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May 30, 2018

Addendum No.: 1

City Project No. 17-22, North Valley Regional Recycled Water Pipeline – Turlock Component

Plan holders:

Addendum No. 1 has been prepared by Carollo Engineers and is attached hereto and consists of 218 pages:

Page 1-2	Cover
Page 3-4	Table of Contents
Page 5-213	Changes to specifications
Page 214-218	Changes to drawings

If you have any questions, please contact me at (209) 668-5417 or email at sfremming@turlock.ca.us.

Sincerely,

Stephen Fremming
Senior Civil Engineer



CITY OF TURLOCK
TURLOCK, CA

NORTH VALLEY REGIONAL RECYCLED WATER PROGRAM

CLIENT PROJECT NO. 17-22A

**ADDENDUM NO. 1
TO THE
CONTRACT DOCUMENTS**

May 2018



Bid Set Signed by:

Civil

Darren G. Baune, P.E.
Carollo Engineers, Inc.
CA PE No. 68899

Civil and Mechanical

Jonathon P. Marshall, P.E.
Carollo Engineers, Inc.,
CA PE No. 73265

Civil - Structural

Inderpreet Kaur Chagger, P.E.
Carollo Engineers, Inc.,
CA PE No. 80512

Electrical and Instrumentation

Carollo Engineers, Inc.,
Ashritha Banapuram, P.E.
CA PE No. 21815

Cathodic Protection & Corrosion

J. Darby Howard, Jr., P.E.
JDH Corrosion Consultants, Inc.
CA Corrosion PE No. 1055

Electrical - Generator

Kevin L. Pezzoni, P.E.
Miller Pezzoni & Associates, Inc.
CA PE No. 16269



Bidders on the above-named project are hereby notified that the Bidding Documents are modified as indicated below. Bidders are required to acknowledge receipt of this Addendum in the space provided on the Document 00410 Bid Form.

This Addendum No. 1 shall become part of the Contract and provisions of the Contract apply.

SPECIFICATIONS

The following sections are modified as indicated below.

1. DOCUMENT 00410 - BID FORM:
 - a. REPLACE section in its entirety with the attached section.
2. DOCUMENT 00507 - DBE GOOD FAITH EFFORT VERIFICATION:
 - a. REPLACE section in its entirety with the attached section.
3. DOCUMENT 00520 – AGREEMENT:
 - a. REPLACE section in its entirety with the attached section.
4. SECTION 01140 – WORK RESTRICTIONS
 - a. REPLACE section in its entirety with the attached section.
5. SECTION 01550 – TRAFFIC CONTROL SPEC WITH ALMENDARIZ UPDATES:
 - a. REPLACE section in its entirety with the attached section.
6. SECTION 02233 - SETTLEMENT MONITORING:
 - a. REPLACE section in its entirety with the attached section.
7. SECTION 02300 – EARTHWORK:
 - a. REPLACE section in its entirety with the attached section.
8. SECTION 02312 – CONTROLLED LOW STRENGTH MATERIAL (CLSM):
 - a. REPLACE section in its entirety with the attached section.
9. SECTION 02318 – TRENCHING:
 - a. REPLACE section in its entirety with the attached section.
10. SECTION 02467A – DRILLED CONCRETE PIERS:
 - a. REPLACE section in its entirety with the attached section.
11. SECTION 02742A – ASPHALTIC CONCRETE PAVING:
 - a. REPLACE section in its entirety with the attached section.
12. SECTION 05190 - MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY:
 - a. REPLACE section in its entirety with the attached section.
13. SECTION 09960 – HIGH-PERFORMANCE COATINGS:
 - a. REPLACE section in its entirety with the attached section.
14. SECTION 15052 – COMMON WORK RESULTS FOR GENERAL PIPING:
 - a. REPLACE section in its entirety with the attached section.

15. SECTION 15277 – STEEL TRANSMISSION PIPE: WELDED, GREATER THAN 22-INCH DIAMETER, AWWA C200:
 - a. REPLACE section in its entirety with the attached section.
16. SECTION 15956 – PIPING SYSTEMS TESTING:
 - a. REPLACE section in its entirety with the attached section.
17. ADD attached APPENDIX E – INCIDENTAL TAKE PERMIT in its entirety.
18. ADD attached APPENDIX R – DEWATERING AGREEMENT - GIOLETTI in its entirety.

DRAWINGS

The following drawings will be “replaced with the attached drawings” as part of Addendum 1:

1. Drawing: G08
Narrative of Edit: Revised hawk buffer areas.
2. Drawing: G09
Narrative of Edit: Added information for disposal of dewatering water to Gioletti property.
3. Drawing: G10
Narrative of Edit: Added information for disposal of dewatering water to Gioletti property.
4. Drawing: P22
Narrative of Edit: Morris property temporary construction easement has been updated.
5. Drawing: P23
Narrative of Edit: Morris property temporary construction easement has been updated.

DOCUMENT 00410

BID FORM

ARTICLE 1 - BID RECIPIENT

1.01 Project Identification:

City of Turlock
Development Services Department/Engineering Division
North Valley Regional Recycled Water Program
Turlock Component
City of Turlock Project No. 17-22A

1.02 This Bid is submitted to:

City of Turlock
Development Services Department/Engineering Division
156 South Broadway, Suite 150
Turlock, CA 95380 - 5454

1.03 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents within the specified time and for the price indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENT

2.01 Bidder accepts all of the terms and conditions of Document 00200 - Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

- A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work
- C. Bidder is familiar with and has satisfied itself as to all Federal, state, and local Laws and Regulations and Permits that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all:
 - 1. reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and
 - 2. reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on
 - 1. the cost, progress, and performance of the Work;
 - 2. the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and
 - 3. Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing the Work required by the Bidding Documents.
- J. In accordance with Section 1861, California Labor Code, the Bidder states the following as its certification:
- K. "I am aware of the provisions of Section 3700 of the California 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."

ARTICLE 4 - BIDDER'S CERTIFICATION

4.01 Bidder further represents:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this paragraph:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made:
 - a. to influence the bidding process to the Owner's detriment,
 - b. to establish bid prices at artificial non-competitive levels, or
 - c. to deprive Owner of the benefits of free and competitive bidding process.
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
 - 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.
 - 5. Pursuant to California Public Contract Code Section 7103.5(b), Contractor or Subcontractor shall offer and agree to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code).

ARTICLE 5 - ASSIGNMENTS AND ALLOWANCES

5.01 No assignments are used on this project.

5.02 Bidder shall provide the Owner with an allowance for Bid Items 36, 37, 38, and 39. The Owner, at Owner's option, will use this allowance for work described in Section 01270 for each Bid Item. For allowance work, the Contractor shall submit the appropriate invoices to the Owner with pay requests. Allowance are included in the unit price schedule in accordance with Section 01210 - Allowances of the General Requirements.

ARTICLE 6 - BASIS OF BID

6.01 Bidder will complete the Work in accordance with the Contract Documents for the following Unit Price Bid of:

BASE BID					
Item Number	Description	Unit	Estimated Quantity	Unit Price	Total Amount
1	Mobilization and Demobilization (Not to be Greater than 4% of the Total Unit Price Bid)	LS	1	\$	\$
2	Relocate AT&T Facilities	LS	1	\$	\$
3	42-inch Pipeline including excavation, installation, pipeline material, joint welding, compaction, and backfill (Bid item does not include sheeting, shoring, and bracing) Enter the Unit Price and Total Amount for only one of the pipeline materials (Item 3a or 3b)				
	3a 42-inch Steel Pipeline from STA 10+00 to STA 386+20 and from STA 387+00 to STA 387+57. (Enter \$0 if a Steel Pipeline is not Proposed in this Bid)	LF	37,307	\$	\$
	3b 42-inch Ductile Iron Pipeline from STA 10+00 to STA 386+20 and from STA 387+00 to STA 387+57. (Enter \$0 if a Ductile Iron Pipeline is not Proposed in this Bid)	LF	37,307	\$	\$
4	42-inch Steel Pipeline from STA 386+20 to STA 387+00.	LF	80	\$	\$
5	Launching Shaft for Microtunnel from STA 47+80 to STA 50+60	LS	1	\$	\$
6	Receiving Shaft for Microtunnel from STA 47+80 to STA 50+60	LS	1	\$	\$
7	Microtunneling Installation from STA 47+80 to STA 50+60	LS	1	\$	\$
8	Launching Shaft for Microtunnel from STA 183+80 to STA 184+40	LS	1	\$	\$
9	Receiving Shaft for Microtunnel from STA 183+80 to STA 184+40	LS	1	\$	\$
10	Microtunneling Installation from STA 183+80 to STA 184+40	LS	1	\$	\$
11	Launching Shaft for Microtunnel from STA 235+57 to STA 237+87	LS	1	\$	\$

BASE BID					
Item Number	Description	Unit	Estimated Quantity	Unit Price	Total Amount
12	Receiving Shaft for Microtunnel from STA 235+57 to STA 237+87	LS	1	\$	\$
13	Microtunneling Installation from STA 235+57 to STA 237+87	LS	1	\$	\$
14	Air Valve Assemblies - Above Ground	EA	1	\$	\$
15	Air Valve Assemblies - Below Ground	EA	22	\$	\$
16	Inspection Manway	EA	21	\$	\$
17	Blow-Off Valves	EA	22	\$	\$
18	Pipe Trench Cutoff Walls	EA	36	\$	\$
19	Cathodic Protection System for the pipeline material selected in Bid Item 3. (Note that the cathodic protection system is dependent on the type of pipe selected in Bid Item 3).	LS	1	\$	\$
20	Modesto Effluent Pump Station Site - Site Work, Yard Piping, Electrical, Instrumentation, and all other Miscellaneous Work.	LS	1	\$	\$
21	Flow Control Valve Vault, including all Civil, Structural, Mechanical, HVAC, Electrical, and Instrumentation Work.	LS	1	\$	\$
22	Turlock Outfall Site - Site Work, Yard Piping, Electrical, Instrumentation, and all other Miscellaneous Work.	LS	1	\$	\$
23	Flow Meter Vault, including all Civil, Structural, Mechanical, Electrical, and Instrumentation Work.	LS	1	\$	\$
24	RTU and SCADA Work Performed by HSQ Technology described by HSQ Quote No. 1804-0008-MP dated April 23, 2018 attached to Section 17050.	LS	1	\$315,900	\$315,900

BASE BID					
Item Number	Description	Unit	Estimated Quantity	Unit Price	Total Amount
25	Permanent Asphalt Pavement Replacement at Roadway Crossings	SY	328	\$	\$
26	Jennings Road 3" Asphalt Pavement Grind and Overlay	SY	9,663	\$	\$
27	West Main Avenue and South Carpenter Road 3" Asphalt Pavement Grind and Overlay	SY	38,018	\$	\$
28	Jennings Road Asphalt Pavement Striping	LS	1	\$	\$
29	West Main Avenue and South Carpenter Road Asphalt Pavement Striping	LS	1	\$	\$
30	Traffic Management	LS	1	\$	\$
31	Dust Control	LS	1	\$	\$
32	Harding Drain Bypass Pump Station Backup Generator	LS	1	\$	\$
33	Dewatering for Trenches and Open Excavations	LS	1	\$	\$
34	Payment for Use of Private Property to Dispose of Dewatering Water	LS	1	\$	\$
35	Surveying, Field Engineering, and Monument Preservation per Section 01722.	LS	1	\$	\$
36	Allowance for Stanislaus County and City of Modesto Encroachment Permit Fees	LS	1	\$75,000	\$75,000
37	Allowance for Culvert Repairs	LS	1	\$50,000	\$50,000
38	Allowance for Unknown Utilities	LS	1	\$50,000	\$50,000
39	Allowance for Disputes Review Board per Section 00820	LS	1	\$20,000	\$20,000
40	Project Partnering per Section 01305.	LS	1	\$	\$

BASE BID					
Item Number	Description	Unit	Estimated Quantity	Unit Price	Total Amount
41	Sheeting, Shoring, and Bracing, or Equivalent Method for the Protection of Life and Limb in Trenches and Open Excavation, Pursuant to California Labor Code §6707 and Section 02260.	LS	1	\$	\$
42	All Work required to completed the project that is not Included in Bid Items 1 - 41)	LS	1	\$	\$
Total	Total Unit Price Bid (Bid Items 1 - 42)				
	\$_____				\$_____
	(in words)				(in figures)

6.02 Bid Alternatives

- A. Bidder offers to make, at the bid alternate prices following, the changes in the Work covered by the Unit Prices that are specified in the bid alternates priced below.
- B. It is understood that:
 1. All bid alternate prices must be filled in.
 2. The acceptance or rejection of any or all of these bid alternates is at the option of Owner.
 3. Acceptance or rejection of bid alternates will not necessarily be made on the basis of price alone.
 4. The acceptance or rejection of one or more bid alternates will not affect the Lump Sum Bid Price, nor other conditions of this Bid, nor the price of other accepted bid alternates.
 5. The addition or deduction shown herein for each bid alternate is the net addition or net deduction that is to be applied to the Lump Sum Bid Price of the undersigned if the bid alternate is accepted by Owner.
 6. The Contract Price shall be the net amount determined by applying the bid alternate prices of all accepted bid alternates to the Total Unit Price Bid.
- C. **Bid Alternate A - Pave All of Jennings Road (add):** Bidder agrees to add to the Total Unit Price Bid the amount shown below for all labor, equipment, materials, insurance, permits, traffic control, and all other work necessary to install a 3-inch asphalt pavement grind and overlay, including striping, over entire paved area of Jennings Road (both lanes) from West Taylor Road to West Main Avenue. The work of this Bid Alternate shall not include the pavement and striping work identified in the Base Bid. For bidding purposes, Bidders shall assume the total quantity of existing pavement on Jennings Road from West Taylor Road to West Main Avenue is 15,000 linear feet long and 24 feet wide (40,000 SY). The Base bid quantity of pavement work on Jennings Road (9,663 SY) shall be deducted from the total quantity for an estimated bid alternate quantity of 30,337 SY. The locations and types of striping shall match existing.

Description	Unit	Estimated Quantity	Unit Price	Total Amount
Bid Alternate A	SY	30,337	\$	\$

- D. **Bid Alternate B - Restrain the Pipeline Only Where Required for Thrust Restraint (deduct):** Bidder agrees to reduce to the Total Unit Price Bid the amount shown below for all labor, equipment, materials, insurance permits, traffic control, and all other work necessary to only restrain the pipeline where required for thrust restrain as shown on Drawing TP08. Note that at bell and spigot joints bonding cables are required. This Bid Alternate is a deduction from the Base Bid, which requires restraining the entire pipeline.

Description	Unit	Estimated Quantity	Unit Price	Total Amount
Bid Alternate B	LS	1	\$	- \$

- E. **Bid Alternate C - Payment for Use of Gioletti Property (APN 058-002-005) to Dispose of Dewatering Water:** The City of Turlock is currently negotiating an agreement to allow dewatering water to be disposed at the Gioletti Property (APN 058-002-005). Because the agreement has not yet been executed, the use of this property is being provided as a bid alternate. ^{AD1}

Bidder agrees to add to (or subtract if a negative value is provided) the Total Unit Price Bid the amount shown below for use of the private property belonging to Gioletti (APN 058-002-005). If the Contractor elects to use this property for disposal of dewatering water, this bid alternate shall include the total cost of the "Payment Terms" for the property included in the terms of the tentative agreement titled, "Agreement to Take Delivery of Trench Dewatering Water, North Valley Regional Recycled Water Project" and located in Volume 4 of the Contract Documents. The "Payment terms" are included in Section 1 of the agreement. If the Contractor elects not to use this property for groundwater disposal, enter a value of \$0 for this bid item. ^{AD1}

Description	Unit	Estimated Quantity	Unit Price	Total Amount
<u>Bid Alternate C</u>	<u>LS</u>	<u>1</u>	<u>\$</u>	<u>\$</u> ^{AD1}

ARTICLE 7 - TIME OF COMPLETION

- 7.01 Bidder agrees that the Work will be substantially completed, and, completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days as specified in Document 00520 - Agreement.

- 7.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified above, which shall be as specified in Document 00520 - Agreement.

