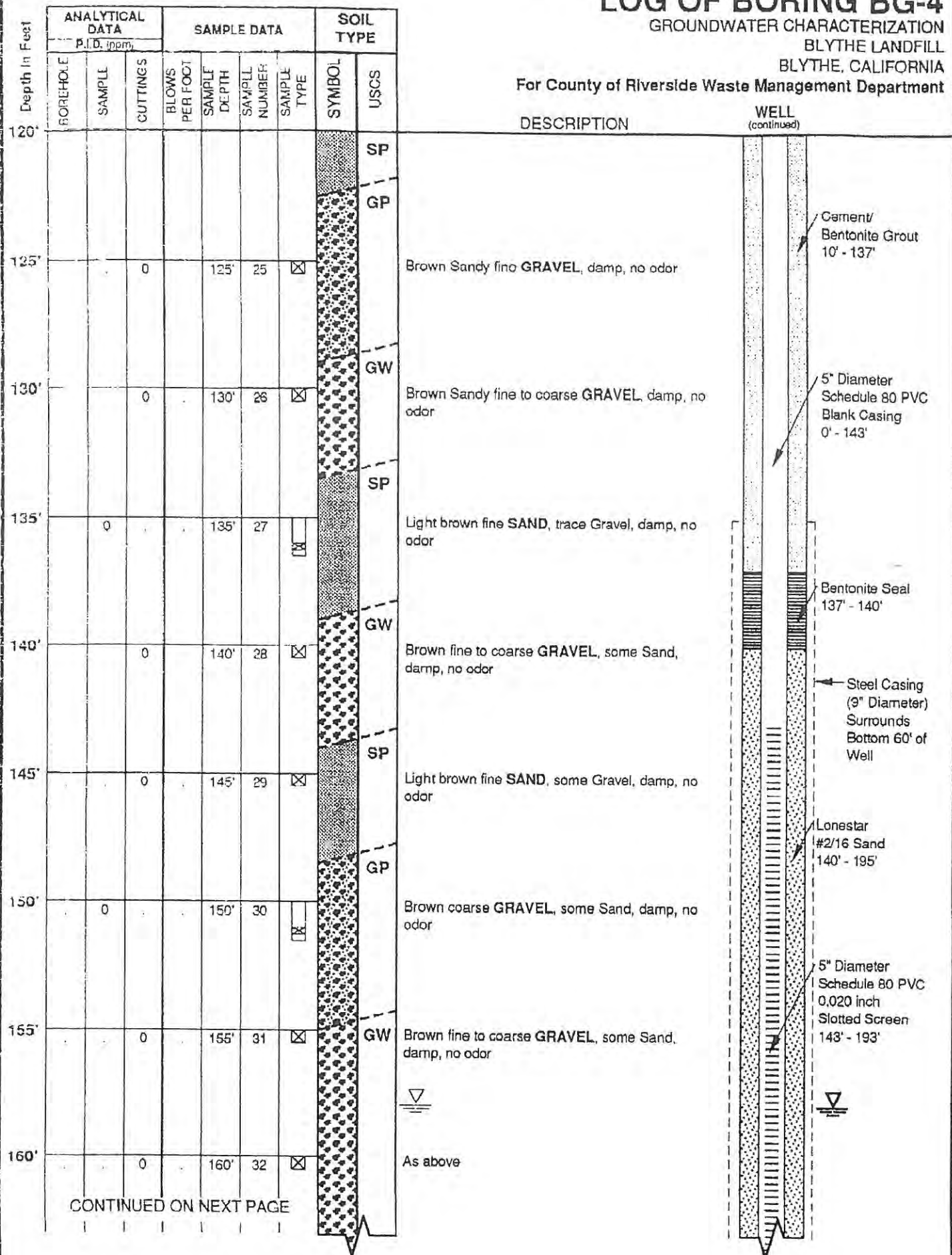
LOG OF BORING BG-4

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department



LOG OF BORING BG-4

GROUNDWATER CHARACTERIZATION

BLYTE LANDFILL

BLYTE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA P I D, (ppm)			SAMPLE DATA				SOIL TYPE		DESCRIPTION	WELL (continued)
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
160'									GW		<p>Steel Casing (9" Diameter) Surrounds Bottom 60' of Well</p> <p>Lonestar #2/16 Sand 140' - 195'</p> <p>5" Diameter Schedule 80 PVC 0.020 inch Slotted Screen 143' - 193'</p> <p>Bottom Well Cap 193'</p> <p>Bottom Of Borehole 195'</p>
165'										No sample obtained	
170'			0		170'	34	☒		SP	Light brown fine SAND, some coarse Gravel, wet, no odor	
175'			0		175'	35	☒			No Gravel	
180'		0			180'	36	☒			As above	
185'			0		185'	37	☒		GW	Brown Sandy fine to coarse GRAVEL (up to 3/4"), wet, no odor	
190'											
195'		0			195'	39	☒		SP	Light brown fine SAND, little Silt, wet, no odor	
200'											

SAMPLING METHOD: Sprague & Henwood
 DRILLING METHOD: Air Rotary Casing Hammer
 DATE STARTED: 2/14/92
 DATE COMPLETED: 2/16/92

Boring completed at a depth of 195 feet below ground surface on February 16, 1992.
 Ground water encountered at 158 feet below ground surface.
 Logged by: JJM ; Reviewed by: SAS
 Monitoring well installed in boring to a depth of 193 feet below ground surface.

Dames & Moore

LOG OF BORING BG-5A

GROUNDWATER CHARACTERIZATION

BLYTE LANDFILL

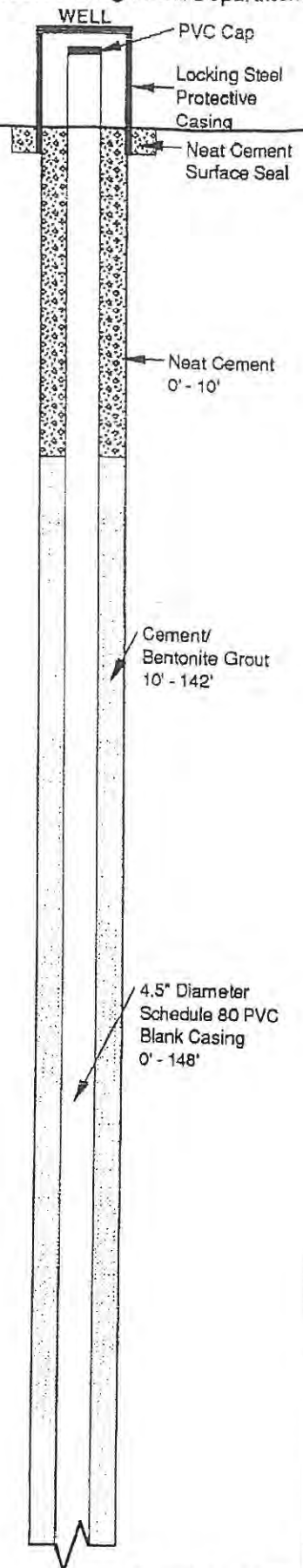
BLYTE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE	
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS
0'									SP
5'					3'	1	☒		Light brown fine SAND, dry, no odor
10'					10'	2	☒		As above
15'					15'	3	☒		Light brown medium SAND, damp, no odor
20'					20'	4	☒	CL	Brown CLAY, some Silt, damp
25'					25'	5	☒	SP	Light brown fine SAND, damp, no odor
30'					30'	6	☒		Light brown medium SAND, moist, no odor
35'					35'	7	☒		As above
40'					40'	8	☒		Light brown fine SAND, damp, no odor

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DESCRIPTION



Dames & Moore

LOG OF BORING BG-5A

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA			SAMPLE DATA				SOIL TYPE		DESCRIPTION	WELL (continued)
	P.T.D. (ppm)			BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL	USCS		
	BOREHOLE	SAMPLE	CUTTINGS								
40'									SP		
45'					45'	9	<input checked="" type="checkbox"/>			Light brown medium SAND, damp, no odor	
50'					50'	10	<input checked="" type="checkbox"/>			As above	
55'					55'	11	<input checked="" type="checkbox"/>			As above	
60'					60'	12	<input checked="" type="checkbox"/>			Light brown medium SAND with little fine Gravel, Silt, and Clay, damp, no odor	
65'					65'	13	<input checked="" type="checkbox"/>			Brown medium SAND, damp, no odor	
70'					70'	14	<input checked="" type="checkbox"/>			As above, with trace 1/2" Gravel	
75'					75'	15	<input checked="" type="checkbox"/>		GW	Brown Sandy fine to coarse GRAVEL, damp, no odor	
80'					80'	16	<input checked="" type="checkbox"/>			As above	
CONTINUED ON NEXT PAGE											

GROUNDWATER CHARACTERIZATION
BLYTHE LANDFILL
BLYTHE, CALIFORNIA
For County of Riverside Waste Management Department