ARTICLE 8 - ATTACHMENTS TO THIS BID

- 8.01 The following documents are attached to and made a condition of this Bid:
- A. Required Bid security in the form of cash, a certified or bank check, or a Bid Bond as specified in Document 00432 - Bid Bond.
 - B. Document 00434 - Proposed Subcontractors Form.
 - C. Document 00436 - List of Equipment Manufacturers.
 - D. Document 00451 - Construction Contractor's Required Qualifications and Statement.
 - E. Document 00452 - Affirmative Action Program Certificate.
 - F. Document 00456 - Non-Collusion Affidavit.
 - G. Document 00458 - Certification of Drug-Free Workplace Requirements.
 - H. Document 00500 - Iran Contracting Act Certification
 - I. Document 00501 - American Iron and Steel Certification
 - J. Document 00502 - Anti-Lobbying Certification
 - K. Document 00505 - Prevailing Wage Statement
 - L. Document 00506 - Public Works Contractor Registration Certification
 - M. Document 00507 - DBE Good Faith Effort Verification

(Submit form 00507 within 3 days of bid opening)

(Submit Attachments 4500-3 and 4500-4 with Bid)

ARTICLE 9 - DEFINED TERMS

- 9.01 The terms used in this Bid with initial capital letters or all capital letters have the meanings as specified in Document 00200 - Instructions to Bidders, General Conditions, and Supplementary Conditions.

ARTICLE 10 - BID SUBMITTAL

SUBMITTED on _____, 20__.

State Contractor License Number _____. (If applicable)

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

Business address: _____

Phone Number: () _____ FAX Number: () _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____

Phone Number: () _____ FAX Number: () _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability):

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest: _____
(Signature of Corporate Secretary, Acting Secretary or other officer)

Business address: _____

Phone Number: () _____ FAX Number: () _____

Date of Qualification to do business is _____

A Joint Venture

Joint Venturer Name: _____

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone Number: () _____ FAX Number: () _____

Joint Venturer Name: _____

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

Phone Number: () _____ FAX Number: () _____

Phone and FAX Number, and Address for receipt of official communications:

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

END OF DOCUMENT

DOCUMENT 00507

DBE GOOD FAITH EFFORT VERIFICATION

SUBMIT ~~DOCUMENT 00507 FORM 00-45-36~~^{AD1} WITHIN 3 DAYS OF BID OPENING.
SUBMIT ATTACHMENTS 4500-3 AND 4500-4 WITH BID

Project: _____ Bid Opening Date: _____
Bidder Name: _____ Bidder Phone Number: _____
Bidder Address: _____

Owner, in accordance with 40 CFR part 33, requires bidders to provide information pertaining to the use of minority businesses, women's business enterprises, and labor surplus area firms (referred to herein as "DBEs").

Please provide the following information, using additional sheets of paper if necessary, and submit this form with your bid. Bidder should also submit mail logs, phone logs, electronic searches and communication, newspaper clippings or similar records documenting efforts to meet the Good Faith Effort requirements.

1. Solicitation Lists/Publications. The names and dates of each publication in which a request for DBE participation for this project was placed by the bidder (please attach copies of advertisements or proofs of publication), or information related to solicitation lists on which DBEs were included. Postings/publications shall be at least 30 days before the bid ~~opening/closing~~^{AD1} date.

Publications/Solicitation Lists	Date of Advertisement

2. Soliciting DBEs as Potential Sources. The names and dates of written notices sent to certified DBEs soliciting bids for this project and the dates and methods used for following up initial solicitations to determine with certainty whether the DBEs were interested (please attach copies of solicitations, telephone records, fax confirmations, etc.):

Name of DBEs Solicited	Date of Initial Solicitation	Follow-up Methods and Dates

3. Division of Requirements. The items of work which the bidder made available to DBE firms including, where appropriate, any breaking down of the contract work items (including those items normally performed by the bidder with its own forces) into economically feasible units to facilitate DBE participation. It is the bidder's responsibility to demonstrate that sufficient work to facilitate DBE participation was made available to DBE firms.

Items of Work	Bidder Normally Performs Them? (Yes/No)	Breakdown of Items	Amount (\$)	Percentage of Contract (%)

4. Delivery Schedules. Efforts made to establish delivery schedules or break down work items, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises:

5. Services of Other Agencies. The names of agencies, organizations or groups contacted to provide assistance in contacting, recruiting and using DBE firms, such as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce (please attach copies of requests to agencies and any responses received, i.e., lists, Internet page download, etc.):

Name of Agency/Organization	Method/Date of Contact	Results

6. DBE Forms. Complete the attached State Water Resources Control Board forms **4500-3** (DBE Subcontractor Performance Form) and **4500-4** (DBE Subcontractor Utilization Form) and submit with the bid.

7. Additional Data. Provide any additional data to support a demonstration of good faith efforts (use additional sheets if necessary):

END OF DOCUMENT

AD1 Addendum No. 1



Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE¹ subcontractor's² description of work to be performed and the price of the work submitted to the prime contractor. A Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractor's bid or proposal package.

Subcontractor Name		Project Name	
Bid / Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity	

Contract Item Number	Description of Work Submitted from the Prime Contractor Involving Construction, Services, Equipment or Supplies	Price of Work Submitted to the Prime Contractor
DBE Certified By: <input type="checkbox"/> DOT <input type="checkbox"/> SBA <input type="checkbox"/> Other: _____		Meets/exceeds EPA certification standards? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Unknown

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	Date

Subcontractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.



Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE¹ subcontractor's² and the estimated dollar amount of each subcontract. A Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name	
Bid / Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact	
Address			
Telephone No.		Email Address	
Issuing/Funding Entity			

<p>I have identified potential DBE certified subcontractors. <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If yes, please complete the table below. If no, please explain:</p>			
Subcontractor Name/ Company Name	Company Address / Phone / Email	Estimated Dollar Amount	Currently DBE Certified?

--Continue on back if needed--

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

DOCUMENT 00520

AGREEMENT

THIS AGREEMENT is by and between City of Turlock, a Municipal Corporation, (Owner) and _____ (Contractor). Owner and Contractor hereby agree as follows:

RECITALS

- A. Owner has taken appropriate proceedings to authorize construction of the public work and improvements herein provided and execution of this contract.
- B. A notice was duly published for bids for the contract for the improvements hereinafter described pursuant to Public Contract Code § 20164.
- C. On _____, 2018, after notice duly given, the City Council of the City of Turlock awarded the contract for the construction of the improvements hereinafter described to Contractor, which Contractor said Council found to be as the lowest responsive and responsible bidder for said improvements.
- D. Owner and Contractor desire to enter into this Agreement for the construction of said improvements.

ARTICLE 1 - WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents for completion of the Project.

ARTICLE 2 - THE PROJECT

- 2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as constructing approximately 7.2 miles of 42-inch diameter pipeline and appurtenances, 3 microtunnels, roadway restoration, a flow meter vault, flow control vault, and associated mechanical, electrical, and instrumentation equipment, and all work necessary to provide a complete and operational facility.

ARTICLE 3 - ENGINEER

- 3.01 The Project has been designed by Carollo Engineers, Inc. ("Design Engineer").

- 3.02 The Owner will retain a construction manager ("Construction Manager" or "CM") to act as Owner's representative.
- 3.03 The term "Engineer" shall refer to either the Construction Manager or Design Engineer based on their roles as defined in Section 00800, SUPPLEMENTARY CONDITIONS, and their separate contracts with the Owner.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the essence:

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Contract Times: Days:

- A. The Work will be substantially completed within ~~390~~ 480^{AD1} calendar days after the date when the Contract Times commence to run as provided in paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with paragraph 15.06 of the General Conditions within ~~420~~ 510^{AD1} calendar days after the date when the Contract Times commence to run.
- B. Parts of the Work shall be substantially completed consistent with the following Milestones:
1. Within 21 days of Notice to Proceed, submit for review and approval pipeline product data needed to order the pipeline material.
 2. Within 45 days of Notice to Proceed, commence potholing of existing utilities. Complete potholing activities within 75 days of Notice to Proceed.
 3. Within 21 days of completing potholing, submit for review and approval the pipeline layout drawings of the pipeline alignment.
 4. Within 90 days of Notice to Proceed, submit the dewatering plan, shoring plan, and traffic control plan for review and approval.
 5. All City of Modesto Jennings Ranch: All ground disturbing work within City of Modesto Jennings Ranch, generally defined as ~~all work between~~ the Modesto Effluent Pump Station site and pipeline installation through approximately STA 91+00 shall be completed between October 15, 2018 and February 28, 2019. These requirements also apply to the Temporary Construction Easement located south of West Main Avenue, from STA 181+00 to STA 187+00, which is City of Modesto Jennings Ranch property.^{AD1}
 6. Morris Property: Use of the Morris Property Temporary Construction Easement approximately located from STA 228+30 to STA 236+40 shall be limited to October 1, 2018 through March 31, 2019. All work, including site restoration, shall be completed within this work window.^{AD1}

4.03 Delay damages:

- A. Contractor and Owner recognize that time is of the essence as stated above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. Any deduction assessed as delay damages shall not relieve the Contractor from liability for any damages or costs resulting

from delays to other contractors on the project or other projects caused by a failure of the assessed Contractor to complete the work within the contract time. Due account shall be taken of any time extensions granted to the Contractor by the Owner. Permitting the Contractor to continue work beyond the contract completion date shall not operate as a waiver on the part of the Owner of any of its rights under the contract nor shall it relieve the Contractor from liability for any damages or costs resulting from delays to other contractors on the project or other projects caused by a failure of the assessed Contractor to complete the work within the contract time. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner \$5,000 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in this Agreement for Substantial Completion until the Work is substantially complete.
2. Completion of Remaining Work: After substantial completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$1,500 for each day that expires after such time until the Work is completed and ready for final payment.
3. Delay damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

4. Milestones:

4-a. Contractor shall pay Owner \$1,500 for each day that expires after the February 28, 2019 work window at the Modesto Jennings Ranch, specified above for achievement of Milestones, until that Milestone is achieved.

b. Milestones: Contractor shall pay Owner \$1,500 for each day that expires after the March 31, 2019 work window at the Morris Property, specified above for achievement of Milestones, until that Milestone is achieved. ^{AD1}

4.04 Special Damages:

- A. In addition to the amount provided for liquidated damages, Contractor shall reimburse Owner for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

- A. For all Work, a lump sum of:

\$

(in words)

(figure)

1. All specific cash allowances are included in the above price and have been computed in accordance with paragraph 13.02 of the General Conditions.

- B. For all Work, at the prices stated by Contractor's Bid, Document 00410 - Bid Form is attached hereto as an exhibit.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and processing of payments:

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Construction Manager as provided in the General Conditions.

6.02 Progress payments; retainage:

- A. Pursuant to Section 20104.50 of California Public Contract Code, Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment within 30 days after receipt during performance of the Work as provided in paragraphs below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract:
 - 1. Pursuant to Section 22300 of California Public Contract Code, Contractor has the option to deposit securities with an Escrow Agent as a substitute for retention of earnings required to be withheld by Owner. For Escrow Agreement see Document 00602B Agreement §2230.
 - 2. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to delay damages, in accordance with the Contract:
 - a. 95 percent of Work completed (with the balance being retainage), pursuant to California Public Contract Code §7201. Release of all retention withheld shall occur within thirty five (35) to sixty (60) days after the Notice of Completion has been recorded in compliance with the Code of Civil Procedure of the State of California.

6.03 Final Payment:

- A. Upon final completion and acceptance of the Work, in accordance with paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Construction Manager.

ARTICLE 7 - INTEREST

- 7.01 All amounts not paid when due shall bear interest at the legal rate unless otherwise specified according to California law.

ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and any data and reference items identified in the Bidding Documents.

- B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all:
 - 1. Reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and
 - 2. Reports and drawings relating to Hazardous Environmental Condition, if any, at or adjacent to the Site which has been identified in the Supplementary Conditions especially with respect to Technical Data in such reports and drawings.
- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on:
 - 1. The cost, progress, and performance of the Work.
 - 2. The means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and
 - 3. Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception, all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents:

- A. The Contract Documents consist of the following:
 - 1. Document 00100 - Advertisement for Bids.

2. Document 00200 - Instructions to Bidders.
3. Document 00300 - State Revolving Fund and Proposition 1 Funding Requirements
4. Document 00520 - Agreement.
5. Document 00612 - Performance Bond.
6. Document 00614 - Payment Bond.
7. Document 00700 - General Conditions.
8. Document 00800 - Supplementary Conditions.
9. Specifications as listed in the table of contents of the Project Manual.
10. Drawings as listed on the sheet index.
11. Addenda (numbers ____ to ____, inclusive).
12. Current version of City Standard Drawings and Specifications published at the time bids are due.
13. Exhibits to this Agreement (enumerated as follows):
 - a. Document 00410 - Bid Form completed by the Contractor.
 - b. Document 00434 - Proposed Subcontractors Form.
 - c. Document 00436 - List of Equipment Manufacturers.
 - d. Document 00451 - Construction Contractor's Required Qualifications and Statement.
 - e. Document 00452 - Affirmative Action Program Certificate.
 - f. Document 00456 - Non-Collusion Affidavit.
 - g. Document 00458 - Certification of Drug-Free Workplace Requirements.
 - h. Document 00500 - Iran Contracting Act Certification
 - i. Document 00501 - American Iron and Steel Certification
 - j. Document 00502 - Anti-Lobbying Certification
 - k. Document 00505 - Prevailing Wage Statement
 - l. Document 00506 - Public Works Contractor Registration Certification
 - m. Document 00507 - DBE Good Faith Effort Verification
 - n. Document 00823 - Escrow Bid Documents.
 - o. Conformed Bid.
14. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Document 00550 - Notice to Proceed.
 - b. Executed change orders.

B. There are no Contract Documents other than those listed in this Document.

C. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms:

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract:

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the

effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns:

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability:

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Procurement contract(s):

None.

10.06 Contractor's Certifications:

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract:
 - 1. "Corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - 2. "Fraudulent practice" means an intentional misrepresentation of facts made:
 - a. To influence the bidding process or the execution of the Contract to the detriment of Owner.
 - b. To establish Bid or Contract prices at artificial non-competitive levels.
 - c. To deprive Owner of the benefits of free and open competition.
 - 3. "Collusive practice" means a scheme or arrangement between 2 or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels.
 - 4. "Coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

- 10.07 In accordance with Section 1775, California Labor Code, Contractor shall forfeit to Owner, as a penalty, not more than \$50 for each calendar day, or portion thereof, for each worker paid, either by Contractor or any subcontractor, less than the prevailing rates as determined by the Director of California Department of Industrial Relations for the Work.

- 10.08 In the performance of the Work, a day's work shall be 8 hours of labor in any workday and 40 hours in any work week and any other work as required by Section 510, California Labor Code, and Contractor shall further conform to the requirements of Section 1813, California Labor Code, or forfeit to Owner, as a penalty, the sum of \$25 for each worker employed in the execution of the Work by Contractor or any subcontractor, for each day during which any worker is required or permitted to labor more than 8 hours in any workday or more than 40 hours in any 1 calendar week in violation of Section 510.
- 10.09 Contractor shall carry workers' compensation insurance and require subcontractors to carry workers' compensation insurance as required by Section 3700, California Labor Code.
- 10.10 Pursuant to California Labor Code Section 6705, excavation of any trench or trenches 5 feet or more in depth, involving estimated expenditures in excess of \$25,000 shall require, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection prepared by a registered civil or structural engineer.
- 10.11 Contractor registration:
- A. Project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations (DIR).
- 10.12 Pursuant to Section 1770 et seq., California Labor Code, the successful Bidder shall pay not less than the prevailing rate of per diem wages as determined by the Director of California Department of Industrial Relations. A copy of such prevailing rate is on file at the offices of the City of Turlock, California which copy will be made available for examination during business hours to any party on request.
- 10.13 Contractor, by signing this Agreement, certifies the following: "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."
- 10.14 Nothing in this Agreement shall prevent Contractor or any Subcontractor from employing properly registered apprentices in the execution of the Agreement. Contractor shall have responsibility for compliance with California Labor Code Section 1777.5 for all apprenticeable occupations.
- 10.15 Other Provisions:
- A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, in the Supplementary Conditions.
- 10.16 Other Contracts:
- A. Owner may award other contracts for additional work, and Contractor shall fully cooperate with such other Contractors and carefully fit Contractor's own work to that provided under

other contracts as may be directed by the City Engineer. Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor.

10.17 Provisions Cumulative:

- A. The provisions of this agreement are cumulative, and in addition to and not in limitation of, any other rights or remedies available to City.

10.18 Notices:

- A. All notices shall be in writing and delivered in person or transmitted by certified mail, postage prepaid.

Notices required to be given to Owner shall be addressed as follows:

City of Turlock
City Engineer
156 S. Broadway, Suite 150
Turlock, CA 95380-5461

Notices required to be given to Contractor shall be addressed as follows:

Notices required to be given to sureties of Contractor shall be addressed as follows:

10.19 Owner Contract Administrator:

- A. The Owner's contract administrator and contact person for this Agreement is:

Stephen Fremming
City of Turlock Engineering Division
156 S. Broadway, Suite 150
Turlock, California 95380
Telephone: (209) 668-5417
E-mail: sfremming@turlock.ca.us

10.20 Use of Owner Project Number

- A. The Contractor or subcontractor agrees to use the aforementioned Owner project number on all maps, drawings, submittals, billing, and written correspondence that involve Owner staff or contracted consultants. Nothing in this section shall preclude the Contractor or subcontractor from using their own project numbers for their own internal use.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____, 20____ (which is the Effective Date of the Agreement).

CONTRACTOR:

By: _____

Print Name

Address: _____

Phone: _____

Date: _____

Federal Tax ID or Social Security No.

OWNER:

CITY OF TURLOCK, a municipal corporation

By: _____

or

By: _____

Robert A. Talloni, Interim City Manager ^{AD1}

Date: _____

APPROVED AS TO SUFFICIENCY:

By: _____

Nathan Bray, Interim Development
Services Director / City Engineer

APPROVED AS TO FORM:

By: _____

Jose M. Sanchez, Interim City Attorney

ATTEST:

By: _____

Jennifer Land, City Clerk

(Attach Contractor Seal Here)

END OF DOCUMENT

^{AD1} Addendum No. 1

SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Requirements for sequencing and scheduling the Work affected by existing site and facility, work restrictions, and coordination between construction operations and plant operations.
- B. Related sections:
 - 1. Section 01110 - Summary of Work.
 - 2. Section 01324A - Progress Schedules and Reports.
 - 3. Section 01550 - Traffic Control Plan
 - 4. Section 01756 - Commissioning.

1.02 GENERAL CONSTRAINTS ON SEQUENCE AND SCHEDULING OF WORK

- A. Wastewater projects:
 - 1. The City of Turlock Regional Water Quality Control Facility (WQCF) is the primary means of treating domestic and industrial wastewater prior to discharging to San Joaquin River. Impairing the operational capabilities of the discharge facilities will result in serious environmental damage and monetary fines. Wastewater discharge facilities include the existing Harding Drain Bypass Pump Station, Harding Drain Bypass Pipeline, and standpipe structure.
 - 2. Conduct Work in a manner that will not impair the operational capabilities of essential elements of the discharge facilities.
 - 3. Conduct commissioning and process start-up activities as specified in Section 01756 in a manner that will not impair the operational capabilities of essential elements of the discharge facilities specified in the discharge permit.
- B. Work sequence and constraints:
 - 1. Utilize description of critical events in work sequence in this Section as a guideline for scheduling and undertaking the Work.
 - 2. Work sequence and constraints presented do not include all items affecting completion of the Work, but are intended to describe critical events necessary to minimize disruption of the existing facilities and to ensure compliance with discharge permit requirements.
- C. Instrumentation and controls process performance testing:
 - 1. After the Process Operational Period, test PCIS system as specified in Section 01756.

1.03 SHUTDOWN AND CONSTRUCTION CONSTRAINTS

- A. General shutdown constraints:
 - 1. The majority of Work activities can be accomplished without a shutdown.
 - 2. Apply to activities of construction regardless of process or work area.

3. Activities that disrupt plant or utilities operations must comply with these shutdown constraints.
 4. Organize work to be completed in a minimum number of shutdowns.
 5. Provide thorough advanced planning, including having required equipment, materials, and labor on hand at time of shutdown.
 6. Where required to minimize treatment process interruptions while complying with specified sequencing constraints, provide temporary pumping, power, lighting, controls, instrumentation, and safety devices.
 7. Final determination of the permitting of shutdowns will be the sole judgment of the Owner.
 8. Owner maintains the ability to abort on the day of the scheduled shutdown.
- B. General work limitations:
1. Activities that disrupt discharge facility operations are prohibited unless otherwise approved in writing by the Engineer.
- C. Shutdown activities:
1. Harding Drain Bypass Pipeline Tie-in:
 - a. Constructing the tie-in to the existing 36 inch flanged outlet on the Harding Drain Bypass Pipeline will require the existing pipeline to be shut down. Only one shutdown will be allowed for the tie-in and the shutdown shall not last more than 36 hours.
 - b. The shutdown can only be performed during the months of May through September and will be delayed if rain is forecasted within 3 days of the proposed shutdown.
 - c. The shutdown will not be allowed if the WQCF Holding Ponds are more than 25 percent full.
 - d. Provide written notification to the Construction Manager and Owner of the approximate shutdown date a minimum of 3 weeks in advance of the anticipated shutdown.
 - e. Contractor shall develop a Shutdown Plan and obtain approval prior to commencing the shutdown. The shutdown plan shall provide a detailed plan that describes specific work items to be performed prior to and during the shutdown including the purpose, time of execution, and special equipment needed. The shutdown plan shall include contingency measures and provisions for rapid return to service in the event that work progress difficulties are encountered or the WQCF needs to make an emergency return to service. Include information from relevant trades associated with the requested shutdown.
 - f. Request approval from Owner for the shutdown in writing, a minimum of 7 days in advance of anticipated shutdown and include documentation that shows the following requirements have been met:
 - 1) All materials required for the shutdown shall be onsite 7 days in advance of the shutdown. Materials include, but are not limited to the tie in piece of pipeline, isolation valve, insulating gasket set, and bolts and nuts. Contractor shall submit proof of materials being onsite as part of the Request.
 - 2) The tie-in piece of pipeline shall be fully welded, lined, pressure tested, and ready for installation.
 - 3) The isolation valve at the tie-in may be connected to the tie-in pipeline before or after it is connected to the existing Harding Drain Bypass Pipeline at the Contractors option.

- g. Once the shutdown begins, the Contractor shall work 24 hours per day, every day until the shutdown is completed.
 - h. Pipeline Dewatering:
 - 1) Once the Harding Drain Bypass Pipeline is shutdown, the pipeline will be full of water with a static head of 80 feet (elevation of the standpipe structure overflow weir).
 - 2) Contractor shall be responsible for dewatering the pipeline by pumping it from the upstream side of the overflow weir to the downstream side of the overflow weir, from where it will drain by gravity to the San Joaquin River. The City's existing discharge permit allows dewatering the pipeline using this method.
 - 3) Contractor shall expect to dewater approximately 1.5 million gallons of water.
 - 4) Tie-in to the existing 36 inch flanged outlet on the Harding Drain Bypass Pipeline shall not occur until the pipeline is completely dewatered.
2. Unplanned shutdowns due to emergencies are not defined in this Section.

1.04 COMPLIANCE WITH NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

- A. The existing facility is operating under the terms of a National Pollutant Discharge Elimination System permit issued by the State of California. This permit specifies the water quality limits that the plant must meet prior to discharge of effluent. A copy of the existing permit is on file for review at the City of Turlock Water Quality Control Facility.
- B. Perform work in a manner that will not prevent the existing facility from achieving the finished water quality requirements established by regulations.
- C. Bear the cost of penalties imposed on the Owner for discharge violations caused by actions of the Contractor.

1.05 OPERATIONS AND MAINTENANCE ACCESS

- A. Provide safe, continuous access to process control equipment for plant operations personnel.

1.06 UTILITIES

- A. Provide advance notice to and utilize services of Underground Services Alert (U.S.A.) for location and marking of underground utilities operated by utility agencies other than the Owner.
- B. Maintain electrical, telephone, water, gas, sanitary facilities, and other utilities within project work area. Provide temporary utilities when necessary.
- C. New yard utilities were designed using existing facility drawings.
 - 1. Field verification of utility locations was not performed during design.
 - 2. Services crossed or located nearby by new yard utilities may require relocation and possible shutdowns.
 - 3. Pipe alignments as indicated on the Drawings.

1.07 WORK SEQUENCE AND CONSTRAINTS

A. Environmental Constraints:

1. Mitigation, Monitoring, and Reporting (MMRP) Requirements:
 - a. The Contractor is required to comply with the MMRP Requirements included as an Appendix to the Contract Documents.
2. Contractor shall comply with the construction work requirements of all project permits and regulatory consultations, which are included in Volume 4 of the Contract Documents.
3. Contractor shall install Environmentally Sensitive Area (ESA) fencing in locations identified on the Drawings. The ESA fence shall consist of a red snow fence with a straw waddle at the bottom of the fence, staked into the ground.
4. Central Valley Regional Water Quality Control Board (CVRWQCB): 401 Water Quality Certification - Monthly Reporting:
 - a. Contractor shall submit a monthly report to the City and CVRWQCB as required in the 401 Water Quality Certification in Volume 4 of the Contract Documents - Section 1 of Page 7 of 8.
 - 1) Upon receipt of the Notice to Proceed, Contractor shall be responsible for submitting monthly reports.
 - 2) Submit monthly reports indicating that "No sampling was required" until any construction involves the following:
 - a) When performing any in-water work.
 - b) During the entire duration of temporary surface water diversions.
 - c) In the event that project activities result in any materials reaching surface waters.
 - d) When any activities result in the creation of a visible plume in surface waters.
 - b. Contractor shall submit an annual report to the City and CVRWQCB as required in the 401 Water Quality Certification in Volume 4 of the Contract Documents - Section 1 of Page 7 of 8.

5. Incidental Take Permit (ITP):

- a. The City has received a preliminary ITP from the California Department of Fish and Wildlife for the Swainson's Hawk. The preliminary ITP is provided in Appendix E.
- b. For bidding purposes, the Contractor shall assume:
 - 1) Swainson's Hawks will nest in locations where they have previously nested, as shown on Drawing G08.
 - 2) There is a 100-foot radius no disturbance buffer around each nest where no new work can begin once a hawk has nested.
 - 3) If work has already begun within the 100-foot radius buffer and a hawk nests, similar work will be allowed to continue within that buffer.
 - 4) The nesting period is from February 15 to September 15 each year.
 - 4)5) The City will hire a third party biologist to perform biological monitoring during construction. ^{AD1}
 - 6) The contractor shall comply with all terms of the ITP.
- c. ~~The City is currently finalizing approval of an ITP for Swainson's Hawk and Red Tailed Hawk with California Department of Fish and Wildlife, expected to be issued in June 2018.~~ ^{AD1}
- d. ~~Upon receipt of the ITP, Contractor shall comply with all ITP requirements.~~
- e. ~~For bid purposes, Contractor shall assume the following:~~

- ~~1) From March 1, 2018 to August 31, 2018, and from March 1, 2019 to August 31, 2019, the following work restrictions will be in place:~~
 - ~~a) Swainson's Hawk:^{AD1}~~
 - ~~(1) Potential work areas within 1/2 mile of a nest requires pre-construction biological surveys not more than 30 days prior to the start of construction within the 1/2 mile buffer area.~~
 - ~~(2) If a nest is found within the buffer area, Contractor shall allow 1 week for the City's biological consultant to relocate the Swainson's Hawk.~~
 - ~~(3) Work may proceed, once the nest is relocated.~~
 - ~~b) Red Tailed Hawk:~~
 - ~~(1) Potential work areas within 500 feet of a nest requires pre-construction biological surveys not more than 30 days prior to the start of construction within the 500 foot buffer area.~~
 - ~~(2) If a nest is found within the buffer area, Contractor shall allow 1 week for the City's biological consultant to relocate the Swainson's Hawk.~~
 - ~~(3) Work may proceed, once the nest is relocated.^{AD1}~~

5.6. Streambed Alteration Agreement:

- a. The City is currently finalizing approval of a streambed alteration agreement with the California Department of Fish and Wildlife. A draft streambed alteration agreement is included in the Volume 4 Appendices.
- b. Upon receipt of the streambed alteration agreement, Contractor shall comply with all agreement requirements.
- c. For bidding purposes, Contractor shall assume the draft streambed alterations agreement included in Volume 4 of the Contract Documents will remain unchanged.

7. Red Tailed Hawk:

- a. For bidding purposes, the Contractor shall assume:
 - 1) Red Tailed Hawks will nest in locations where they have previously nested, as shown on Drawing G08.
 - 2) There is a 100-foot radius no disturbance buffer around each nest where no new work can begin once a hawk has nested.
 - 3) If work has already begun within the 100-foot radius buffer and a hawk nests, similar work will be allowed to continue within that buffer.
 - 4) The nesting period is from February 15 to September 15 each year.
 - 5) The City will hire a third party biologist to perform biological monitoring during construction.^{AD1}

6.8. Valley Longhorn Elderberry Beetle:

- a. Work within 20 feet of the two identified Elderberry bushes is prohibited.
- b. On the ESA fence, Contractor shall install laminated 8.5-inch by 11-inch signs every 50 feet with the following language: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." Contractor shall maintain the signs for the duration of construction.
- c. Contractor shall water any dirt access roads adjacent to the shrub throughout the duration of construction to minimize dust.

B. Stanislaus County:

1. Obtain an encroachment permit from Stanislaus County.
 - a. A draft permit is included in the Appendix of these Contract Documents.

- C. Turlock Irrigation District (TID) - Irrigation and Drainage Pipelines:
1. Notify TID 2 weeks in advance of crossing a TID pipeline to coordinate timing of the crossing. TID irrigation pipelines are in operation approximately 1 to 2 days per week.
 2. Coordinate crossing of irrigation pipelines so that a crossing does not occur during the day(s) the irrigation pipeline is in operation.
- D. Turlock Irrigation District (TID) - 12kV and 115kV power lines:
1. Contractor shall contact TID prior to working near the power lines along the pipeline alignment and other areas.. Contractor shall perform work in accordance with TID's and California OSHA safety requirements. All costs associated with working near the powerlines or support of the power poles shall be born by the Contractor. The Contractor shall verify the following work restrictions with T1D. ^{AD1}
 - 4.2. When working near TID power lines follow all CAL-OSHA safety requirements and work setbacks.
 - 2.3. Equipment shall maintain a minimum separation distance from energized power lines, even if the power lines are covered with protection
 - 3.4. The minimum separation distance for lifting and hoisting equipment from a 12 kV power line is 10 feet.
 - 4.5. The minimum separation distance for lifting and hoisting equipment from a 115 kV power line is 13 feet.
 - 5.6. Work that involve a crane and or equipment which qualifies as a crane per CAL-OSHA must maintain 20 feet clearance from energized lines.
 - 6.7. TID requires a 1:1 slope (Horizontal:Vertical) for any excavation near TID power poles. For example, a trench or excavation 7 feet in depth requires is required to be 7 feet from the face of the TID power pole. The Contractor will need to design, submit and obtain TID approval prior to installation, and install a shoring system to support the TID power pole if work is closer to a pole than the 1:1 requirement.
- E. City of Modesto - Jennings Road:
1. Obtain an encroachment permit from the City of Modesto.
 - a. A draft permit is included in the Appendix of these Contract Documents.
 2. Notify the City of Modesto in writing 2 weeks in advance of working on Jennings Road.
 3. Notify the City of Modesto in writing 2 weeks in advance of crossing an irrigation or drain pipeline.
 - ~~4. Prior to crossing the City of Modesto irrigation or drain pipeline, procure and have on hand a repair kit for the irrigation or drain pipeline in case the pipeline is found damaged or construction damages the pipeline.~~ ^{AD1}
 - 5.4. There are no seasonal work restrictions for working on Jennings Road.
 - 6.5. Throughout construction on Jennings Road, post and maintain project signage that includes a 24-hour emergency contact telephone number.
 - 7.6. Develop a Traffic Control Plan per Section 01550.
- F. City of Modesto - Jennings Wastewater Treatment Plant (Plant):
1. The Plant is generally defined as the Modesto Effluent Pump Station site and pipeline installation through approximately STA 91+00.
 2. Ground disturbing work within the Jennings Treatment Plant shall only occur between October 15, 2018 and February 28, 2019.