Cement/
Bentonite Grout
10' - 142'

4.5" Diameter
Schedule 80 PVC
Blank Casing
0' - 148'

CONTINUED ON NEXT PAGE

Cement/
Bentonite Grout
10' - 142'

4.5" Diameter
Schedule 80 PVC
Blank Casing
0' - 148'

LOG OF BORING BG-5A

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department

LOG OF BORING BG-5A										GROUNDWATER CHARACTERIZATION	
										BLYTHE LANDFILL	
										BLYTHE, CALIFORNIA	
										For County of Riverside Waste Management Department	
Depth In Feet	ANALYTICAL DATA			SAMPLE DATA			SOIL TYPE		DESCRIPTION	WELL (continued)	
	P.I.D. (p.p.m.)			BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL			USCS
85'									GW		
35'					85'	17	☒		As above		
90'					90'	18	☒		As above, dense		
95'					95'	19	☒		As above		
100'					100'	20	☒		SP Brown Gravelly medium SAND, damp, no odor		
105'					105'	21	☒		ML Brown SILT, some Clay and Sand, damp, very stiff, no odor		
110'					110'	22	☒		SP Brown fine SAND, damp, no odor		
115'					115'	23	☒		Brown fine SAND, damp, no odor		
120'					120'	24	☒		Brown fine SAND, damp, dense, no odor		
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Cement/
Bentonite Grout
10' - 142'

4.5" Diameter
Schedule 80 PVC
Blank Casing
0' - 148'

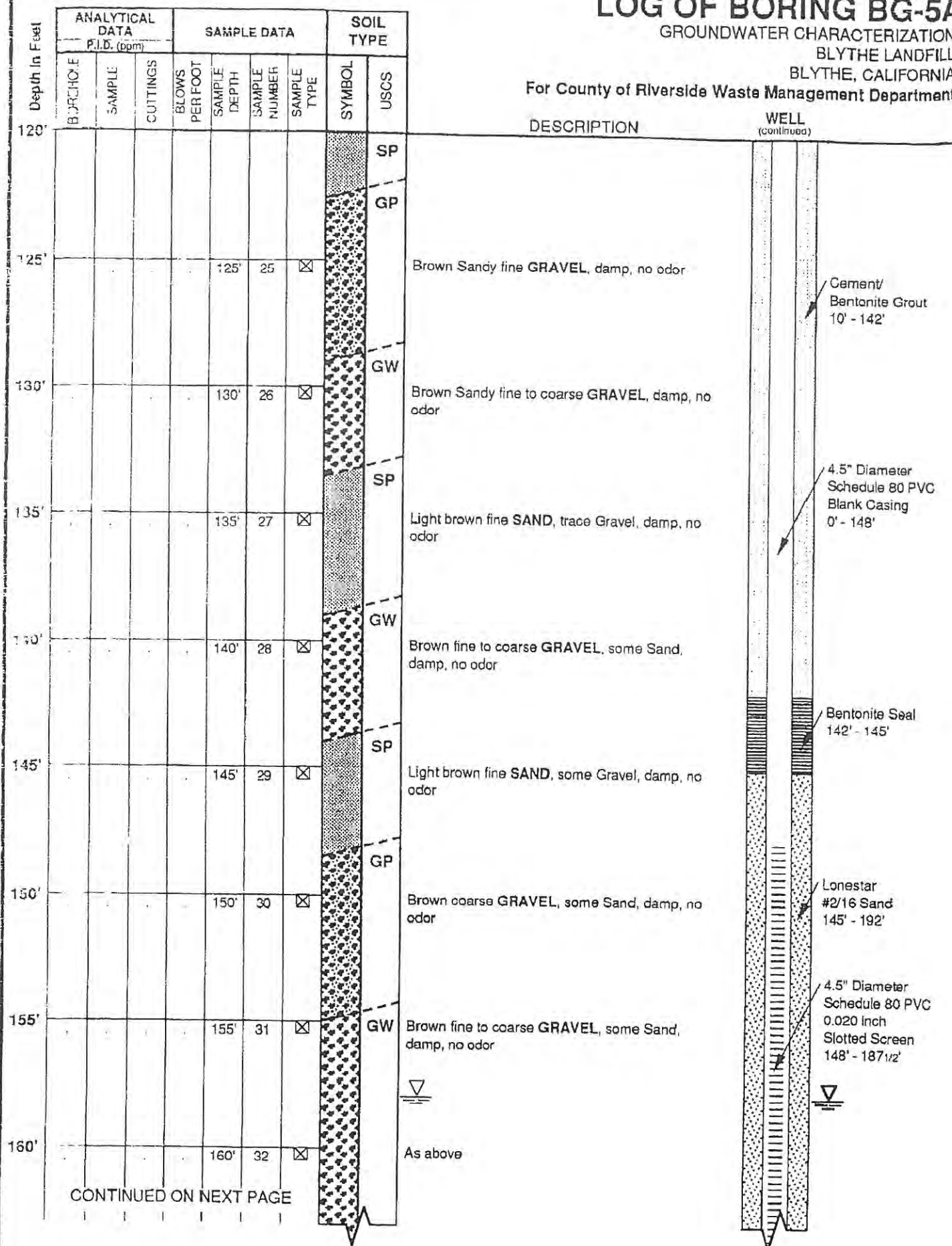
LOG OF BORING BG-5A

GROUNDWATER CHARACTERIZATION

BLYTHE LANDFILL

BLYTHE, CALIFORNIA

For County of Riverside Waste Management Department



LOG OF BORING BG-5A

GROUNDWATER CHARACTERIZATION

BLYTE LANDFILL

BLYTE, CALIFORNIA

For County of Riverside Waste Management Department

Depth In Feet	ANALYTICAL DATA — P.T.D. (ppm)			SAMPLE DATA			SOIL TYPE		DESCRIPTION	WELL (continued)
	BOREHOLE	SAMPLE	CUTTINGS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	SYMBOL		
160'									GW	
165'					165'	33	☒			No sample obtained
170'					170'	34	☒		SP	Light brown fine SAND, some coarse Gravel, wet, no odor
175'					175'	35	☒			As above, no Gravel
180'					180'	36	☒			As above
185'					185'	37	☒		GW	Brown Sandy fine to coarse GRAVEL (up to 3/4"), wet, no odor
190'					190'	38	☒			
195'					195'	39	☒		SP	Light brown fine SAND, little Silt, wet, no odor
200'										

GROUNDWATER CHARACTERIZATION
BLYTHE LANDFILL
BLYTHE, CALIFORNIA
For County of Riverside Waste Management Department

Lonestar #2/16 Sand 145' - 192'

4.5" Diameter Schedule 80 PVC 0.020 inch Slotted Screen 148' - 187 1/2'

Bottom Well Cap 187 1/2'

Bottom Of Borehole 192'

Lonestar
#2/16 Sand
145' - 192'

4.5" Diameter
Schedule 80 PVC
0.020 inch
Slotted Screen
148' - 187 1/2'

Bottom
Well Cap
187 1/2'

Bottom Of
Borehole 192'

SAMPLING METHOD: Sprague & Henwood
DRILLING METHOD: Air Rotary Casing Hammer
DATE STARTED: 2/14/92
DATE COMPLETED: 3/25/92

Boring completed at a depth of 195 feet below ground surface on March 25, 1992.
Ground water encountered at 158 feet below ground surface.
Logged by: JJM ; Reviewed by: SAS
Monitoring well installed in boring to a depth of 187-1/2 feet below ground surface.

Dames & Moore

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISIONS			SYMBOLS		TYPICAL NAMES	
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVELS	Clean gravels with little or no fines	GW		Well graded gravels, gravel-sand mixtures	
		Gravels with over 12% fines	GP		Poorly graded gravels, gravel-sand mixtures	
			GM		Silty gravels, poorly graded gravel-sand-silt mixtures	
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures	
	SANDS	Clean sands with little or no fines	SW		Well graded sands, gravelly sands	
		Sands with over 12% fines	SP		Poorly graded sands, gravelly sands	
			SM		Silty sands, poorly graded sand-silt mixtures	
			SC		Clayey sands, poorly graded sand-clay mixtures	
FINE GRAINED SOILS > half is smaller than No. 200 sieve	SILTS AND CLAYS	Liquid limit less than 50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	
		SILTS AND CLAYS	Liquid limit greater than 50	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic clays and organic silty clays of low plasticity	
	SILTS AND CLAYS	Liquid limit greater than 50	MH		Inorganic silts, micaceous or diatomaceous fine, sandy or silty soils, elastic silts	
			CH		Inorganic clays of high plasticity, fat clays	
			OH		Organic clays of medium to high plasticity, organic silts	
	HIGHLY ORGANIC SOILS		P		Peat and other highly organic soils	

BORING LOG SYMBOLS

SAMPLE TYPE



STANDARD PENETRATION TEST
Split barrel sampler in accordance with ASTM D1587-84 Standard Test Method



DRIVE SAMPLE, 2.42" ID sampler, driven with 140 lb. weight, 30 in. drop



DRIVE SAMPLE, No Recovery



DISTURBED BULK SAMPLE

TEST TYPE

(Results shown in Appendix B)

SAMPLE DISTURBED

CLASSIFICATION

Plasticity

Grain Size Analysis

Sand Equivalent

Specific Gravity

Expansion Index

Compaction Curve

STRENGTH

Pocket Penetrometer

Direct Shear

Unconfined Compression

Triaxial Compression

Vane Shear

CONSOLIDATION

COLLAPSE TEST

RESISTANCE (R) VALUE

CHEMICAL ANALYSIS

ELECTRICAL RESISTIVITY

OTHER

—

pl

ma

se

sg

ei

max

P

ds

uc

tx

vs

c

ct

r

ca

er

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

BLYTHE MONITORING WELL

Project No.