3. Notify the City of Modesto in writing 2 weeks in advance of working on the Plant.
 4. All personnel on the Plant shall have a visible badge (provided by the Contractor) with their name, company, picture, and project name.
 5. All personnel on the Plant shall participate in a 1-hour Plant orientation and recycled water safety training from Plant staff.
 6. Contractor shall coordinate with Plant staff to comply with Plant security, work hours, and access requirements.
 7. Work in agricultural planting areas:
 - a. Separately stockpile topsoil and replace it upon completion of the work.
 - b. The Contractor shall hire a registered land surveyor to prepare a detailed topographic pre-and post-construction survey to not less than 0.5-foot contours to confirm the pre- and post-construction topography are identical. Make grade adjustments, as needed, so the post-construction topography matches the pre-construction topography.
 8. Throughout construction at the Plant, post and maintain project signage that includes a 24-hour emergency contact telephone number.
 9. Contractor shall comply with the Plant truck route and access plan shown on the Drawings.
 10. These requirements also apply to the Temporary Construction Easement located south of West Main Avenue from STA 181+00 to STA 187+00.
- G. South Carpenter Road, West Main Avenue, and Jennings Road Work Restrictions:
1. Develop a Traffic Control Plan per Section 01550.
- H. Existing irrigation and culvert crossings (including TID):
1. Contractor shall expect that irrigation and culvert pipes are not watertight and may leak. Contractor should expect approximately 25 gpm of leakage from each pipe; water from pipe leakage will need to be removed consistent with Section 02240.
 2. ~~Not~~Where indicated on the drawings, not less than 3 weeks prior to crossing ~~each~~ irrigation ~~pipeline~~pipelines and ~~culvert~~culverts, perform a CCTV inspection of the pipeline or culvert to determine its condition. In advance of CCTV inspection, coordinate with pipeline owner and Construction Manager for timing and restrictions of performing the CCTV inspection. For bidding purposes, assume CCTV access for each irrigation pipeline and culvert is within 300 feet of the crossing. ^{AD1}
 3. If the existing utility requires repair, replace the damaged piece of pipe with a new piece of pipe to match existing type and size with transition couplings or concrete collars to connect to the existing pipe.
 - a. If a corrugated metal culvert within the City of Modesto property requires repair, replace it with an ABS material pipe.
 - b. The amount of pipe to be repaired or replaced shall be determined by the Construction Manager and payment shall be made from the allowance included in Section 00410.
 - c. Following the repair, perform a low head pressure test after the repair is made per Section 15956 to confirm it is watertight.
 4. After crossing the utility (regardless if a repair was made), perform a post-construction CCTV to document the condition after construction has been completed.
- I. AT&T Relocation:

1. Contractor shall install conduit and pull boxes for AT&T to relocate the AT&T cable as shown in the drawings.
 2. Contractor shall comply with the terms of the AT&T contract in Volume 4 including the insurance requirements to add AT&T as an additional insured and to extend the warranty period for AT&T's conduit and pull boxes for 2 years following AT&T's acceptance of the facility.
- J. Abandon Groundwater Monitoring Well:
1. The groundwater monitoring well and piezometer instrumentation have been left in place for Contractors use to monitor the groundwater elevations during construction. Following construction, Contractor shall obtain and pay for a well abandonment permit from Stanislaus County (<http://www.stancounty.com/er/pdf/water-well-construction-and-destruction-application.pdf>), abandon the well per Stanislaus County requirements, and return the piezometer instrumentation to the Engineer.
- K. Morris Property Temporary Construction Easement ~~North of West Main Avenue~~ approximately from STA 228+~~7030~~ to STA 236+~~60.40~~.^{AD1}
1. The City is currently negotiating a Temporary Construction Easement (TCE) with the landowner. The final TCE will be provided to the Contractor when available.
 2. For bid purposes, the Contractor shall assume the TCE area shown on the drawings is only available for use from October ~~451~~, 2018 to March 31, 2019.
 3. The TCE is available for equipment and material staging and storage.^{AD1}
 4. The Contractor shall submit for review and approval a plan to protect the soil within the TCE from mixing with any other material, restoring the soil to 85% relative compaction, and restoring the topography to pre-construction conditions. The Contractor shall hire a registered land surveyor to prepare a detailed topographic pre-and post-construction survey to not less than 0.5-foot contours to confirm the pre- and post-construction topography are identical. Make grade adjustments, as needed, so the post-construction topography matches the pre-construction topography.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

^{AD1} Addendum No. 1

SECTION 01550

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor's responsibilities regarding the Traffic Control Plan during the construction period shall include labor, material, equipment, tools, and services used in the regulation of construction traffic to and from the project site as well as public vehicular and pedestrian traffic within the project limits.

1.02 REFERENCES

- A. United States Department of Transportation, Federal Highway Administration.
 - 1. California Manual on Uniform Traffic Control Devices (CA-MUTCD) 2014 Rev 3.

1.03 SUBMITTALS

- A. Approved and signed copies of:
 - 1. Encroachment permit.
 - 2. Right-of-way occupancy permit.
 - 3. Traffic control plan (TCP).
 - 4. Notification plan.
- B. Submittals shall be reviewed by the Engineer for general conformance with the requirements of the Section and accepted for record if found to conform with the requirement of this Section. Contractor shall provide the accepted submittals for approval by Stanislaus County and the City of Modesto as part of obtaining the encroachment permits, and update the submittals, if needed, per comments from Stanislaus County and the City of Modesto.

1.04 GENERAL REQUIREMENTS

- A. Comply with requirements from the following Authorities Having Jurisdiction (AHJ):
 - 1. CA-MUTCD 2014 Rev 3.
 - 2. Stanislaus County.
 - 3. City of Modesto.
- B. Federal, state, and local laws and regulations as required by the AHJ supersede the requirements of this Section.
 - 1. CA-MUTCD 2014 Rev 3.
- C. Contractor is responsible for costs associated with permits, plans, implementation, and maintenance.
- D. This Section includes traffic control requirements beyond the minimum requirements set in the MUTCD. Where conflicts in the traffic control requirements are found, Contractor shall implement the more stringent requirement.

- E. The traffic control plan shall be prepared, stamped and signed by a California licensed professional civil engineer.

1.05 ENCROACHMENT PERMIT

- A. Obtain an Encroachment Permit from Stanislaus County and the City of Modesto.

1.06 TRAFFIC CONTROL PLAN (TCP)

- A. Provide a TCP for each phase or segment of the construction meeting the requirements of the AHJ and this section.
 - 1. TCPs shall be provided for working hours.
 - 2. TCPs shall be provided for non-working hours when open excavations, equipment, or materials are left in or near the roadway while construction crews are not present.
 - 3. Each TCP shall be considered separately.
- B. Work hours:
 - 1. Work in the roadway shoulder shall occur during daytime work hours - actual hours will be defined in the encroachment permits.
 - 2. Work that occurs in the roadway (roadway crossings) shall occur during nighttime work hours - actual hours will be defined in the encroachment permits.
- C. Timing:
 - 1. Include work hours and define non-work hour requirements.
 - 2. A single lane closure is allowed for work in the road shoulder.
 - 3. A full road closure is allowed for work that crosses the road. If the Contractor elects to perform a full road closure, the Contractor shall pay the road closure fee to the Agency (Stanislaus County or City of Modesto) that owns the road. For bidding purposes, the Contractor shall assume road closure fees are \$5,000 per day. ^{AD1}
 - 4. Lane closures shall commence in accordance with hours defined in the encroachment permits.
 - a. No work that interferes with public traffic shall be done outside these hours.
 - b. Minor deviations from the requirements of this section concerning hours of work may be permitted upon approval by the AHJ.
 - c. When work is not actively in progress the full width of the traveled way shall be open for public traffic.
- D. Maintain at least one vehicle access to all properties (including emergency vehicles) at all times unless closure is approved in writing.
- E. Define placement of the following:
 - 1. Project signs.
 - 2. Changeable Message Sign (CMS) boards:
 - a. Locate fixed CMS boards at each end of the project set.
 - b. Locate 2 moveable CMS boards within the current work setup area.
- F. Define placement and spacing of traffic control devices (including signs, markings, channelizing devices, lighting devices, flaggers, etc.) and spacing/location of these within the following traffic control areas:

- a. Advance warning areas.
 - b. Transition areas.
 - c. Buffer spaces.
 - d. Work areas.
 - e. Termination Areas.
 - f. No parking areas.
 - g. Fresh oil areas.
 - h. "Double penalty in work zones" warning areas.
 - i. Detour areas.
- G. Set-up changes to accommodate different phasing of the work:
 - 1. Define channelizing, shifting of traffic lanes, and barricading.
 - 2. After installation of new or modified control, Contractor shall inspect and certify that controls are installed and operating as intended.
 - a. Certification shall consist of a signed affidavit stating that the traffic control has been inspected and found to be in conformance with the TCP and contract requirements provided to the government agency with jurisdiction of the right-of-way.
- H. General signage requirements:
 - 1. Include location and size.
 - 2. All signage shall meet the requirements and specifications of the current CA-MUTCD (2014 Rev 3) and the FHWA.
- I. Provide for the protection of the traveling public, pedestrians and workers within the area covered by the limits of construction, at all times when the area is affected by construction facilities or activities including the following:
 - 1. Business access.
 - 2. Private property access:
 - a. Warn, control, protect, and expedite vehicular and pedestrian traffic through the private property.
 - 3. Driveway access.
 - 4. Pedestrian access.
 - 5. Bike access:
 - a. Maintain safe bike facilities through the work zone and associated traffic control layouts.
 - b. Bicyclists shall be allowed to utilize the entire lane when sharing the lane with vehicular traffic. Appropriate signage shall be used to indicate this usage.
 - c. Provide alternative bike facilities or designated detour routes when necessitated by temporary removal of existing bike lanes.
 - 6. Emergency vehicle access:
 - a. Maintain access for emergency vehicles at all times.
 - 7. Excavations.
 - 8. Work sites.
 - 9. Intersections.
- J. Define lane widths, transition offsets, and taper lengths.
- K. Provide 24-hour emergency contact information.
- L. Administration:

1. Submit the approved TCP to the Construction Manager within 48 hours of approval by the AHJ.
 - a. Review and comment on the TCP by the government agency with jurisdiction of the right-of-way shall in no way relieve the Contractor of the responsibility for traffic and safety requirements.
 - b. Such acceptance shall in no way be construed as confirmation of the technical accuracy or adequacy of the contents of the TCP and shall not relieve the Contractor of the obligation to institute traffic control measures in full compliance with contract requirements and in conformance with local agency requirements.
 2. Submit traffic control change certification to the Construction Manager within 48 hours of completing the change.
- M. Changes to the TCP:
1. If, during the execution of the work, the Contractor determines that the traffic control is not functioning as intended, the Contractor may make revisions to the TCP as necessary, provided that the local agencies with jurisdiction have accepted the changes.
 2. Emergency change requests affecting life and property can be submitted by the Contractor to the AHJ.
- N. Temporary surfaces:
1. Provide temporary surfacing of excavated areas immediately after completing the backfilling of any section of the Work.
 - a. If permitted by the AHJ, the Contractor may be allowed to leave excavations open provided that traffic control devices, approved by the governmental agency maintaining the right-of-way, are in place and maintained, and excavations are covered with approved temporary steel plates (non-skid surface type) at the close of each working day.
 2. Provide hard surfaced temporary detours or bypasses with a minimum of 1-1/2 inches of asphalt-concrete pavement:
 - a. Maintain in a smooth and usable condition.
- O. Barricades and enclosures:
1. Contractor shall install temporary Type K railing in locations where materials or equipment is stored within the public right of way shoulder to prevent vehicles from pulling off road and crashing into equipment.
 2. Any excavation left open during non-working hours shall be protected with Type K railing in order to prevent the public from entering the excavation.
 3. Provide suitable barricades, lights, signs, and watchmen at places where the Work causes obstructions to the normal traffic or constitutes in any way a hazard to the workmen or the public.
 4. Statutory requirements: Install and maintain barricades, signs, lights, and other protective devices within rights-of-way in strict conformity with applicable statutory requirements by the AHJ in accordance with approved Traffic Control Plan.
 5. At microtunneling pit locations, while the pit is excavated, install Type K railing between pit and road for a minimum of 200 feet in both directions of the pit.
 6. All barricades, enclosures, and Type K railings shall have sufficient reflective markings to warn motorists and allow the guardrail to be seen during nighttime hours.

- P. Temporary bridges:
1. Design and place suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic and to accommodate the use of temporary sewer bypass pipelines.
- Q. Pavement markings:
1. Temporary pavement markings:
 - a. All temporary pavement marking shall meet the requirements and specifications of the CA-MUTCD Rev 3 Part 3.
 - b. Use pilot line method for the placement.
 - c. Use is limited to 14 calendar days.
 - d. Double yellow line shall have 2 pieces of tape side by side with a 4-inch space between.
 - e. Painted temporary striping shall be 4 inches wide unless specified otherwise.
 - 1) Do not use painted temporary striping on the existing pavement or on final wearing course of pavement.
 2. Existing pavement markings:
 - a. Remove either painted or raised pavement markers that are not applicable or are within the transverse limits of the temporary travel lanes to the satisfaction of the Construction Manager.
 - b. Painting over existing markings is not permitted.
- R. Placement and maintenance of traffic control devices:
1. Maintain required traffic control devices and trenches within the right-of-way at all times, 24 hours per day, 7 days per week including holidays and weekends.
 2. Replace in kind signs and street markings damaged by the construction.
 - a. Replace the whole stripe or marking in its entirety on partial damaged lane stripes and traffic lettering.
 3. Remove traffic control devices not in use, or that will not be used for a period greater than 24 hours, from the work area.
 - a. Do not store unused traffic control devices on sidewalk unless the sidewalk is closed and an approved barricade plan is provided for rerouting pedestrians.
 4. Maintain barricades and other traffic control devices in clean and effective condition and replace devices in poor condition immediately.
 5. Begin placing barricades in the direction of traffic and remove them in the direction of opposing traffic.
- S. Flaggers:
1. Flaggers are required for one-lane, two-way closures.
 2. All flaggers shall be certified by the ATSSA or as required by the local authority.
- T. Pilot car:
1. A pilot car is required to escort traffic through the work zone during lane closures.
- U. Traffic Delay time:
1. Alternate traffic through single lane closures at approximately 5 minute intervals.

- V. Residential areas:
 - 1. Pedestrian access shall be maintained by use of escorts or route diversions.
 - 2. Access to residences shall be maintained throughout construction.
- W. Emergency Services
 - 1. Traffic Control Plan must include provisions for emergency service providers such as medical, fire, and police.

1.07 NOTIFICATION PLAN

- A. Submit Notification Plan to Construction Manager for approval.
- B. Changeable message sign boards shall be installed to notify traffic travelling toward the project of the work in accordance with the following:
 - 1. Road Closures:
 - a. Install a minimum 2 weeks prior to road closures.
 - b. Maintain in operation, in place until road closure work has completed.
 - c. Install 1/4 mile from road closure location on all roads leading to the road closure.
 - 2. Lane Closures:
 - a. Install prior to commencing lane closure
 - b. Maintain in operation, in place until lane closure is completed.
 - c. Install in each direction of road where lane closure is occurring. Location shall be in advance of the traffic control setup and coordinated with the Construction Manager.
 - 3. Coordinate wording of the changeable message sign board with the Construction Manager. The wording will change depending on the type of closure (single lane or whole road).
 - 4. Check changeable message sign board daily to ensure it is in operation and promptly remove graffiti if found.
- C. Define who will notify, how they will notify, and when they will notify:
 - 1. Notify affected emergency agencies, residences, and businesses within the area of current work 15 days prior to start of operations.
 - 2. Notify AHJ for any traffic control or Work areas affecting traffic signals, public bus routes, or bus stops at a minimum of 72 hours prior to any the work.
- D. Notify Construction Manager prior to the start of operations and submit notification to Construction Manager 15 days prior to start of operations.
- E. Notify the AHJ a minimum of 2 working days prior to the anticipated beginning of construction.
- F. Provide street closure details related to the notification of the following:
 - 1. Emergency services, such as police and fire.
 - 2. Other services, such as mail and garbage collection.
- G. Residential areas:
 - 1. Notify adjacent residents using "door knob type" Notices approved by the Construction Manager.
 - a. Notices shall describe the impending work.
 - b. Notices shall also identify dates and stages of work.

- H. Temporary closing:
 - 1. At least 2 weeks prior to temporarily closing any part of the street, sidewalk, driveway, or other access to pedestrian or vehicle traffic, obtain approval from AHJ.
- I. Contractor will immediately notify the AHJ of emergency change requests affecting life and property.
- J. The provisions of this Section do not relieve the Contractor from the responsibility to provide such additional devices or take such measures as may be necessary to ensure public safety.
 - 1. Contractor shall immediately repair or replace any component in the Traffic Control system that is damaged, displaced, or ceases to operate or function as specified.
 - 2. When lane closures are made for work periods only, at the end of each work period, remove all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, from the traveled way, shoulder, and auxiliary lanes.
 - 3. Upon completion of the work requiring lane closure, all components of the Traffic Control system shall be removed from the site of the work and shall become the property of the Contractor.

1.08 TRAFFIC DEVICES & MAINTENANCE

- A. Contractor shall maintain all traffic control devices installed in the field. This shall include patrolling the devices to ensure that they are in the correct locations and in good repair. All construction signs shall be kept clean and readable at all times.
- B. Contractor shall designate in writing a representative in charge of all traffic control on the project site. This representative shall be responsible for the care and maintenance of all devices.
- C. All channelizing devices used during night operations, or during times of darkness, shall be retroreflective or have retroreflective banding per the requirements of the CA-MUTCD.
- D. Regulatory signs that are removed during work operations shall be replaced with temporary units for the duration of the work and shall be replaced once construction is complete.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials shall conform to the requirements of the AHJ and as specified in this Section.

2.02 TEMPORARY STRIPING

- A. Temporary traffic striping tape material shall conform to requirements of the AHJ.

- B. Tape shall be 4 inches wide. The color of the tape shall match the color of the existing line.

2.03 PERMANENT STRIPING

- A. Permanent striping shall conform to the requirements of the AHJ and the CA-MUTCD Rev 3 Part 3.

2.04 TEMPORARY PAVEMENT

- A. Temporary pavement may be required to maintain required number of lanes or lane widths.
 - 1. Hard surfaced with a minimum of 1 1/2 inches of asphalt-concrete pavement and maintained in a smooth and usable condition for the duration of the detour and/or bypass.
 - 2. Upon completion of construction, remove temporary pavement and return the affected area to original condition.

PART 3 EXECUTION

3.01 RIGHT-OF-WAY OCCUPANCY TERMS AND CONDITIONS

- A. Comply with the requirements of the AHJ.
- B. An approved traffic control plan will be required, prior to the anticipated beginning of construction.
 - 1. A pre-approved concept traffic control plan set is included in the contract documentation, for streets with the highest potential impact to traffic.
 - 2. The traffic control plan shall be available at the job site at all times during construction.
- C. A complete permit package shall be available at the job site at all times during construction.
- D. Contractors and subcontractors connected with work on this project shall have a complete copy of this permit at the site at all times or the work will be closed down until a copy is made available.

3.02 IMPLEMENTATION OF TRAFFIC CONTROL

- A. Do not perform any lane closures or implement any part of the Traffic Control Plan until the AHJ has approved or provided the following:
 - 1. Encroachment permit.
 - 2. Right-of-way occupancy permit.
 - 3. Traffic control plan (TCP).
 - 4. Notification plan.
- B. If, in the judgement of the Construction Manager or Engineer, a condition exists that is dangerous to the public safety, the Owner may immediately remedy it by any means available, and deduct the cost of the remedy from amounts owed the Contractor by the Owner.

- C. Access to driveways adjacent to the construction work zone shall be maintained at all times, if at all possible. Additional cones, delineators, traffic plates, and flaggers may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveways, unless prior written approval is obtained from the Traffic Engineer.
- D. Through travel lanes maintained during construction shall be a minimum of one existing lane width wide.
 - 1. Barricades or barrier rails shall be located a minimum of 2 feet beyond the outside of any travel lane.
 - 2. Travel lanes located along curb and gutter shall be measured from the lip of gutter.
 - 3. Travel lanes for each roadway segment shall be opened when the underground construction activities are complete. If additional construction activities are required to complete the roadway in accordance with the contract documents, the Contractor shall completely remove all traffic control devices until additional construction activates commence on the segment of roadway.
- E. Contractor shall stage the work at each intersection to accommodate turning vehicles, including trucks and emergency vehicles, at all times, except as indicated in the concept traffic control plan set.

END OF SECTION

SECTION 02233

SETTLEMENT MONITORING

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes requirements for settlement monitoring of the ground surface over trenchless pipeline installations.

1.02 SUBMITTALS

- A. The Contractor shall prepare and submit information required herein in accordance with the submittal requirements.
- B. Initial Survey Report of Settlement Monitoring Points:
 - 1. One report shall be submitted for each trenchless crossing.
 - 2. The report shall include a table of horizontal coordinates (northing and easting), elevation, and approximate station and offset along the pipeline for each settlement monitoring point.
 - 3. Identify the control point number, horizontal coordinates and elevation of the survey control points used to determine the above data for each monitoring point.
 - 4. Elevations and coordinates shall use the same coordinate system and datum as the topographic survey for the project.
 - 5. Submit prior to beginning shaft excavation or tunneling operations.
- C. Survey Monitoring Reports:
 - 1. One report shall be submitted for each trenchless crossing at the locations identified on the Drawings.
 - 2. This report shall consist of a table showing the settlement monitoring point (labeled by station), date of measurement, and the elevation recorded for each measurement.
 - 3. The surveyor shall record subsequent measurements to the table as they are taken, so that trends can be easily noticed.
 - 4. Submit within 24 hours of taking measurements.
- D. Submit the surveyor's California Professional Land Surveyor's license number. The report shall be stamped and signed by a California Professional Land Surveyor.
- E. Submit additional information required by permits for the trenchless crossings.

1.03 QUALIFICATIONS

- A. Surveying shall be performed by a California licensed Professional Land Surveyor. The Professional Land Surveyor shall not be directly employed by the Contractor ~~DB-Entity~~^{AD1} or the tunneling subcontractor, rather a third party subcontractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Settlement Points:
 - 1. Surface settlement points located on pavement or concrete shall either be p/k nails or temporary paint marks.
 - 2. Surface settlement points located on soil shall be 2-inch by 2-inch wooden hubs with a nail in the top.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Location: Settlement monitoring points shall be located as shown on the drawings.

3.02 SURVEYING ACCURACY

- A. Elevations shall be measured to 0.005-foot accuracy.

3.03 MONITORING FREQUENCY

- A. Monitoring shall include a baseline survey prior to beginning the work, then continuously every 2 hours throughout performance of the work while actively tunneling, then at the conclusion of the tunneling work (no earlier than two days following completion). The tunneling construction period shall include the time from the commencement of trenchless excavation activity (launching of the tunneling machine) until after the casing pipe is fully installed. After completion of tunneling, monitoring shall occur two months after the installation is complete.
- B. Submit survey reports as described in Part 1.

3.04 MAXIMUM ALLOWABLE SETTLEMENT (OR HEAVE)

- A. The maximum allowable settlement (or heave) is 0.25-inch at any monitoring location.
- B. Corrective action to avoid additional settlement or heave shall be taken by the Contractor if the measured settlement (or heave) exceeds one-half of the maximum allowable settlement (or heave). Potential corrective actions include modifying the tunneling technique, changing equipment, etc.
- C. If the maximum allowable settlement (or heave) is exceeded, the Contractor shall implement a corrective action plan acceptable to the City and the jurisdictional authority. The Contractor shall restore the pavement, ground surface and all other surface features to the pre-construction elevations to the satisfaction of the City and Caltrans.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Loosening, excavating, filling, grading, borrow, hauling, preparing subgrade, compacting in final location, wetting and drying, and operations pertaining to site grading for buildings, basins, reservoirs, boxes, roads, and other facilities.
 - 2. Backfilling and compacting under and around structures.
 - 3. Backfilling and compacting above buried structures.
- B. Related sections:
 - 1. Section 01355A - Stormwater Pollution Prevention Construction Activities: Best Management Practices.
 - 2. Section 02050 - Soils and Aggregates for Earthwork.
 - 3. Section 02240 - Dewatering for Structures.
 - 4. Section 02312 - Controlled Low Strength Materials (CLSM).
 - 5. Section 03300 - Cast-In-Place Concrete.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
 - 2. D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)).
 - 3. D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.03 DEFINITIONS

- A. Backfill adjacent to structure: Backfill within volume bounded by the exterior surfaces of structure, the surface of undisturbed soil in the excavation around structure, and finish grade around structure.
- B. Embankments: Dikes, levees, berms, and similar facilities.
- C. Excavation: Consists of loosening, removing, loading, transporting, depositing, and compacting in final location, wet and dry materials, necessary to be removed for purposes of construction of structures, ditches, grading, roads, and such other purposes as are indicated on the Drawings.

1.04 SYSTEM DESCRIPTION

- A. Performance requirements:
 - 1. Where mud or other soft or unstable material is encountered, remove such material and refill space with stabilization material. Wrap stabilization material with stabilization fabric.
 - 2. Obtain acceptable import material from other sources if surplus obtained within Project site does not conform to specified requirements or are not sufficient in quantity.
 - 3. No extra compensation will be made for hauling of fill materials nor for water required for compaction.

1.05 SUBMITTALS

- A. Copy of Property Owner's Agreement allowing placement of surplus soil material on their property.
- B. Excavation plan.
- C. Testing lab: Submit Contractor's proposed testing laboratory capabilities and equipment.
- D. Test reports:
 - 1. Submit certified test reports of all tests specified to be performed by the Contractor.
 - 2. Sign and seal test reports by a registered Geotechnical Engineer.

1.06 QUALITY ASSURANCE

- A. Initial compaction demonstration:
 - 1. Adequacy of compaction equipment and procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of following amounts of earthwork quantities:
 - a. 25 linear feet of pipeline backfill.
 - b. 50 cubic yards of backfill adjacent to structures.
 - c. 100 cubic yards of embankment work.
 - d. 100 cubic yards of fill.
 - e. 50 cubic yards of roadway base material.
 - f. 100 cubic yards of road fill.
 - 2. Initial compaction demonstration testing will be conducted by the Construction Manager. ^{AD1}
 - 2.3. Compaction sequence requirements: Until specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.
 - 3.4. After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified under "FIELD QUALITY CONTROL."
- B. Contractor shall perform all work related to this Section in accordance with the approved Stormwater Pollution Prevention Plan (SWPPP) and as specified in Section 01355A.

1.07 SEQUENCING AND SCHEDULING

- A. Schedule earthwork operations to meet requirements specified in this Section for excavation and uses of excavated material.
- B. If necessary, stockpile excavated material in order to use it at specified locations.
- C. Excavation, backfilling, and filling: Perform excavation, backfilling, and filling during construction in manner and sequence that provides drainage at all times.
- D. Contractor shall coordinate with Construction Manager for scheduling Quality Assurance and Field Quality Control inspection and testing. Contractor shall provide access for the Construction Manager, as needed, to perform testing. Contractor shall provide Construction Manager a minimum 1 working day advance notice before inspection or testing is needed. ^{AD1}

PART 2 PRODUCTS

2.01 MATERIALS

- A. Water for compacting: Use water from source acceptable to Engineer.
- B. Soil and rock materials:
 - 1. General:
 - a. Provide aggregate base course, Class 2 permeable, controlled low-strength material, drain rock, gravel, native material, sand, select material, and stabilization material where specified or indicated on the Drawings.
 - b. If suitable surplus materials are available, obtain native material and select material from cut sections or excavations or imported materials.
 - 2. Aggregate base course materials: As specified in Section 02050.
 - 3. Class 2 permeable: As specified in Section 02050.
 - 4. Drain rock: As specified in Section 02050.
 - 5. Gravel: As specified in Section 02050.
 - 6. Native material: As specified in Section 02050.
 - 7. Sand: As specified in Section 02050.
 - 8. Select material: As specified in Section 02050.
 - 9. Stabilization material: As specified in Section 02050.
- C. Controlled low-strength material: As specified in Section 02312.
- D. Geotextile fabrics:
 - 1. Filter fabric: As specified in Section 02620.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of conditions:
 - 1. Character and quantity of material:

- a. Verify character and quantity of rock, gravel, sand, silt, water, and other inorganic or organic materials to be encountered in work to be performed.
- b. Determine gradation, shrinkage, and swelling of soil, and suitability of material for use intended in work to be performed.
- c. Determine quantity of material, and cost thereof, required for construction of backfills, cuts, embankments, excavations, fills, and roadway fills, whether from onsite excavations or imported materials. Include in cost of work to be performed.
- d. Include wasting of excess material, if required, in cost of work to be performed.

3.02 PREPARATION

A. Backfills:

1. After clearing and excavation are completed, scarify entire areas that underlie backfills or structures to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
2. Recompect scarified areas to density specified before placing backfill material or concrete.
3. Do not place backfill against walls until:
 - a. Walls have been cast full height of structure and concrete has reached the specified strength.
 - b. Connecting slabs and beams have been cast, and concrete has reached the specified strength.
4. Prior to backfilling:
 - a. Remove all forms.
 - b. Clean all trash and debris from the excavation site.
5. After inspection of foundation, walls, and pipes, place backfill symmetrically around structures to prevent eccentric loading of structures.
6. Place material on top of structure to prevent excessive point loading that exceeds the loading capacity of the structure.
 - a. Contractor is responsible for damage to structures due to improper backfilling and compaction.

B. Embankments:

1. After clearing is completed, scarify entire areas that underlie embankments to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
2. Recompect scarified areas to density specified for embankments before placing of embankment material.

C. Fills:

1. After clearing is completed, scarify entire areas that underlie fill sections or structures to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
2. Recompect scarified areas to density specified for compacted fills before placing of fill material or concrete.

D. Roadway fills:

1. After clearing is completed, scarify entire areas that underlie roadway fills to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
 2. Recompect scarified areas to density specified for roadway fills before placing of roadway fill material.
- E. Sloped surfaces for fill or foundations:
1. Foundations for fill having slopes in excess of 1 vertical to 4 horizontal:
 - a. Bench or terrace to adequately key existing ground and fill built thereon.
 2. Slopes of original hillsides and old fills: Bench minimum of 10 feet horizontally as fill is placed.
 3. Provision of new benches:
 - a. Start new bench wherever vertical cut of next lower bench intersects existing grade.
 - b. Recompect material thus cut out along with new embankment material at no additional cost to the Owner.

3.03 INSTALLATION

- A. General:
1. Dispose of excavated materials that are not required or are unsuitable for fill and backfill in lawful manner.
 2. Dispose of surplus material on private property only when written permission agreement is furnished by owner of property. Submit copies of such agreements.
 3. Rocks, broken concrete, or other solid materials larger than 4 inches in greatest dimension: Remove from project site at no additional cost to the Owner.
 4. Stabilization of subgrade: Provide materials used, or perform work required, to stabilize subgrade so it can withstand loads that may be placed upon it by Contractor's equipment.
- B. Borrow area: There is no borrow area on Project site.
1. Where material is required, import material from source located off Project site selected by the Contractor and subject to acceptance by the Engineer.
 2. There will be no additional cost to the Owner for use of imported material.
- C. Compaction:
1. Provide specified compaction for backfills, cuts, embankments, fills, roadway fills, and other earthwork.
 2. Perform confirmation tests to verify and confirm that work has complied, and is complying at all times, with compaction requirements specified in this Section for initial compaction demonstration and field quality control testing.
 3. In-place density of compacted backfills, cuts, embankments, fills, and roadway fills determined in accordance with ASTM D1556, or with ASTM D6938.
 4. Maximum density obtained in laboratory when tested in accordance with ASTM D1557.
 5. To prevent damage to structures due to backfilling operations, place backfill with equipment that does not exceed HS-20 loading, within a distance from the face of the structure of not less than 1/2 the depth of backfill. The depth of backfill is the distance between the level being compacted and the bottom of

the excavation. Outside this distance, heavier compaction equipment may be used.