93-16-141-03



Converse Consultants Inland Empire

Drawing No.

A-1

Log of Boring No. BG- 6

Dates Drilled: 3/16/94 -

Logged by: Jason L. Holcomb Checked by: Richard F. Escandon

Equipment: 10" Dia. Hammer Rig

Driving Weight and Drop: 140 lb / 30 in

Ground Surface Elevation(ft): 410

Depth to Water(ft): 154.8 Feet

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS <small>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</small>	SAMPLES		BLOWS/FOOT	OVA (ppm)	FID (ppm)	LABORATORY TESTS	SUMMARY OF WELL INSTALLATIONS
			DRIVE	BULK					
5		SILTY SAND (SM): fine-to medium-grained, inclusions of gravel clasts up to 1" dia., light brown to gray.					0		PVC casing extends to 2' above ground surface
10		GRAVELLY SAND (GP): loose, subrounded gravel clasts.							4" dia. SCH 80 PVC blank casing 0' - 145'
15		SILTY SAND (SM): fine-to medium-grained, micaceous, light gray to tan.							
20									
25									
30									
		CLAYEY SILT (CL-ML): soft, dark gray.					0		cement/bentonite seal 0' - 136'



Converse Consultants
Inland Empire

Project Name.
Blythe Monitoring Well

Project No.
93-16-141-03

Drawing No.
A-2a

Log of Boring No. BG- 6

Dates Drilled: 3/16/94 -

Logged by: Jason L. Holcomb Checked by: Richard F. Escandon

Equipment: 10" Dia. Hammer Rig

Driving Weight and Drop: 140 lb / 30 in

Ground Surface Elevation(ft): 410

Depth to Water(ft): 154.8 Feet

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS <small>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</small>	SAMPLES		BLOWS/FOOT	OVA (ppm)	FID (ppm)	LABORATORY TESTS	SUMMARY OF WELL INSTALLATIONS
			DRIVE	BULK					
40		SILTY SAND WITH GRAVEL(SM-GM): loose, dry, subrounded gravel clasts, light gray to brown.			56				4" dia. SCH 80 PVC blank casing 0' - 145' cement/bentonite seal 0' - 136'
45		SAND (SP): poorly graded, uniform, fine-to medium-sand, loose, micaceous, light brown to tan.							
45		SANDY GRAVEL (GP): loose, angular to subrounded gravel clasts, little or no fines, medium to light gray.							
50		SAND (SP): fine-grained with some gravel, poorly graded, loose, medium to light brown.				0			
55		SAND (SW-SM): fine-to coarse-grained, lenses of clayey silt, inclusions of gravels up to 2" dia.							
60		SAND (SW-SM): fine-to coarse-grained, lenses of clayey silt, inclusions of gravels up to 2" dia.							
65		SAND TO SILTY SAND (SP-SM): fine sand with some silt, loose, medium to light brown.							
		SILTY CLAY (CL): highly plastic, stiff,							



Converse Consultants
Inland Empire

Project Name.
Blythe Monitoring Well

Project No.
93-16-141-03

Drawing No.
A-2b

Log of Boring No. BG- 6

Dates Drilled: 3/16/94 -










Logged by: Jason L. Holcomb Checked by: Richard F. Escandon

Equipment: 10" Dia. Hammer Rig

Driving Weight and Drop: 140 lb / 30 in

Ground Surface Elevation(ft): 410

Depth to Water(ft): 154.8 Feet

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS <small>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</small>	SAMPLES		BLOWS/FOOT	OVA (ppm)	FID (ppm)	LABORATORY TESTS	SUMMARY OF WELL INSTALLATIONS	
			DRIVE	BULK						
75		medium brown to gray.					0		 4" dia. SCH 80 PVC blank casing 0' - 145'	 cement/bentonite seal 0' - 136'
80		GRAVELLY SAND (SW): fine-to medium-grained sand, gravel clasts up to 2" dia..								
85		SAND (SP): fine sand, uniform, micaceous, loose, medium brown.								
90		GRAVELLY SAND (SW): fine-to coarse-grained sand, subangular to subrounded gravel clasts up to 2 1/2" dia..								
95							0			
100		SAND (SP): fine-to medium-grained, occasional gravel, loose, light brown to gray.								



Converse Consultants
Inland Empire

Project Name.
Blythe Monitoring Well

Project No.
93-16-141-03

Drawing No.
A-2c

Log of Boring No. BG- 6

Dates Drilled: 3/16/94 -

Logged by: Jason L. Holcomb Checked by: Richard F. Escandon

Equipment: 10" Dia. Hammer Rig

Driving Weight and Drop: 140 lb / 30 in

Ground Surface Elevation(ft): 410

Depth to Water(ft): 154.8 Feet

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS		SAMPLES		BLOWS/FOOT	OVA (ppm)	FID (ppm)	LABORATORY TESTS	SUMMARY OF WELL INSTALLATIONS
		DRIVE	BULK							
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.								
		SAND (SP): fine-to medium-grained, occasional gravel, loose, light brown to gray.						0		
110		SILTY CLAY (CL): stiff, medium brown to gray.								
115		SANDY GRAVEL (GW): fine-to coarse-grained sand, with gravels up to 2" dia., gravels are subangular to subrounded, loose, medium to light gray.								
120										
125		SAND (SP): fine-grained, uniform sand, no fines, loose, medium brown.						0		
		SANDY GRAVEL (GW): fine-to coarse-grained sand, subangular to subrounded gravels up to 2" dia..								
130										
135								0		
		SILTY SAND (SM): fine-grained sand, dense, occasional subrounded gravel clasts 1-1/2" to 2-1/2" dia., reddish brown.								
										4" dia. SCH 80 PVC blank casing 0' - 145'
										cement/bentonite seal 0' - 136'
										4" bentonite seal 136' - 140'



Converse Consultants
Inland Empire

Project Name.
Blythe Monitoring Well

Project No.
93-16-141-03

Drawing No.
A-2d

Log of Boring No. BG- 6

Dates Drilled: 3/16/94 -

Logged by: Jason L. Holcomb Checked by: Richard F. Escandon

Equipment: 10" Dia. Hammer Rig

Driving Weight and Drop: 140 lb / 30 in

Ground Surface Elevation(ft): 410

Depth to Water(ft): 154.8 Feet

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS <small>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</small>	SAMPLES		BLOWS/FOOT	OVA (ppm)	FID (ppm)	LABORATORY TESTS	SUMMARY OF WELL INSTALLATIONS
			DRIVE	BULK					
145		SILTY SAND (SM): fine-grained sand, dense, occasional subrounded gravel clasts 1-1/2" to 2-1/2" dia., reddish brown.					0		4" dia. SCH 80 PVC blank casing 0' - 145'
		SILTY CLAY (CL): stiff, very plastic, reddish brown.							
150		SAND (SP): fine-to medium-grained, micaceous sand, uniform, poorly graded, light brown to light gray.							4" dia. SCH 80, 0.020 slotted screen 145' - 180'
155		- becoming very moist							
160		- wet cuttings, sand							
		- free water in cuttings							
165							0		sand backfill 140' - 200'
170		GRAVELLY SAND (SW): medium-to coarse-grained sand with fine to coarse gravels, saturated, loose, medium gray to brown.							
		SAND (SP): medium-grained, poorly graded, uniform sand, medium brown.							



Converse Consultants
Inland Empire

Project Name.
Blythe Monitoring Well

Project No.
93-16-141-03

Drawing No.
A-2e

Log of Boring No. BG- 6

Dates Drilled: 3/16/94 -


Logged by: Jason L. Holcomb Checked by: Richard F. Escandon

Equipment: 10" Dia. Hammer Rig

Driving Weight and Drop: 140 lb / 30 in

Ground Surface Elevation(ft): 410

Depth to Water(ft): 154.8 Feet

DEPTH (ft)	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS		SAMPLES		BLOWS/FOOT	OVA (ppm)	FID (ppm)	LABORATORY TESTS	SUMMARY OF WELL INSTALLATIONS
		DRIVE	BULK							
180		<p>SAND (SP): medium-to coarse-grained with fine gravel 1/2" dia., medium brown.</p>						0		 <p>4" dia. SCH-80 PVC, .020 slotted screen 145' - 180'</p> <p>180': END CAP</p> <p>sand backfill</p> <p>200': Bottom of Borehole</p>
185										
190		<p>- with gravel, medium-to coarse-grained, fine-to coarse-gravels, subangular to subrounded clasts</p>								
195										
200		<p>End of boring at 200 feet. Groundwater encountered at 160 feet during drilling. Groundwater stabilized at 154.8 feet on 3/17/94. Borehole converted to monitoring well on 3/17/94.</p>						0		



Converse Consultants
Inland Empire

Project Name.
Blythe Monitoring Well

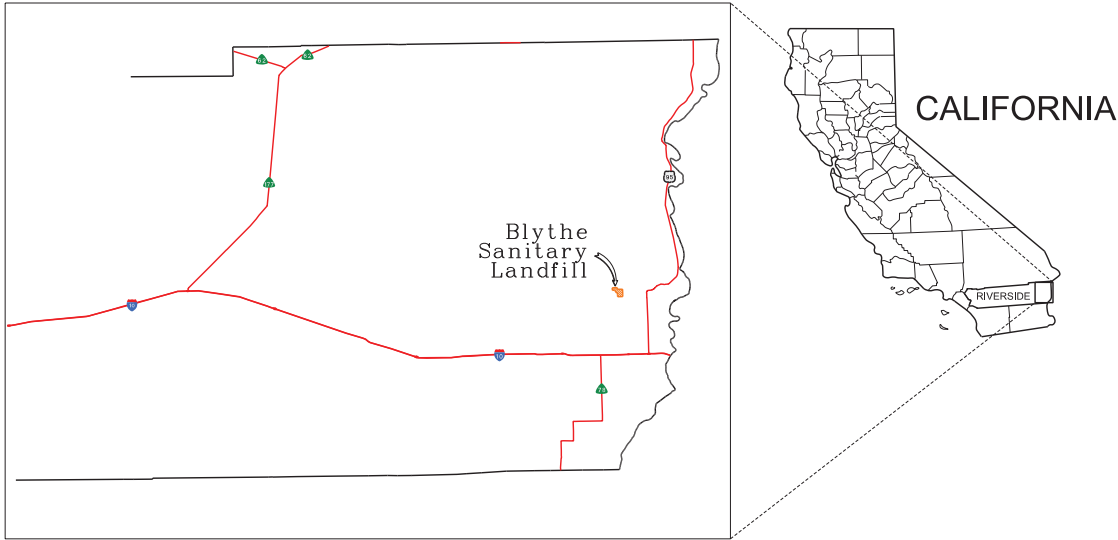
Project No.
93-16-141-03

Drawing No.
A-2f

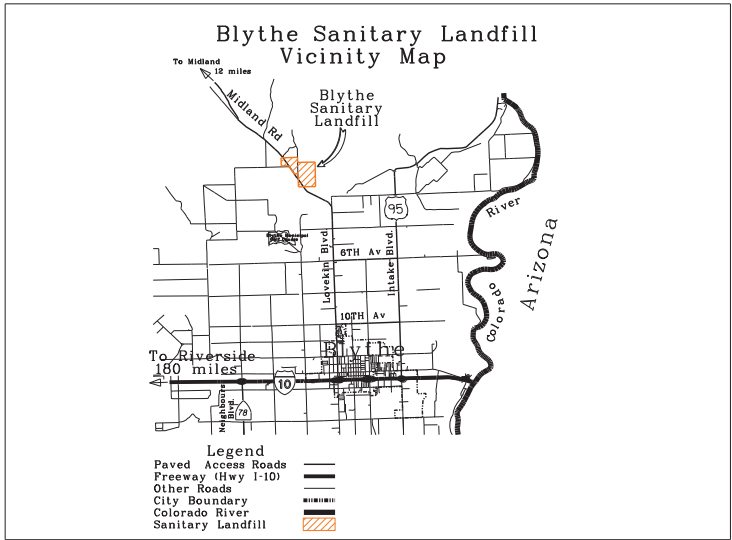
BLYTHE SANITARY LANDFILL CONSTRUCTION PLANS FOR THE CONSTRUCTION OF GROUNDWATER WELLS JULY 2022

PREPARED BY
DEPARTMENT OF WASTE RESOURCES
HANS KERNKAMP, GENERAL MANAGER AND CHIEF ENGINEER
14310 FREDERICK STREET
MORENO VALLEY, CALIFORNIA 92553
TEL. (951) 486-3200 FAX (951) 486-3205





LOCATION MAP
N.T.S.

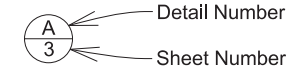


VICINITY MAP
N.T.S.

LEGEND

- Property line
- Topo Contours (April 2022)
- Flow Line / Flow Direction
- Landfill Operations Permit Limit

DETAIL CALLOUTS



FILL PATTERNS

- Sanitary Seal
- Transition Seal / Concrete
- Pellet Seal
- Filter Pack
- Engineered Fill

ABBREVIATIONS

- Approx. Approximate
- C Cut
- CL or CL Center Line
- DIA Diameter
- E Easting
- EL Elevation
- Exist. Existing
- F Fill
- FL or FL Flow Line
- Gal. Galvanized Steel
- GB Grade Break
- LF Linear Feet
- L Length
- MIN. Minimum
- N Northing
- NAD North American Datum
- NTS Not To Scale
- PL or PL Property Line
- R.C.E. Registered Civil Engineer
- RCFC Riverside County Flood Control
- RS Reinforced Shotcrete
- SCH. Schedule
- TOE Toe of Slope
- TS Top of Slope
- TYP Typical
- Vert. Vertical
- WWF Welded Wire Fabric

INDEX OF DRAWINGS

SHEET	FILE NAME	TITLE	SCALE
1	bly_CGWW_s01 Title.dgn	Title Sheet	NTS
2	bly_CGWW_s02 Index.dgn	Index, Legend, & Vicinity Map	NTS
3	bly_CGWW_s03 Site Map.dgn	Site Map	1" = 300'
4	bly_CGWW_s04 Production Well.dgn	Production Well Location	1" = 30'
5	bly_CGWW_s05 Well Details.dgn	Well Details	NTS
6	bly_CGWW_s06 Water Tower.dgn	Water Tower & Trench Details	NTS
7	bly_CGWW_s07 Site Photos.dgn	Site Photos	NTS

GENERAL NOTES

- Details of construction, materials and workmanship not shown in these drawings shall conform to the pertinent requirements of the Standard Specifications and any applicable Contract Specifications.
- Contractor shall provide all utilities (water, electrical, and telephone service) as necessary to successfully complete any and all construction activities.
- All existing utilities such as fences, monitoring wells, pipelines, gas lines, probes, etc. shall be protected from damage or replaced at Contractor's expense.
- All existing and proposed dimensions shall be verified by the Contractor prior to starting work. The County shall be notified immediately of any discrepancies.
- Topography is developed by digital photogrammetric methods and field topographic survey.
- Grid ticks are based on North American datum of 1983 (NAD 83). California coordinate system Zone VI NAD 83 is to be used for all on-site survey work.
- Topographic features of the Blythe Landfill site, both contours and plan data, are based on R.C.F.C. photogrammetric mapping dated June 2020.

DEPARTMENT OF WASTE RESOURCES

Hans Kernkamp
APPROVED: General Manager - Chief Engineer R.C.E. C-45868 Exp. 12/31/22

Digitally signed by Hans Kernkamp
Date: 2022.07.18 16:13:18 -07'00'
SUBMITTED: Principal Engineer R.C.E. C-72000 Exp. 6/30/24