6. Compact to percentage of maximum density as follows:
 - a. Backfill adjacent to structures: 95 percent.
 - b. Backfilling voids: 95 percent.
 - c. Embankments: 95 percent.
 - d. Other areas: 85 percent.
 - e. Spoil areas indicated on the Drawings: No minimum required.
 - f. Under present and future structures: 95 percent.
 - g. Under roadways, parking and storage areas, curbs, and sidewalks: 95 percent.
 - h. Upper 6 inches of cuts: 95 percent.
 - i. Fills: 95 percent.

D. Dewatering: As specified in Section 02240.

E. Excavation:

1. Excavations for structures:
 - a. Provide excavations conforming to dimensions and elevations indicated on the Drawings for each structure, including trenching for piping and all work incidental thereto.
 - b. After clearing is complete, excavate for the structure, down to the elevation indicated on the Drawings. Unless directed by Engineer, do not carry excavations below elevation indicated on the Drawings.
 - c. Where soil is encountered having unsuitable bearing value, Engineer may direct in writing that excavation be carried to elevations below those indicated on the Drawings.
 - d. Where excavations are made below elevations indicated on the Drawings, adjust elevations of excavations in accordance with the following requirements:
 - 1) Under slabs: Restore to proper elevation in accordance with procedure specified for backfill in this Section.
 - 2) Under footings: Restore to the proper elevation using one of the following:
 - a) Aggregate base course.
 - e. Excavation width:
 - 1) Extend excavations at least 2 feet clear from walls and foundations of structures to allow for placing and removal of forms, installation of services, and inspection.
 - 2) Do not undercut slopes.
 - f. Difficulty of excavation: No extra compensation will be made for removal of rock or any other material due to difficulty of excavation.
2. Excavation of lined channels:
 - a. Excavations in open cut for lined channels may be made so as to place concrete directly against excavated surfaces providing faces of excavations are:
 - 1) Firm and unyielding.
 - 2) Will stand or can be made to stand without sloughing.
 - b. Excavations to provide subgrade for lined channel or subdrainage material: Excavate to lines and grades indicated on the Drawings.
3. Excavation of unlined channels and basins:
 - a. Excavate to lines and grades indicated on the Drawings.

- b. Perform excavation and grading so that finish surfaces are in uniform planes with no abrupt breaks in surface.
 - 4. Excavation of ditches and gutters:
 - a. Cut ditches and gutters accurately to cross sections and grades indicated on the Drawings.
 - b. Take care not to excavate ditches and gutters below grades indicated on the Drawings.
 - c. Backfill excessive ditch and gutter excavations to grade with suitable material acceptable to the Engineer.
 - d. Do not deposit any material within 3 feet of edge of ditch unless otherwise indicated on the Drawings.
 - 5. Necessary over excavation:
 - a. Where it becomes necessary to excavate beyond normal lines of excavation in order to remove boulders or other interfering objects, backfill voids remaining after removal as specified in backfilling of voids below, or as acceptable to the Engineer.
 - b. Backfill voids with material acceptable to the Engineer:
 - 1) With acceptance of the Engineer, backfill with one of the following:
 - a) Aggregate base course.
 - b) Controlled low-strength material.

F. Materials for backfills, embankments, fills, and roadway fills:

- 1. General:
 - a. Obtain import material from other sources if surplus materials from cuts and excavations obtained from within Project site do not conform to specified requirements or are not sufficient in quantity for construction of Project.
- 2. Backfills:
 - a. Backfill adjacent to structures, slabs, or walls: Imported material unless otherwise specified or indicated on the Drawings.
 - b. Backfill material under concrete structures: Aggregate base course material, except in areas where controlled low-strength material or concrete encasement are indicated on the Drawings.
 - c. Extend backfill in any area under concrete structures from undisturbed soil or rock to the bottom aggregate base course material layer.
- 3. Embankments:
 - a. Native material or imported material meeting the requirements of select material, unless otherwise specified or indicated on the Drawings.
- 4. Fills:
 - a. Native material or imported material meeting the requirements of select material, unless otherwise specified or indicated on the Drawings.
 - b. Extend fill in any area under concrete structures from undisturbed soil or rock to the bottom aggregate base course material layer.
- 5. Roadway fills: One of the following, unless otherwise specified or indicated on the Drawings:
 - a. Aggregate base course material.

G. Placement:

- 1. General:
 - a. Lines and grades:
 - 1) Construct backfills, embankments, fills, and road fills, at locations and to lines and grades indicated on the Drawings.

- 2) Overbuild all permanent fill slopes by at least 1 foot and then cut to final grade to provide adequate compaction of the remaining fill.
2. Backfills:
 - a. Place loose material in successive layers that do not exceed 8 inches in depth after compaction.
 - b. Bring each layer to a moisture content between optimum moisture content and 3 percent above optimum moisture content before compacting.
 - c. Defective compacted backfills: Remove and recompact.
3. Fills:
 - a. Place loose material in successive layers that do not exceed 8 inches in depth after compaction.
 - b. Bring each layer to a moisture content between optimum moisture content and 3 percent above optimum moisture content before compacting.
 - c. Defective compacted fills: Remove and recompact.
4. Coarse fill:
 - a. When materials are coarsely graded so that performance of field density tests are impossible:
 - 1) Placement and compaction: Place material in lifts so as to obtain compacted thickness of 6 inches and roll with pneumatic roller or power roller.
 - 2) Moisture content: Provide moisture content of fraction of material passing 3/4-inch sieve within plus or minus 2.0 percent of optimum moisture as determined in accordance with ASTM D1557, Method C.
5. Embankments:
 - a. Place loose material in successive layers that do not exceed 8 inches in depth after compaction.
 - b. Bring each layer to a moisture content between optimum moisture content and 3 percent above optimum moisture content before compacting.
 - c. Defective compacted embankments: Remove and recompact.
6. Roadway fills:
 - a. Place loose material in successive layers that do not exceed 8 inches in depth after compaction.
 - b. Bring each layer to a moisture content between optimum moisture content and 3 percent above optimum moisture content before compacting.
 - c. Defective compacted roadway fills: Remove and recompact.

3.04 FIELD QUALITY CONTROL

A. Tests:

1. Confirmation ~~tests~~: Tests: Confirmation tests will be conducted by the Construction Manager. ^{AD1}
 - a. Contractor's ~~responsibilities~~ Responsibilities:
 - 1) Accomplish specified compaction for ~~backfills, fills~~ backfill, fill, and other earthwork. ^{AD1}
 - 2) Control operations by confirmation tests to verify that compaction work complies, and is complying at all times, with requirements specified in this Section concerning compaction, control, and testing.
 - 3) Cost of confirmation tests Confirmation Tests: Paid for by the Construction Manager. ^{AD1}
 - 3)4) Copies of Confirmation Test Reports: ^{AD1} Construction Manager will provide copies to Contractor, Engineer, and Owner. ^{AD1}

- ~~4) Qualifications of Contractor's testing laboratory: Perform confirmation testing by soils testing laboratory acceptable to the Engineer.~~
- ~~5) Copies of confirmation test reports: Submit promptly to the Engineer.~~
- ~~b. Perform initial compaction demonstration per Part 1.06 of this Section.~~ ^{AD1}

~~c.b.~~ Frequency of confirmation testing:

- 1) Perform Construction Manager will perform testing not less than ~~the following: as follows:~~ ^{AD1}
 - a) In-place density:
 - (1) Backfill: Test all backfill lifts every ~~50~~ 40 ^{AD1} linear feet of installed ^{AD1} pipeline, and not less than once per day.
 - (2) Cuts: 100 CY.
 - (3) Embankments: 100 CY.
 - (4) Fills: 100 CY.
 - (5) Roadway fills: 50 CY.
 - b) Maximum dry density versus moisture:
 - (1) Backfill: Every 200 linear feet of installed ^{AD1} pipeline, and not less than once per day.
 - (2) Cuts: 200 CY.
 - (3) Embankments: 200 CY.
 - (4) Fills: 200 CY.
 - (5) Roadway fills: 200 CY.

~~2. Compliance tests:~~

- ~~a. Periodic compliance tests will be made by the Engineer to verify that compaction is meeting requirements previously specified.~~
- ~~b. Remove overburden above level at which the Engineer wishes to test. Backfill and recompact excavation after testing is completed.~~ ^{AD1}
- c. If compaction fails to meet specified requirements, perform remedial work by one of the following methods:
 - 1) Remove and replace ~~materials~~ backfill at proper density.
 - 2) Bring density up to specified level by other means acceptable to the ~~Engineer~~ Construction Manager. ^{AD1}
- d. Retesting:
 - 1) ~~Contractor bears the costs~~ Costs of Retesting: Costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements shall be borne by the Contractor. ^{AD1}
 - ~~2) Contractor's confirmation tests during performance~~ Confirmation Tests During Performance of remedial work: Double Remedial Work:
 - ~~a) Performance: Construction Manager will perform.~~
 - ~~2)b) Frequency: Test at twice the normal rate~~ frequency specified ~~for initial confirmation tests.~~ ^{AD1}

B. Tolerances:

- 1. Finish grading of backfills, cuts, embankments, fills, and roadway fills:
 - a. Perform fine grading under concrete structures such that finish surfaces are never above the grade or cross section indicated on the Drawings and are never more than 0.10 feet below.
 - b. Provide finish surface for areas outside of structures that are within 0.10 feet of grade or cross section indicated on the Drawings.
- 2. Unlined channels and basins:

- a. In both cut and fill, and levee and access road side slopes in cut: Vertical tolerance of none above and 3 inches below grade indicated on the Drawings on bottom and side slopes.
 - b. On top surface of levee and access road in both cut and fill, and levee and access road side slopes in fill: Vertical tolerance of none below and 3 inches above grade indicated on the Drawings.
- 3. Areas which are not under structures, concrete, asphalt, roads, pavements, sidewalks, dikes, and similar facilities:
 - a. Provide finish graded surfaces of either undisturbed soil, or cohesive material not less than 6 inches deep.
 - b. Intent of proceeding is to avoid sandy or gravelly areas.
- 4. Finish grading of surfaces:
 - a. Reasonably smooth, compacted, and free from irregular surface changes.
 - b. Provide degree of finish that is ordinarily obtainable from blade grader operations, except as otherwise specified.
 - c. Uniformly grade areas that are not under concrete.
 - d. Finish ditches and gutters so that they drain readily.

3.05 ADJUSTING

- A. Finish grades of excavations, backfills, and fills:
 - 1. Repair and reestablish grades to required elevations and slopes due to any settlement or erosion that may occur from action of the elements or any other cause prior to final acceptance.

3.06 PROTECTION

- A. Finish grades of backfills, cuts, excavations, and fills:
 - 1. Protect newly graded areas from erosion and deterioration by action of the elements.
- B. Ditches and gutters:
 - 1. Maintain ditches and gutters free from detrimental quantities of debris that might inhibit drainage until final acceptance.

END OF SECTION

AD1 Addendum No. 1

SECTION 02312

CONTROLLED LOW STRENGTH MATERIAL (CLSM)

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Controlled low strength material (CLSM), also known as “flowable fill.”
- B. Related sections:
 - 1. Section 01450 - Quality Control.
 - 2. Section 01455 - Special Tests and Inspections.
 - 3. Section 01460 - Contractor Quality Control Plan.

1.02 REFERENCES

- A. American Concrete Institute (ACI)
 - 1. 229R - Report on Controlled Low-Strength Materials.
 - 2. 301 - Specifications for Structural Concrete.
- B. ASTM International (ASTM):
 - 1. C 33 - Standard Specification for Concrete Aggregates.
 - 2. C 94 - Standard Specification for Ready Mix Concrete.
 - 3. C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
 - 4. C 150 - Standard Specification for Portland Cement.
 - 5. C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 6. C 403 - Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
 - 7. C 494 - Standard Specification for Chemical Admixtures for Concrete.
 - 8. C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - 9. D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³(600 kN-m/m³)).
 - 10. D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³(2,700 kN-m/m³)).
 - 11. D 4832 - Standard Test Method of Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
 - 12. D 5971 - Standard Practice for Sampling Freshly Mixed Controlled Low Strength Material.
 - 13. D 6023 - Standard Test Method for Density (Unit Weight), Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low-Strength Material.

1.03 SYSTEM DESCRIPTION

- A. Mixture of portland cement, water, pozzolan, fine aggregate and admixtures, proportioned in accordance with the recommendations of ACI 229 to produce a homogeneous mixture that is flowable, that will readily work into corners and angles; that will not segregate in the plastic state; and that is self-compacting at the time of placement without the use of mechanical vibration.

- B. Performance requirements:
 - 1. Air content, total calculated in accordance with ASTM D 6023: Not less than 8.0 percent, nor greater than 12.0 percent.
 - 2. Compressive strength, measured in accordance with ASTM D 4832 at 28 days: Not less than 50 pounds per square inch, nor greater than 200 pounds per square inch.
 - 3. Wet density: Not greater than 132 pounds per cubic foot.
 - 4. Slump, measured in accordance with ASTM C 143 at the point of placement: Greater than 9 inches and that allows CLSM to flow freely and to be self-compacting during placement.

1.04 SUBMITTALS

- A. Product data: Submit data completely describing materials in the mix and demonstrating compliance with the requirements of this Section.
 - 1. Cement: Mill tests. Indicate alkali content representative of each shipment.
 - 2. Fly ash: Identify source and type of fly ash.
 - 3. Water: Identify source and quality if not from a municipal treatment source.
 - 4. Admixtures: Manufacturer's product data indicating suitability for use in CLSM mixes and recommended dosage rates.
 - 5. Aggregate:
 - a. Submit source, type, and sieve analyses. Include testing to demonstrate that materials in accordance with ASTM C 33 requirements.
 - b. Resubmit at any time there is a significant change in grading of materials.
- B. Mix design:
 - 1. Submit full details, including mix design calculations for mix proposed for use.
 - 2. Trial batch test data:
 - a. Submit data for each test cylinder.
 - b. Submit data that identifies mix and slump for each test cylinder.
- C. Work Plan
 - 1. Submit a work plan with step by step procedures and drawings demonstrating how CLSM is planned to be placed. Document how the potential for pipe floating will be mitigated.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store or stockpile cement, fly ash, and aggregate in accordance with ACI 301.
- B. Store admixtures in accordance with the manufacturer's recommendations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. CLSM shall be a fluid workable mixture of aggregate, cement, and water:
 - 1. Aggregate:
 - a. Sand per Section 02050.
 - b. Non-expansive, non-reactive, inert natural sand in accordance with ASTM C 33 for fine aggregate.

- c. Native material per Section 02050, free of organic material and other deleterious substances.
- 2. Cement:
 - a. Portland cement in accordance with ASTM C 150, Type II.
 - b. Having total alkali content not more than 0.60 percent.
- 3. Water:
 - a. Potable water. Clean and free from oil and deleterious amounts of alkali, acid, organic matter, salts, or other substances or impurities that adversely affect the backfill.
- 4. Fly ash and admixtures may be proposed as part of the mix design:
 - a. Fly ash: Class C or Class F fly ash in accordance with ASTM C 618.
 - b. Admixtures: Products of a single manufacturer, specifically manufactured or recommended by that manufacturer for use in CLSM.
 - 1) Air entraining admixture: In accordance with ASTM C 260.
 - 2) Water reducing admixture: In accordance with ASTM C 494, Type A.

2.02 MIXES

- A. See System Description for performance requirements of the plastic and hardened mix.

2.03 SOURCE QUALITY CONTROL

- A. Trial batch:
 - 1. Contractor shall pay for trial batch source quality control.
 - 2. After mix design has been accepted by Engineer, have trial batch of the accepted mix design prepared by testing laboratory acceptable to Engineer.
 - 3. Prepare trial batches using the specific cement, fly ash, admixtures, aggregates, and water proposed for the Work.
 - 4. Prepare trial batch with quantity sufficient to determine slump, workability, and consistency; and to provide test cylinders as indicated in the following paragraphs.
 - 5. Prepare a trial batch for each different type of aggregate source planned to be used and, where native material is planned to be used as the aggregate source, not less than one trial batch per mile along the pipeline alignment, evenly spaced along the alignment.
- B. Trial batch testing:
 - 1. Determine slump in accordance with ASTM C 143, with the following modifications:
 - a. Do not rod the concrete material.
 - b. Place material in slump cone in one semi-continuous filling operation, slightly overfill, tap lightly, strike off, and then measure and record slump.
 - 2. Prepare and test trial batch specimens in accordance with ASTM D 4832, with the following modifications:
 - a. Provide cylindrical test specimens, each 6-inches in diameter by 12-inch high.
 - b. Provide a minimum of 8 cylinders for testing of each trial batch.
 - c. Fill the molds to overflowing and tap sides lightly to settle the mix.
 - d. Do not rod the mix for consolidation in the cylinder.
 - e. Strike off the excess material.

3. Place test cylinders in a moist curing room. Exercise caution in moving and transporting the cylinders since they are fragile and will withstand only minimal bumping, banging, or jolting without damage.
 4. Do not remove the test cylinder from mold until that cylinder is to be capped and tested.
 - a. Perform the capping carefully to prevent premature fractures.
 - b. Do not perform initial compression test until the cylinders reach a minimum age of 3 days.
 5. Provide compressive strength tests.
 - a. Test 4 test cylinders at 7 days after casting, and another 4 cylinders at 28 days after casting.
 - b. The compression strength of the 4 test cylinders tested at 28 days shall be equal to or greater than the minimum required compression strength, but shall not exceed maximum compression strength.
- C. If the trial batch tests do not meet the Specifications for strength or density, revise and re-submit the mix design, prepare additional trial batch(es), and complete additional trial batch tests. Repeat until an acceptable trial batch is that conforms to the Specifications is produced.
1. All the trial batches and acceptability of materials shall be paid by the Contractor.
 2. After acceptance, do not change the mix design without submitting a new mix design, trial batches, and test information.

PART 3 EXECUTION

3.01 PREPARATION

- A. Do not place CLSM until preparation and condition of surfaces receiving the fill have been observed and accepted by the Engineer.
- B. Remove debris foreign matter, and standing or running water from excavations and areas receiving CLSM before placement.
- C. Pipes and trenches.
1. Where CLSM is placed around and over pipes, secure pipes in place, or place CLSM in lifts to prevent pipe flotation.
 2. Where CLSM is placed in long, open trenches, confine material using bulkheads of sandbags, earth dams, or stiffer concrete at open ends of placement.
- D. Soil preparation, unless otherwise indicated on the Drawings:
1. Prior to placement of CLSM, prepare underlying soils as follows:
 - a. Scarify surface to a depth of 4 inches.
 - b. Adjust moisture content to or slightly above the optimum in accordance with ASTM D 1557.
 - c. Re-compact scarified surface to a minimum of 95 percent relative density in accordance with ASTM D 1557.

3.02 MEASURING, BATCHING, MIXING AND TRANSPORTING

- A. Measure, batch, mix and transport CLSM in accordance with the requirements of ASTM C 94 and this Section. When using native material for onsite mixing, a pugmill or similar approved mixer shall be used.
- B. Mix until there is uniform distribution of materials.
- C. Discharge mixer completely prior to recharging.
- D. After trial batch testing and mix acceptance, maintain slump during construction within plus or minus 1 inch of the design slump.

3.03 PLACING

- A. Place controlled low strength material by method that preserves the quality of the material in terms of compressive strength and density.
- B. Maintain fluid properties of the mix during placement.
 - 1. At point of placement, provide material that flows easily around, beneath, or through walls, pipes, conduits, or other structures.
 - 2. Do not place CLSM that has partially hardened or that has been contaminated by foreign materials.
 - 3. Handle and place CLSM using methods that minimize segregation of the mix.
 - 4. Deposit mix as near its final position as possible to avoid segregation due to rehandling or flowing.
 - 5. Contain and confine mix while it is fluid. Design containment structures and bracing at walls and forms to withstand lateral pressures of wet mix.
- C. Lifts:
 - 1. Limit lift heights of CLSM placed against structures and other facilities that could be damaged due to the pressure from the CLSM, to the lesser of 3 feet or the lift height indicated on the Drawings.
 - 2. Do not place another lift of CLSM until the last lift of CLSM has set and gained sufficient strength to prevent additional lateral load against the forms or structure due to the weight of the next lift of CLSM.
- D. Water conditions:
 - 1. Do not place CLSM in standing or flowing water.
 - 2. Do not permit water to flow over the surface of freshly placed or un-hardened CLSM.
 - 3. Do not submerge CLSM in water within 24 hours after placement.
- E. Manage CLSM bleed water.
 - 1. Grade top surface of CLSM to drain away from the fill.
 - 2. Provide side containment that permits bleed water to drain to a contained management area away from the fill.

3.04 CURING AND PROTECTION

- A. Curing;
 - 1. Prior to and during curing, install barriers to prevent equipment or personnel from falling into or becoming entrapped in CLSM.

- B. Protect CLSM from:
 - 1. Damage from the elements.
 - 2. Damage of any nature during surrounding construction operations.

3.05 FIELD QUALITY CONTROL

- A. Provide quality control over the Work of this Section as specified in Sections 01450 and 01460 and as specified in this Section.
- B. General:
 - 1. Construction Manager inspection and acceptance required prior to placement.
 - 2. Make provisions for and furnish all material for the test specimens, and provide manual assistance to assist the Construction Manager in preparing said specimens.

3.06 FIELD QUALITY ASSURANCE

- A. Provide quality control over the work of this Section as specified in Sections 01450 and 01460.
- B. Field inspections:
 - 1. Construction Manager shall provide on-site inspection for the Work of this Section.
 - 2. Advise Construction Manager of readiness to proceed at least 24 hours prior to each placement of CLSM.
 - 3. Required inspections:
 - a. Construction Manager will observe the prepared areas. Do not place CLSM until Construction Manager has observed and accepted preparations.
 - 4. Record of inspections.
- C. Field sampling and testing:
 - 1. During construction, Contractor shall provide Contractor shall coordinate with Construction Manager for scheduling Quality Assurance and Field Quality Control inspection and testing. Contractor shall provide access for the Construction Manager, as needed, to perform inspection and testing. Contractor shall provide Construction Manager a minimum 1 working day advance notice before inspection or testing is needed.^{AD1}
 - 1-2. During construction, Construction Manager shall perform^{AD1} sampling and testing to determine whether the CLSM, as produced and placed, complies with the requirements specified.
 - a. Make provisions for and furnish material for test specimens. Cooperate by allowing free access for Owner's independent testing firm Construction Manager^{AD1} to sample and test materials. Provide assistance in obtaining and preparing said specimens.
 - 2-3. Sample CLSM for testing in accordance with ASTM D 5971.
 - 3-4. Required tests:
 - a. Air content: Prepare sample and test in accordance with ASTM D 6023
 - b. Compressive strength: Prepare and test cylinder specimens in accordance with ASTM D 4832.
 - 1) Prepare 6-inch diameter by 12-inch high specimens for testing.
 - a) Provide one set of specimens for each 100 cubic yards of CLSM placed, but not less than 1 set for each half day's placement.

- b) Prepare and test not less than 3 cylinders for each set.
- c) Place CLSM in the molds in accordance with ASTM D 4832. Do not rod or otherwise consolidate the material in the mold.
- d) In accordance with ASTM D 4832 recommendations for displacing bleed water at the top of the molds and refilling the molds before covering with a lid. Do not use air-tight lids.
- 2) Place the cylinders in a safe location away from construction activities.
 - a) Protect cylinders from bumping and impact.
 - b) Maintain temperature surrounding cylinders between 60 and 80 degrees Fahrenheit until delivery to the laboratory for testing.
 - c) After the first day, surround molds with a high humidity environment by covering with wet burlap, or equivalent highly absorptive material. Maintain saturation of the cover. Do not sprinkle water directly on the cylinders.
- 3) After 4 days, place the cylinders in a protective container for transport to the laboratory for testing.
 - a) Exercise caution in moving and transporting the cylinders since they are fragile and will withstand only minimal bumping, banging, or jolting without damage.
 - b) Transport container may be a box with a Styrofoam or similar lining that will limit jarring and bumping of the cylinders.
- 4) Upon receipt at the testing laboratory, place test cylinders in a moist curing room until dates for testing.
- 5) Do not remove test cylinders from molds until the day that cylinders is to be capped and tested.
- 6) Cap and test for compressive strength in accordance with ASTM D 4832.
 - a) Do not perform initial compression test until the cylinders reach an age of at least 4 days.
 - b) Test 1 cylinder at 7 days and 2 at 28 days.
- 7) Compressive strength of the cylinders tested at 28 days shall be equal to or greater than the minimum required compression strength, but shall not exceed maximum compression strength specified.

3.07 NON-CONFORMING WORK

- A. When testing or observation indicates CLSM with properties outside the specified and accepted range, Construction Manager will issue instructions regarding disposition of nonconforming materials.
- B. Construction Manager or Engineer may:
 - 1. Reject CLSM represented by those test specimens and require its removal and replacement.
 - 2. Require modification of the mix design to provide CLSM with the properties specified.

- C. Make such modifications at no additional expense to the Owner and with no adjustment to the schedule.

END OF SECTION

SECTION 02318

TRENCHING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Trench excavation, fine grading, pipe bedding, backfilling, and compaction for the following, including requirements for ditch crossings:
 - 1. Pipes.
 - 2. Direct buried electrical and control conduits.
 - 3. Electrical and control duct banks.
 - 4. Manholes, valves, or other accessories.
 - 5. Potable water pipe and appurtenances.
- B. Related sections:
 - 1. Section 02050 - Soils and Aggregates for Earthwork.
 - 2. Section 02240 - Dewatering for Structures.
 - 3. Section 02260 - Excavation Support and Protection.
 - 4. Section 02300 - Earthwork.
 - 5. Section 02312 - Controlled Low Strength Material (CLSM).
 - 6. Section 15956 - Piping Systems Testing.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
 - 2. D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 3. D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.03 SUBMITTALS

- A. Lab certification.
- B. Confirmation test reports.

1.04 QUALITY ASSURANCE

- A. Initial compaction demonstration:
 - A. As specified in Section 02300. :
 - 1. Adequacy of compaction equipment and procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of following amounts of earthwork quantities:
 - a. 100 linear feet of trench backfill. This is required for each compaction equipment operator and if/when equipment operators are replaced with new operators.

- ~~2. Compaction sequence requirements: Until specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.~~
- ~~3.1. After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified under "FIELD QUALITY CONTROL."~~^{AD1}

PART 2 PRODUCTS

2.01 MATERIALS

- A. Soil and rock materials:
 - 1. Aggregate base course material: As specified in Section 02050.
 - 2. Gravel: As specified in Section 02050.
 - 3. Native material: As specified in Section 02050.
 - 4. Sand: As specified in Section 02050.
 - 5. Select material: As specified in Section 02050.
- B. Controlled low-strength material: As specified in Section 02312.

PART 3 EXECUTION

3.01 PREPARATION

- A. General:
 - 1. Embankment condition:
 - a. Exists where width of trench exceeds limits specified in this Section.
 - b. Before laying pipes in fill, place fill and compact it to not less than 2 feet above top of pipe.
 - c. After placing and compacting fill, excavate pipe trench through fill.
- B. Protection: Stabilize trench excavations as specified in Section 02260.

3.02 INSTALLATION

- A. Trench excavation:
 - 1. General requirements:
 - a. If, because of soil conditions, safety requirements, or other reasons, trench width at top of pipe is increased beyond width specified in this Section, upgrade laying conditions or install stronger pipe designed in conformance with Specifications for increased trench width, without additional cost to Owner.
 - b. Excavate bottom of trench to depth indicated on the Drawings. The bottom of the trench excavation shall be firm and dry.
 - 2. The trench may be excavated by machinery to the grade indicated on the Drawings provided that the soil material remaining in the bottom of the trench is no more than slightly disturbed.
 - 3. Rock:
 - a. Pipe: If bottom of trench excavation is found to consist of rock or any material that by reason of its hardness cannot be excavated to provide uniform bearing surface, remove such rock or other material to a depth of

- not less than 4 inches below bottom of fine grading material. Backfill overcut with aggregate base course material compacted to 95 percent of maximum density up to bottom of fine grading material.
- b. Direct buried electrical and control conduits: If bottom of trench excavation is found to consist of rock or any material that by reason of its hardness cannot be excavated to provide uniform bearing surface, remove such rock or other material to a depth of not less than 4 inches below bottom of conduit bedding material. Backfill overcut with aggregate base course material up to bottom of conduit bedding material.
 - c. Electrical and control duct banks: If bottom of trench excavation is found to consist of rock or any material that by reason of its hardness cannot be excavated to provide uniform bearing surface, remove such rock or other material to a depth of not less than 4 inches below bottom of concrete duct bank. Backfill overcut with aggregate base course material up to bottom of concrete duct bank.
- 4. Overcut of trench bottom: Where the bottom of the trench is excavated below the depth indicated on the Drawings, restore trench bottom to proper grade by back filling with aggregate base course material compacted to 95 percent of maximum density, at no additional cost to Owner.
 - 5. Soft or unstable material:
 - a. If bottom of excavation is found to consist of soft or unstable material which is incapable of providing proper support, remove such material to a depth and for the length required, as determined by the Engineer. Backfill trench to bottom of fine grading material with aggregate base course material compacted to 90 percent of maximum density.
 - 6. Concrete cradle: Where indicated on the Drawings, cradle pipe in concrete.
 - 7. Trench widths:
 - a. Pipe shall be centered in the trench.
 - b. Minimum clear width of trench for pipe (measured at top of pipe):
 - 1) For pipe sizes 4 inches to and including 24 inches: Not less than outside diameter of pipe plus 18 inches.
 - 2) For pipe sizes larger than 24 inches: Not less than outside diameter of pipe plus 24 inches.
 - a) For CLSM backfill: Not less than 18 inches.
 - c. Maximum clear width of trench for pipe (measured at top of pipe):
 - 1) For pipe sizes 4 inches to and including 24 inches: Not to exceed outside diameter of pipe plus 24 inches.
 - 2) For pipe sizes larger than 24 inches: Not to exceed outside diameter of pipe plus 36 inches.
 - 8. For manholes, valves, or other accessories:
 - a. Provide excavations sufficient to leave at least 12 inches clear between their outer surfaces and sides of trench or shoring.
 - b. Backfilling of manhole excavation: Conform to backfilling requirements as specified for trenches in this Section.
 - c. Backfill under manholes, vaults, tanks, or valves with aggregate base course material. Do not backfill with soil.
 - d. Fill any unauthorized excess excavation below elevation indicated on the Drawings for foundation of any structure with aggregate base course material at no additional cost to Owner.
 - 9. Potable water pipe and appurtenances:
 - a. Lay in trenches separate from those used for sewers.