NO.	REVISIONS	BY	APPROVED	DATE

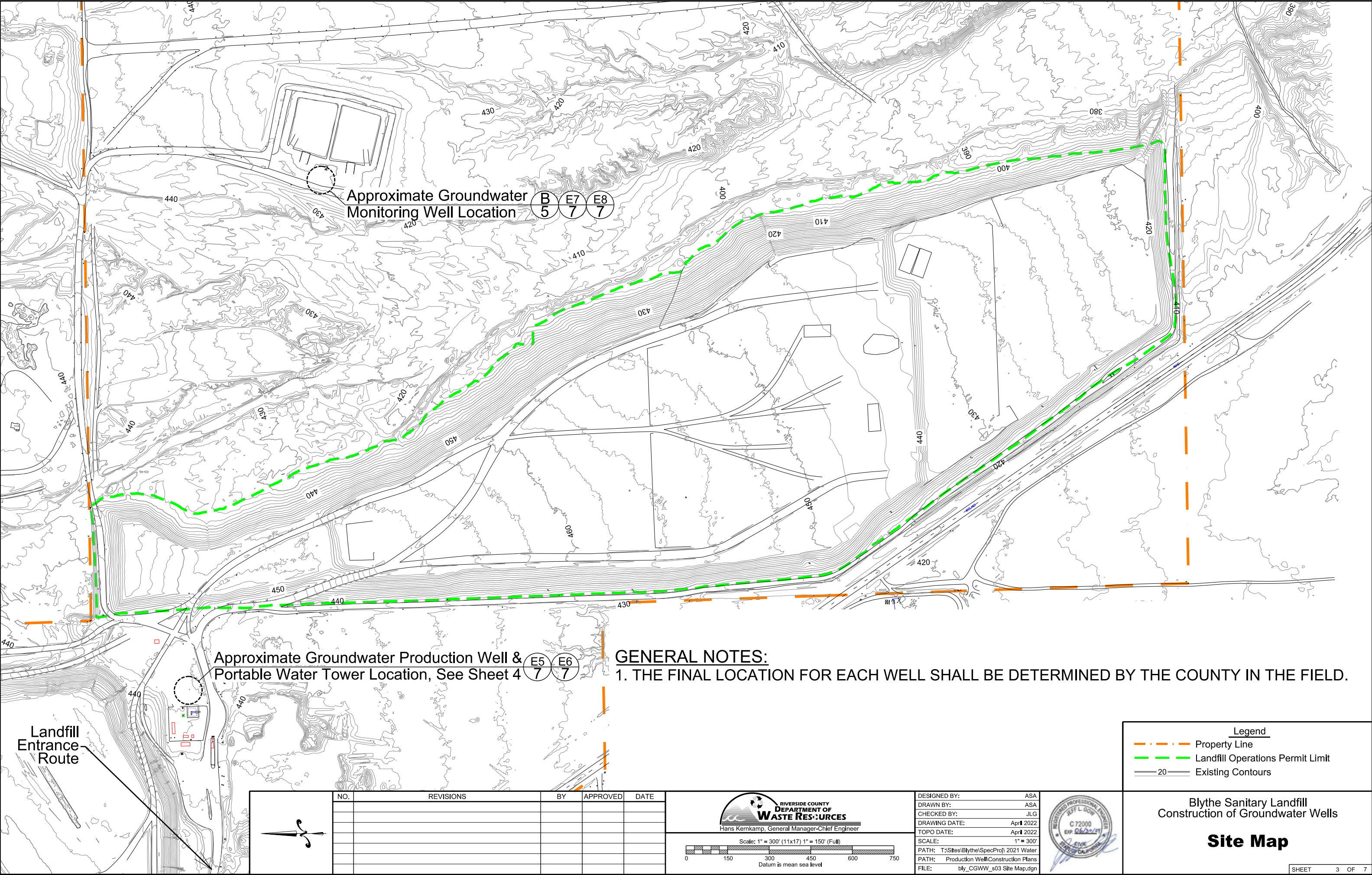


Hans Kernkamp, General Manager-Chief Engineer

DESIGNED BY:	ASA
DRAWN BY:	ASA
CHECKED BY:	JLG
DRAWING DATE:	April 2022
SCALE:	NTS
PATH:	T:\Sites\Blythe\SpecProj\ 2021 Water
PATH:	Production Well\Construction Plans\
FILE:	bly_CGWW_s02 Index.dgn



Blythe Sanitary Landfill
Construction of Groundwater Wells
Index, Legend & Vicinity Map



GENERAL NOTES:
1. THE FINAL LOCATION FOR EACH WELL SHALL BE DETERMINED BY THE COUNTY IN THE FIELD.

Legend

- Property Line
- Landfill Operations Permit Limit
- Existing Contours

NO.	REVISIONS	BY	APPROVED	DATE

RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Hans Kernkamp, General Manager-Chief Engineer

Scale: 1" = 300' (11x17) 1" = 150' (Full)

Datum is mean sea level

DESIGNED BY:	ASA
DRAWN BY:	ASA
CHECKED BY:	JLG
DRAWING DATE:	April 2022
TOPO DATE:	April 2022
SCALE:	1" = 300'
PATH:	T:\Sites\Blythe\SpecProj\ 2021 Water
PATH:	Production Well\Construction Plans
FILE:	bly_CGWW_s03 Site Map.dgn



Blythe Sanitary Landfill
Construction of Groundwater Wells

Site Map

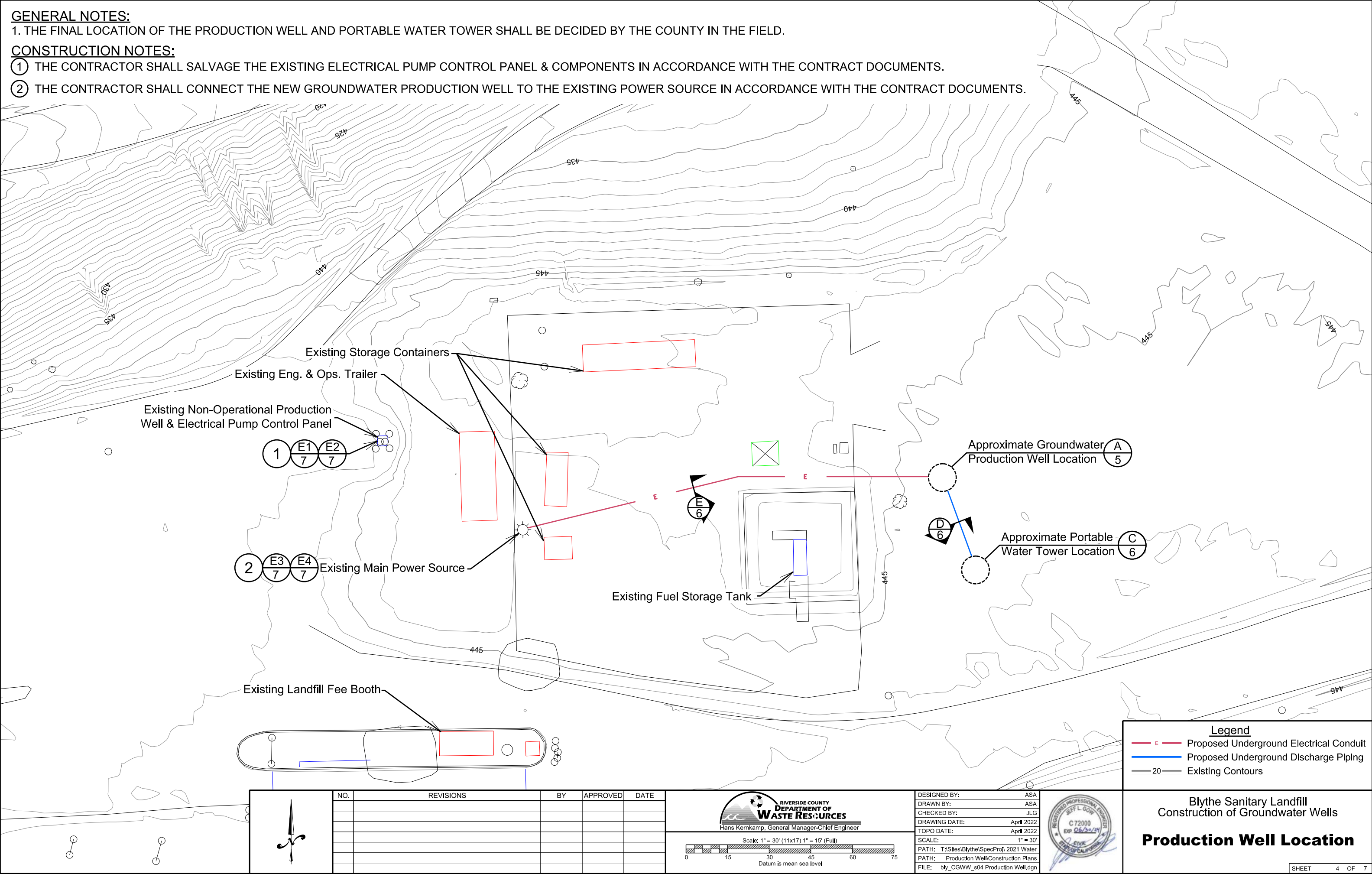
SHEET 3 OF 7

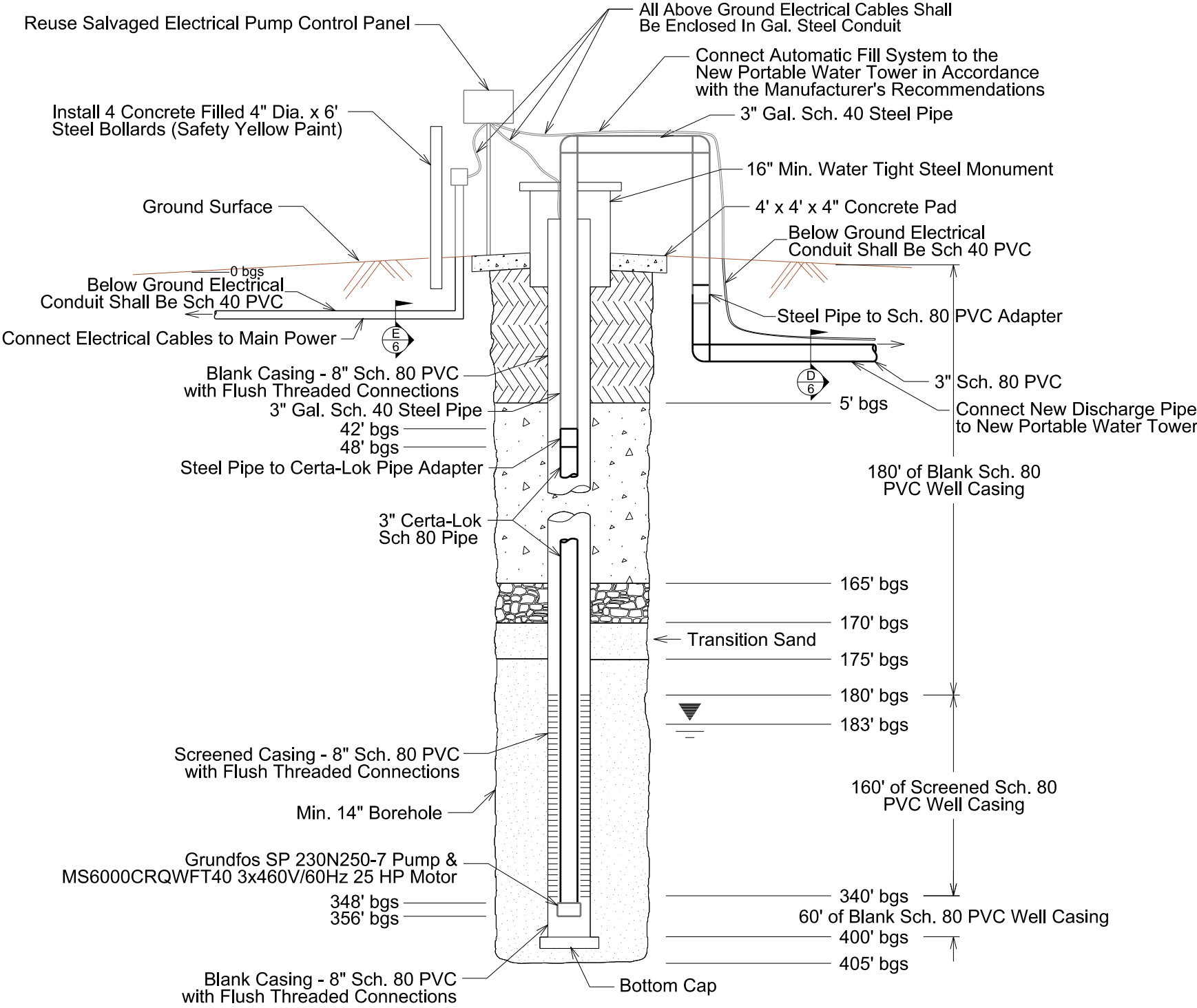
GENERAL NOTES:

1. THE FINAL LOCATION OF THE PRODUCTION WELL AND PORTABLE WATER TOWER SHALL BE DECIDED BY THE COUNTY IN THE FIELD.

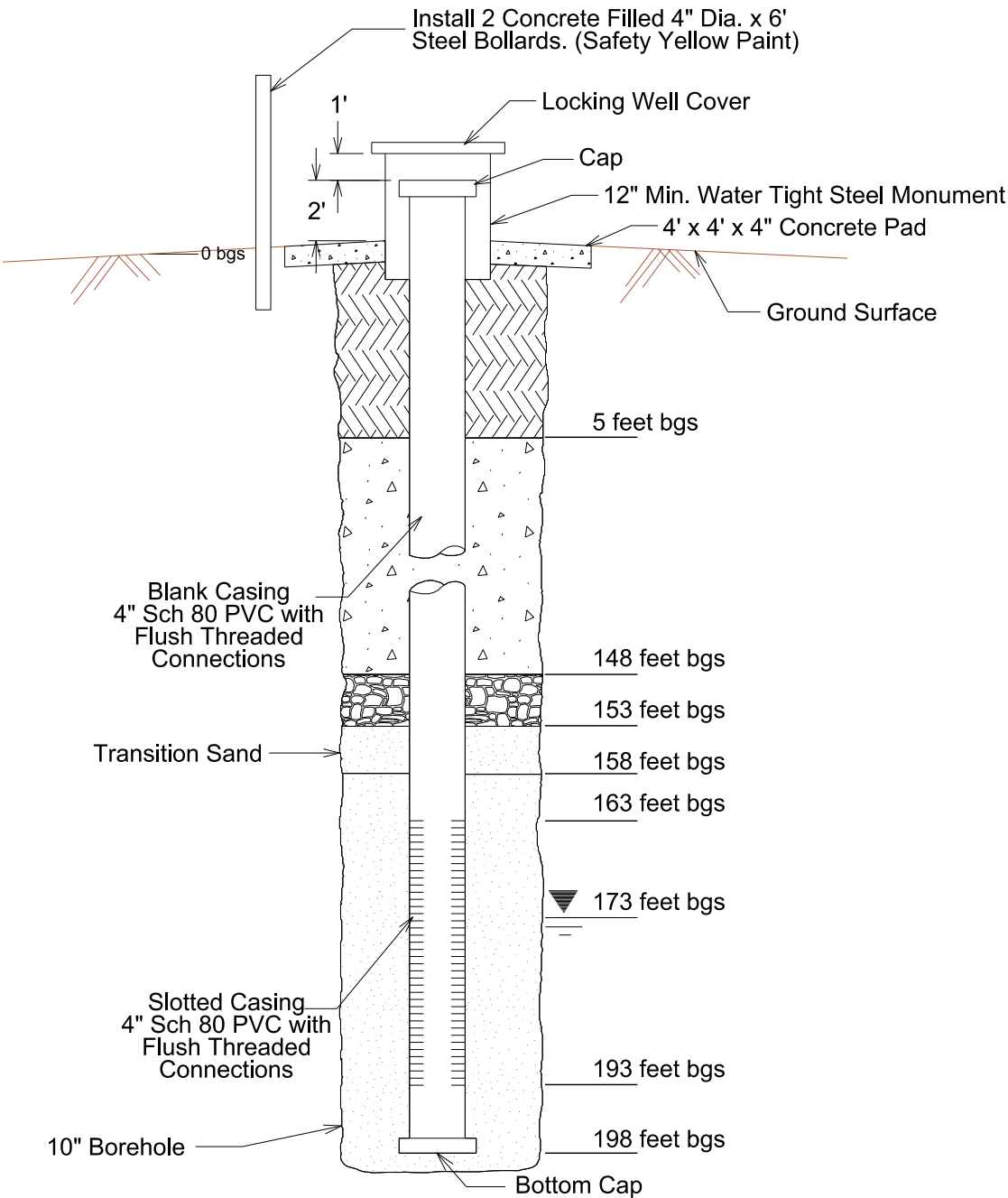
CONSTRUCTION NOTES:

- ① THE CONTRACTOR SHALL SALVAGE THE EXISTING ELECTRICAL PUMP CONTROL PANEL & COMPONENTS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- ② THE CONTRACTOR SHALL CONNECT THE NEW GROUNDWATER PRODUCTION WELL TO THE EXISTING POWER SOURCE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.





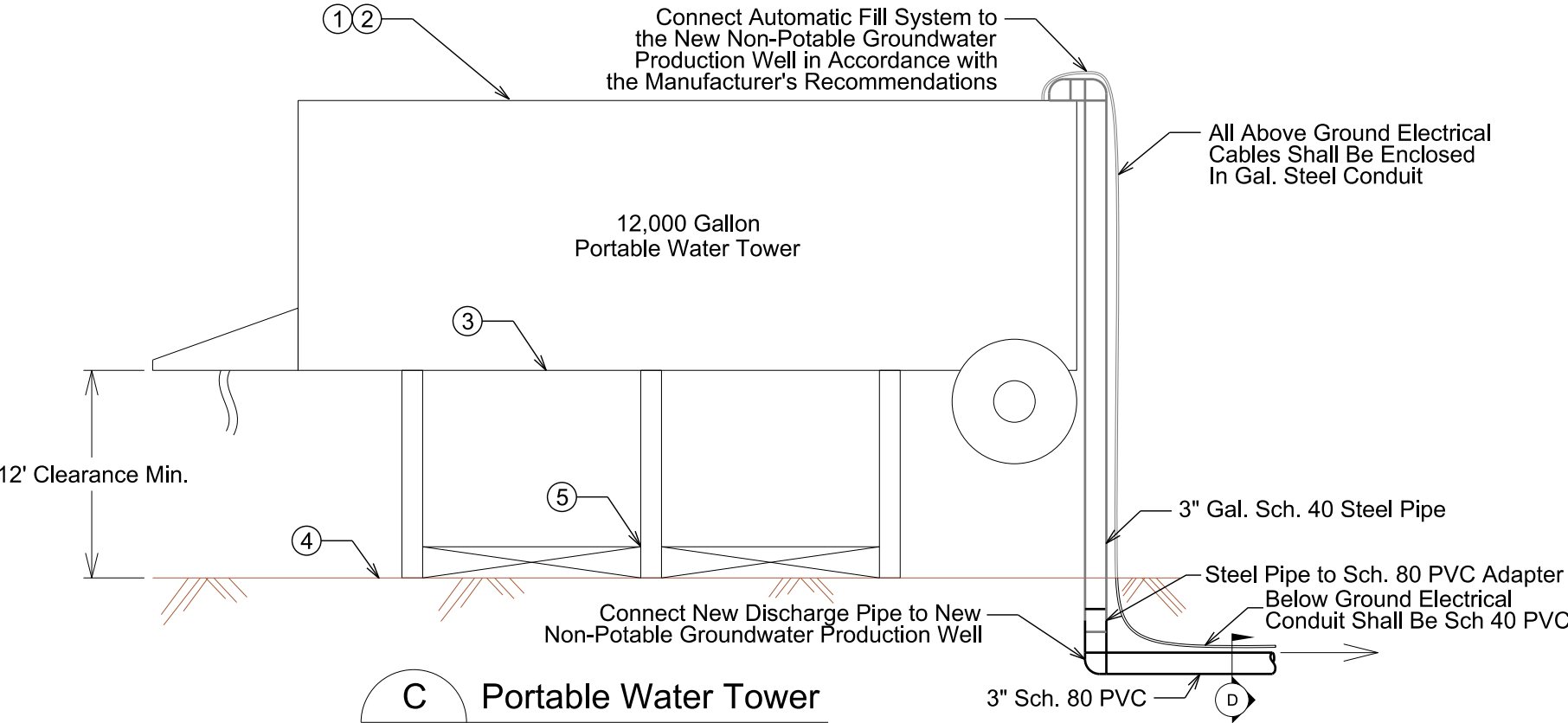
A Non-Potable Production Well
Not To Scale



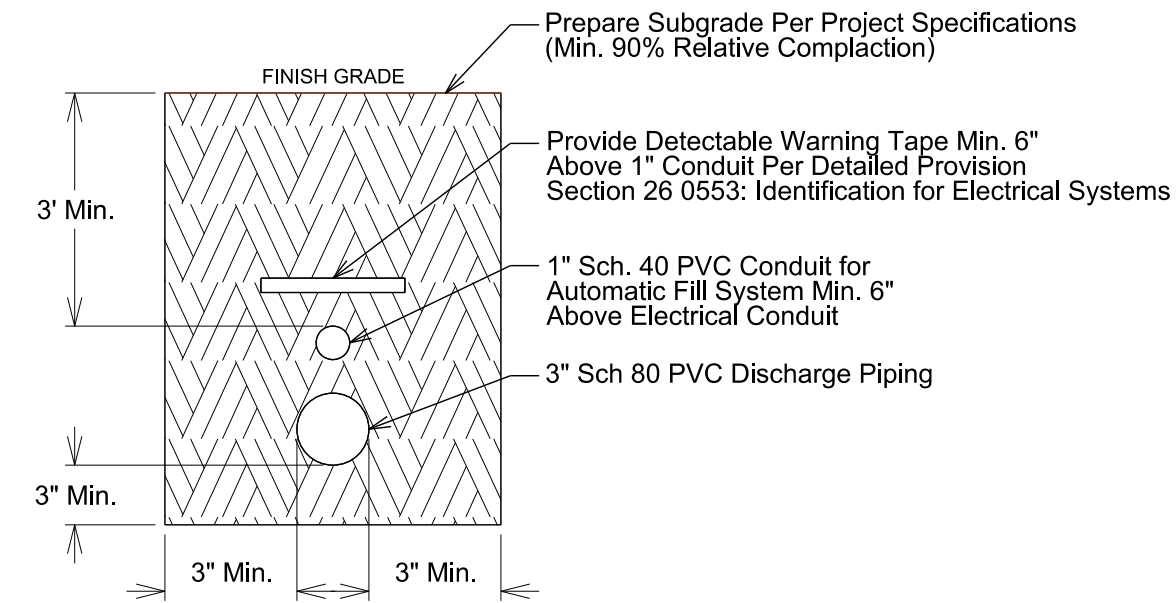
B Groundwater Monitoring Well
Not To Scale

CONSTRUCTION NOTES:

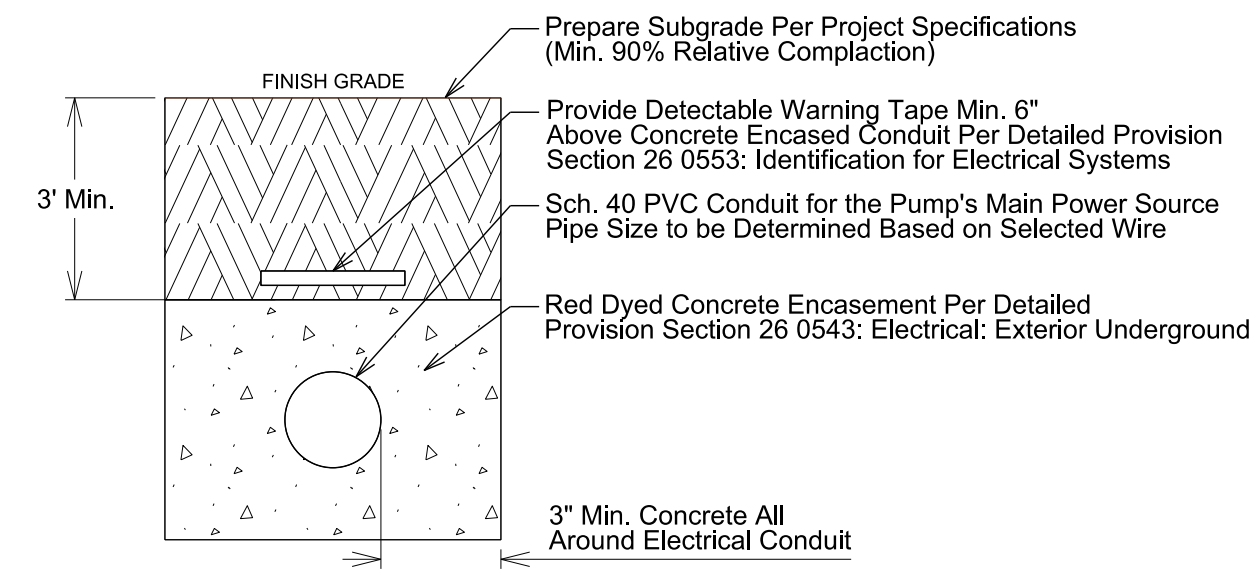
- ① THE CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) 12,000-GALLON PORTABLE WATER TOWER AT THE LOCATION IDENTIFIED IN THE FIELD BY THE COUNTY IN ACCORDANCE WITH DETAILED PROVISIONS SECTION 33 1600: WATER UTILITY STORAGE TANKS. THE PORTABLE WATER TOWER SHALL, AT A MINIMUM, INCLUDE: STEEL FITTED HEADS, A 10-INCH DIAMETER DISCHARGE TUBE (MIN. 12-FEET FROM GRADE), DUAL 3-INCH FILL PIPE WITH APPROVED AIR GAPS, VALVES, FLOAT ASSEMBLIES AND CAMLOCK ON END OF PIPE, A MECHANICAL FLOAT SYSTEM (FILL CONTROLLED BY WATER DEPTH), AN AUTOMATIC SHUT OFF VALVE, A TANK ACCESS HATCH, AND AN OSHA-APPROVED ACCESS LADDER. OPTIONAL ITEMS THAT CAN BE REMOVED BEFORE OR AFTER DELIVERY AND INSTALLATION FOR A COST CREDIT TO THE COUNTY SHALL INCLUDE BUT NOT BE LIMITED TO: A FIFTH WHEEL HITCH, A REMOVEABLE HYDRAULIC PUMP AND MOTOR, A HEAVY-DUTY LONG-LIFE AXLE, SUSPENSION, AND AIR BRAKE SYSTEM, AND DUAL WHEELS AND TIRES.
- ② EXTERIOR OF PORTABLE WATER TOWER TANK SHALL BE COATED WITH PRIMER AND WHITE EPOXY PAINT.
- ③ INTERIOR OF PORTABLE WATER TOWER TANK SHALL BE COATED WITH A RUST-RESISTANT TWO- OR THREE-COAT EPOXY COATING SYSTEM TO PREVENT CORROSION.
- ④ THE COUNTY SHALL PERFORM ROUGH GRADING OF SUBGRADE PRIOR TO PLACEMENT OF THE PORTABLE WATER TOWER.
- ⑤ THE CONTRACTOR SHALL SECURE THE PORTABLE WATER TOWER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.



C Portable Water Tower
Not To Scale



D Discharge Pipe Trench Detail
Not To Scale



E Electrical Trench Detail
Not To Scale

NO.	REVISIONS	BY	APPROVED	DATE

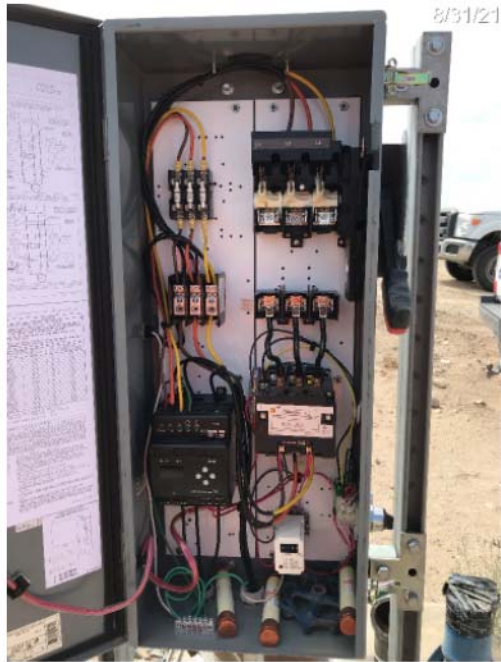


DESIGNED BY:	ASA
DRAWN BY:	ASA
CHECKED BY:	JL/G
DRAWING DATE:	April 2022
TOPO DATE:	--
SCALE:	NTS
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PATH:	Production Well\Construction Plans
FILE:	bly_CGWW_s06 Water Tower.dgn



Blythe Sanitary Landfill
Construction of Groundwater Wells

Water Tower &
Trench Details



E1 Salvage Existing Electrical Control Panel
Not To Scale

E2 Salvage Existing Electrical Control Panel
Not To Scale

E3 Existing Main Electrical Power Source
Not To Scale

E4 Existing Main Electrical Power Source
Not To Scale



E5 New Production Well & Water Tower Location
Not To Scale

E6 New Production Well & Water Tower Location
Not To Scale

E7 New Groundwater Monitoring Well Location
Not To Scale

E8 New Groundwater Monitoring Well Location
Not To Scale

NO.	REVISIONS	BY	APPROVED	DATE



DESIGNED BY:	ASA
DRAWN BY:	ASA
CHECKED BY:	JLG
DRAWING DATE:	April 2022
TOPO DATE:	-
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PATH:	Production Well\Construction Plans\
FILE:	bly_CGWW_s07 Site Photos.dgn



Blythe Sanitary Landfill
Construction of Groundwater Wells

Site Photos

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Hans W. Kernkamp, General Manager-Chief Engineer

NOTICE OF EXEMPTION

DATE: September 19, 2022

TO: County Clerk, County of Riverside (County)

PROJECT CASE NO/TITLE: NOE 22-04/ Construction of Groundwater Wells at the Blythe Sanitary Landfill (BSL) Project

PROJECT LOCATION: Blythe Landfill, 1000 Midland Road, Blythe, CA

PROJECT DESCRIPTION: The Project will replace an existing non-potable water production well and construct an additional well to be incorporated into the groundwater quality monitoring program.

PUBLIC AGENCY APPROVING PROJECT: County

PROJECT SPONSORS: Department of Waste Resources (RCDWR)

The project is exempt from the provisions of CEQA, specifically by the State CEQA Guidelines as identified below. The project will not result in any specific or general exceptions to the use of categorical exemptions as detailed under State CEQA Guidelines section 15300.2. The project will not cause any impacts to scenic resources, historic resources, or unique sensitive environments. Further, no unusual circumstances or potential cumulative impacts would occur that may reasonably create a direct or reasonably foreseeable indirect physical environmental impact.

EXEMPT STATUS:

- ☐ Ministerial
- ☐ Declared Emergency
- ☐ Emergency Project
- ☐ Statutory Exemption:
- ☒ Categorical Exemption

Section 15301, Existing Facilities; 15302, Replacement and Reconstruction; 15303, New Construction or Conversion of Small Structures; 15304, Minor Alterations to Land
Section 15061(b)(3), General Rule Exemption

- ☒ Other Exemption:

REASONS FOR EXEMPTION:

Section 15061(b)(3) - General Rule Exemption

The activity is covered by the general rule that CEQA applies only to projects, which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.

This project is exempt under Section 15061(b)(3) because:

The Project proposes to replace an existing non-potable water production well and construct an additional well to be incorporated into the groundwater quality monitoring program currently being implemented at the Blythe Sanitary Landfill (BSL) in accordance with California Regional Water Quality Control Board – Colorado Region (CRWQCB) Waste Discharge Requirement Order No. R7-2020-0005. Replacement of the production well is a measure to re-establish an on-site water source to provide facility fire protection and maintain dust control efforts to protect air quality for the surrounding area. The Project would not have a direct, indirect, or cumulatively significant effect on the environment or environmental resources. As such, the Project meets the scope and intent of Section 15061(b)(3), General Rule Exemption.

Based upon the entire record, the Project would not result in the potential for any significant effect on the environment. This determination is an issue of fact and sufficient evidence exists in the record that the activity will not have a significant effect on the environment. As such, the exemption applies and no further evaluation under CEQA is required. See *Muzzy Ranch Co. v. Solano County Airport Land Use Comm'n* (2007) 41 Cal. 4th 372.

Section 15301, Existing Facilities

Class 1 consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination.

This project is exempt under Section 15301 because:

The Project proposes to replace an existing non-potable water production well and construct an additional well to be incorporated into the groundwater quality monitoring program. The existing production well provided the BSL with an on-site water source for performing dust control, fire protection, and soil conditioning activities in support of landfill operations. The Project involves no expansion of approved uses. As such, the Project is found not to affect any environmental resources; therefore, the Project meets the scope and intent of Section 15301, Categorical Exemption.

Section 15302, Replacement and Reconstruction

Class 2 consists of replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced.

This project is exempt under Section 15302 because:

The project will convert the existing production well into possible use as a groundwater quality monitoring well and construct a new non-potable production well using a casing consisting of non-corrosive materials. The project includes the installation of a monitoring well immediately adjacent to the liquid waste ponds. The Project will occur in an existing permitted area. Therefore, the Project as proposed meets the scope and intent of the Class 2 Categorical Exemption.

15303, New Construction or Conversion of Small Structures

Class 3 consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure.

This project is exempt under Section 15303 because:

The Project proposes to install a 12,000 gallon above-ground water storage tank to provide on-site water storage for operational use and emergency fire suppression. The proposed contract work is located within the permitted landfill disturbance areas. This work would not have a direct, indirect, or cumulatively significant effect on the environment. The project as proposed meets the scope and intent of the Class 3 Categorical Exemption.

15304, Minor Alterations to Land

Class 4 consists of minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes.

This project is exempt under Section 15304 because:

Drilling of the two (2) wells for the project will be performed by a contractor with a C-57 Well Drilling license as issued by the California Contractors State License Board and constructed in accordance with all applicable regulatory requirements. Due to the previous disturbance and current use of the site, no healthy, mature, scenic trees are present in the project area. Therefore, the Project as proposed meets the scope and intent of the Class 4 Categorical Exemption.

FINDINGS:

1. Based upon the identified exemptions and justifications above, the RCDWR, on behalf of the County, hereby concludes that no physical environmental impacts are anticipated to occur and the Project as proposed is exempt under CEQA. No further environmental analysis is warranted.
2. The proposed Project is exempt from CEQA pursuant to Section 15061(b)(3), and categorically exempt from CEQA pursuant to Section 15301, 15302, 15303, and 15304.
3. It can be seen with certainty that there is no possibility that this Project would have a direct, indirect, or cumulatively significant effect on the environment; therefore, the activity is exempt under CEQA as previously identified.

If there are any questions regarding the above matter, I can be reached at (951) 486-3200.

**Hans Kernkamp, General Manager - Chief Engineer
Riverside County Department of Waste Resources**

By: _____

Ryan Ross

Title: _____
Planning Division Manager

Date: _____
September 19, 2022



CONTRACT DOCUMENTS

FOR THE

CONSTRUCTION OF GROUNDWATER WELLS

AT THE

BLYTHE SANITARY LANDFILL

JULY 2022

FORM APPROVED COUNTY COUNSEL

BY: Lisa Sanchez 9/15/2022
LISA SANCHEZ DATE