- b. Unless otherwise specified or indicated on the Drawings, lay in trenches having cover of not less than 3 feet below surface of ground and located at distance of not less than 10 feet from any parallel sewer trench.
 - 10. At road crossings or existing driveways:
 - a. Make provision for trench crossings at these points, either by means of backfills, tunnels, or temporary bridges.
- B. Dewatering: As specified in Section 02240.
- C. Pipe fine grading:
 - 1. Schedule fine grading material as specified in this Section.
 - 2. For pipes 16 inches in nominal diameter and under.
 - a. Place 4 inches of fine grading material below bottom of pipe.
 - b. Place fine grading material at uniform density, with minimum possible compaction.
 - 3. For pipe over 16 inches in diameter.
 - a. Place 4 inches, or 1/12 the outside diameter of pipe, whichever is greater, of fine grading material below bottom of pipe.
 - b. Place fine grading material at uniform density, with minimum possible compaction.
 - c. For CLSM backfill, place a sufficient amount of sandbags beneath pipe to support pipe during CLSM placement.
 - 4. Bell or coupling holes:
 - a. Dig holes after trench bottom has been graded.
 - b. Provide holes of sufficient width to provide ample room for grouting, banding, or welding.
 - c. Excavate holes only as necessary for making joints and to ensure that pipe rests upon prepared trench bottom and not supported by any portion of the joint.
 - 5. Depressions for joints, other than bell-and-spigot:
 - a. Make in accordance with recommendations of joint manufacturer for particular joint used.
- D. Pipe bedding:
 - 1. Schedule bedding material as specified in this Section.
 - 2. After pipe laid:
 - a. Place bedding material under and around pipe in 6 inch maximum lifts of bedding material, to level 12 inches above top of pipe. Compact to 90 percent of maximum density.
 - b. For CLSM backfill, place CLSM in pipe zone as specified in Section 02312 in one continuous pour operation.
 - 3. Pipe displacement:
 - a. Take necessary precautions in placement and compaction of bedding material to prevent displacement of piping.
 - b. In event there is movement or floating of the piping, re-excavate, re-lay, and backfill the pipe.
- E. Trench backfill:
 - 1. Schedule bedding material as specified in this Section.
 - 2. Place backfill material in 12-inch maximum lifts.
- F. Under existing intersecting pipes or conduits larger than 3 inches in diameter:

1. As indicated on the Drawings.
- G. Compaction:
1. Where in Stanislaus County right-of-way perform compaction testing using Caltrans Test Method No. 216 and No 231. Submit to County Inspector. Obtain County Inspector approval prior to paving.
 2. Where outside Stanislaus County right-of-way, in-place density of compacted trench backfill, and bedding may be determined in accordance with ASTM D1556, or with ASTM D6938.
 3. Maximum density obtained in laboratory when tested in accordance with ASTM D1557.
 4. Consolidation:
 - a. Do not use water settling methods such as flooding, poling, or jetting.
- H. Excess material:
1. Remove excess excavated material from the Project site as specified in Section 02300 and dispose of legally off site.
- I. Timing of Trench Restoration:
1. Unless otherwise indicated or required, trenches shall be restored in accordance with the following:
 - a. Paved Right-of-Way: Unless otherwise required by the Agency that owns the right-of-way, trenches shall be backfilled and be temporarily or permanently paved at the end of each day. If striping is damaged, temporary or permanent striping shall be installed at the end of each day. Trench plating is not permitted.
 - b. Unpaved Right-of-Way: Unless otherwise required by the Agency that owns the right-of-way, trenches shall be backfilled or covered with trench plates secured in place overnight. Trench plates shall comply with Caltrans Temporary Steel Plate Bridging – With a Non-Skid Surface (Manual for Encroachment Permits on California State Highways – Chapter 600 – Utility Permits - 2013). Locations with trench plates shall be barricaded from vehicular traffic with temporary type K rails with reflective warning tape to prevent motorists from pulling off the road and driving onto the trench plates.
 - c. Private Property: Unless otherwise approved by the property owner in writing, comply with requirements of the Unpaved Right-of-Way.

3.03 FIELD QUALITY CONTROL

A. Trench backfill testing:

~~A. As specified in Section 02300. Tests:~~

~~1. Confirmation tests:~~

~~a. Contractor's responsibilities:~~

~~1) Accomplish specified compaction of trench backfill.~~

~~2) Control operations by confirmation tests to verify and confirm that compaction work complies, and is complying at all times, with requirements specified in this Section concerning compaction, control, and testing.~~

~~b. Confirmation tests shall be conducted and paid for by the Contractor per the Field Quality Control requirements in Section 02300.~~

~~2. Compliance tests:~~

- ~~a. Frequency of testing: Periodic compliance tests will be made by the Construction Manager to verify that compaction is meeting requirements previously specified.~~
- ~~b. If compaction fails to meet specified requirements: Perform remedial work by one of the following methods:~~
 - ~~1) Remove and replace backfill at proper density.~~
 - ~~2) Bring density up to specified level by other means acceptable to the Engineer.~~
 - ~~3. Retesting:~~
 - ~~a. Costs of retesting: Contractor is responsible for the costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements.~~
 - ~~b. Contractor's confirmation tests during performance of remedial work:~~
 - ~~1) Performance: Perform tests in manner acceptable to the Engineer.~~
 - ~~2) 1. Frequency: Double amount specified for initial confirmation tests.~~^{AD1}

- B. Piping system testing:
 - 1. As specified in Section 15956.

3.04 SCHEDULES

- A. Pipe fine grading materials:
 - 1. Fine grading material shall be the same as bedding material compacted to 95 percent of maximum density.
- B. Bedding materials:
 - 1. Pipes:
 - a. For pipe less than 24-inch nominal size: Except as otherwise specified, use aggregate base course material compacted to 95 percent of maximum density.
 - b. For pipe 24-inch or greater nominal size: Except as otherwise specified, use sand compacted to 95 percent of maximum density.
 - 1) CLSM may be used at the Contractor's option.
 - c. For polyvinyl chloride or other plastic pipe less than 2 inches in diameter: Except as otherwise specified use sand.
 - 2. Direct buried electrical and control conduits: sand compacted to 95 percent of maximum density.
- C. Trench backfill:
 - 1. Under structures:
 - a. Backfill trench between pipeline bedding and underside of structure with aggregate base course material as specified in Section 02050 compacted to 95 percent of maximum density.
 - 2. Cuts across roadways and paved streets:
 - a. Backfill trench between pipeline bedding and road subgrade with aggregate base course material as specified in Section 02050 compacted to 95 percent of maximum density.
 - 3. Under and parallel to roadways or in paved areas, storage areas, access roads, or roadway shoulders:
 - a. Backfill trench between pipeline bedding and road subgrade with aggregate base course material as specified in Section 02050 compacted to 95 percent of maximum density.
 - 4. In open country or agricultural areas:

- a. Backfill trench above pipeline bedding to finish grade with native material as specified in Section 02050 compacted to 90 percent of maximum density. In agricultural areas, compact the topsoil to 85 percent of maximum density
- 5. Through earth slopes adjacent to, or supporting structures:
 - a. Backfill trench above pipeline bedding to finish grade with aggregate base course material or select material compacted to 95 percent of maximum density.

END OF SECTION

^{AD1} Addendum No. 1

SECTION 02467A
DRILLED CONCRETE PIERS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Drilled concrete piers.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
1. 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 2. 350 - Code Requirement for Environmental Engineering Concrete Structures and Commentary.
- B. ASTM International (ASTM):
1. C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 2. C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 3. C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
 4. C172 - Standard Practice for Sampling Freshly Mixed Concrete.
 5. C192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.

1.03 DEFINITIONS

- A. Cementitious materials: Defined as portland cement and pozzolan admixture.

1.04 SUBMITTALS

- A. Reinforcing bar placement drawings.
- B. Bar lists and bending details.
- C. Concrete mix design report as specified in Section 03300 - Cast-in-Place Concrete.
- D. Aggregate tests.
- E. Trial batch results.
- F. Concrete testing requirements as specified in Section 03300 - Cast-in-Place Concrete.
- G. A list and description of proposed equipment to be used for the construction of piers such as cranes, drills, cleaning equipment, and tremie concrete pumps.

- H. Details of overall construction operation, sequence, and drilling construction methods.
- I. Qualifications:
 - 1. Drilled pier contractor: Name, address, and qualifications. Submit names and references for 5 projects of similar size completed within 3 years of the bid date.
 - 2. Qualifications of crew for review. Substitution of approved personnel will not be allowed without written authorization by the Owner.
- J. Pier location plan and location information:
 - 1. Pier layout plan: Pier plan showing location indicated on the Drawings, including:
 - a. Assigned number for each pier as identification for use in pier installation record.
 - b. Pier tip elevation.
- K. Pier location survey.

1.05 QUALITY ASSURANCE

- A. Contractor qualifications:
 - 1. The Contractor shall be regularly engaged in the installation of drilled piers foundation systems.
 - 2. Have a minimum of 10 years previous experience on projects of similar or larger size, complexity, and subsurface conditions.
 - 3. The job supervisor directly responsible for pier installation shall have continuous experience on drilled pier installation throughout the last 10 years.
 - 4. The crane operators or "keymen" who give directions to the crane operators shall have at least 2 years of experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Reinforcing steel: Use reinforcing steel as specified in Section 03200 - Concrete Reinforcing.
- B. Tie wire: Use Number 18 double annealed iron wire, tie wire.
- C. Concrete: Use Class A concrete materials as specified in Section 03300 and as modified below.
 - 1. Performance Requirements:
 - a. Use proportions of Portland cement, fly ash, aggregate, and water in accordance with ACI 211.1 and ACI 336 to produce a workable, strong, dense, and impermeable concrete having a consistency as specified below.
 - b. Use concrete having a maximum nominal aggregate size of 3/4 inch.
 - c. Use concrete having a maximum water-to-cementitious materials ratio of 0.40.
 - d. Use concrete with 7- to 9-inch slump at the point of deposit and until placement is complete.

- e. Use concrete with a minimum 6-inch slump after 4 hours.
- f. Do not exceed a maximum fly ash content of 125 pounds per cubic yard.
- g. Use a minimum cementitious materials content of 520 pounds per cubic yard of concrete.
- 2. Admixtures
 - a. Accelerating or retarding admixtures may be used when ambient temperatures affect setting times.
 - b. Water-reducing admixture in accordance with ASTM C494, Type D.
 - c. Superplasticizer in accordance with ASTM C494, Type G.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Install piers only in the presence of the Engineer.
 - 2. Piers that fail to meet the requirements of these Specifications for alignment and piers which for other reasons are unacceptable will be rejected.
 - 3. Correct damaged or rejected piers by methods acceptable to the Engineer.
- B. Drilling:
 - 1. Drill holes by means of a power driven, rotary bucket, rotary auger type, or core barrel foundation drilling machine designed to excavate a cylindrical shaft:
 - a. Have sufficient power and cutting capacity to excavate the pier holes to the required depths into the soil or rock at the site.
 - 2. Use drilling method which prevents the shaft sidewalls from caving in or sloughing into the excavated hole, except that dewatering will not be permitted.
 - 3. Proceed with the work in the "wet" if the groundwater level is found above pier tip elevation.
 - 4. Do not drill holes within 4 pier diameters (center-to-center) of a previously drilled hole until after the concrete in the previous hole has set up, but in no case until the concrete has been placed for at least 15 hours.
 - 5. Do not drill holes until the excavation or fill in the area in which the shafts are to be located has been completed to the elevations indicated on the Drawings.
 - 6. Clean out the hole until no more than 1/4 inch of loose or soft material is left in the bottom of the hole.
 - 7. Clean and protect top of holes to prevent soil from falling into hole.
 - 8. Drill piers from the ground surface to tip elevations as indicated on the Drawings.
 - a. The Engineer will determine the final bottom of hole elevation and will keep a record of each drilled hole during installation.
- C. Reinforcing steel:
 - 1. Upon completion of drilling, position the reinforcing steel cage in the pier shaft as indicated on the Drawings and suspend it above the bottom of excavation before any concrete is placed in the shaft.
 - 2. Support the reinforcing steel cage so that it rotates freely just prior to final suspension.

3. If soil caving occurs after reinforcing steel is placed and before placement of concrete, remove the reinforcing steel and ream the hole to permit repositioning of the cage.
4. Support the cage in a manner that will ensure that it remains centered in the pier shaft during placement of concrete.
 - a. Use plastic roller type centering devices attached to spiral reinforcing bars.
 - b. The centering device shall position reinforcing cages in center of hole and provide proper cover for reinforcing bars.

D. Concrete:

1. Quality:
 - a. Use concrete composed of portland cement, fly ash, natural or crushed aggregate, and water proportioned in accordance with ACI 211.1, and mixed as specified.
 - b. Use proportions of portland cement, fly ash, and aggregate to produce a workable, strong, dense, and impermeable concrete having a consistency and strength as specified.
 - c. Use concrete having a maximum water-to-cementitious materials ratio of 0.40.
 - d. Do not exceed a maximum fly ash content of 125 pounds per cubic yard.
 - e. Use an air content of concrete, in accordance with ACI 350 for severe exposure.
 - f. Use a minimum cementitious materials content of 520 pounds per cubic yard of concrete.
2. Consistency:
 - a. Determine the quantity of water required for the proper consistency of the concrete by using slump tests in accordance with ASTM C143.
 - b. Use 8- to 10-inch slump at point of deposit for concrete which contains super-plasticizer.
3. Admixtures:
 - a. Accelerating or retarding admixtures may be used when ambient temperatures affect setting times.
 - b. Use water-reducing admixtures in mix.
 - c. Use super-plasticizer for drilled piers.
4. Aggregate tests:
 - a. Take samples of fine and course aggregate at the concrete batch plant.
 - b. Perform mechanical analysis and determine the specific gravity of one sample for each aggregate size.
 - c. Perform all sampling and tests using an independent engineering testing laboratory acceptable to the Engineer.
5. Concrete strength:
 - a. ~~Verify~~ Construction Manager shall perform verification of ^{AD1} the concrete strength during placement of concrete by test cylinders of samples taken at the job site.
 - b. Sample concrete in accordance with ASTM C172 at the time the concrete is deposited to determine the strength of the castings at different areas.
 - c. Make and cure test cylinders in accordance with ASTM C31.
 - d. Perform compression tests in accordance with ASTM C39.
 - e. Six cylinders shall be molded, cured, and tested for each day or for every 20 cubic yards of concrete placed, whichever is greater.

- f. Perform strength tests 28 days after molding the cylinders, except 2 cylinders of the set shall be tested at 7 days or 14 days.

E. Concrete placement:

1. Placement of concrete shall be as specified for dry or wet conditions as may be applicable for the conditions found at the time of the work.
2. During concrete placement, take care to prevent concrete from hitting the sides of the steel reinforcing bar cage which will cause segregation.
3. To prevent segregation, do not allow concrete to fall more than 5 feet.
4. Proceed with concrete placement that starts underwater, using underwater placement requirements until the hole is completely filled.
 - a. Do not dewater the shaft after partial concrete placement.
5. Provide for a supply of concrete that is adequate to complete placement on any given drilled pier in one continuous uninterrupted operation without cold joints.
6. Construct concrete work in a manner that dense, monolithic concrete is provided throughout the full length and diameter of the drilled pier.
7. Immediately after acceptance of the excavation, place the concrete.
8. Water in excavation:
 - a. Excavations containing more than 3 inches of water shall be pumped dry prior to concrete placement.
 - 1) Except for the bottom 3 inches, do not drop concrete through water:
 - b. In a dry excavation, place concrete with a concrete chute or pumping method acceptable to the Engineer.
 - c. Direct the flow of concrete down the center of the pier shaft in order to minimize sloughing of the sides of the hole and segregation of the concrete on the reinforcing steel.
9. Water seepage:
 - a. If seepage occurs at such a rate that the concrete cannot be properly placed, even if the pier hole is cased, place concrete using the "tremie" method:
 - b. Use a tremie pipe having a disposable plug that keeps the tremie free of fluid until the plug is blown out by the concrete pressure.
 - c. Preferably, use a tremie pipe which is 12 inches, but not less than 8 inches in diameter.
 - d. Alternatively, use pumped concrete discharging through a pipe at least 5 inches in diameter.
 - e. Use a tremie or pump pipe having watertight joints.
 - f. Provide for no more than 3 inches of height between the bottom of the tremie pipe and the bottom of excavation during initial concrete placement.
 - g. Provide positive control to make certain that the bottom of the tremie or pump pipe is at all times below the concrete surface.
 - h. At least a 1foot head of concrete shall be maintained above the top of the water.

F. Temporary casing:

1. Use temporary casing.
 - a. Withdraw casing as the concrete is placed:
2. Provide steel casing onsite in various appropriate lengths.
3. Case the drilled pier holes through any fill and native soil or rock as required to maintain a stable excavation.

4. Withdrawn casing as concrete placement proceeds while maintaining at least 3 feet of concrete depth over the bottom of the casing pipe.
 5. Use steel casing with an outside diameter at least as large as the design pier diameter.
 6. Use a casing wall thickness such that it is not damaged by water or ground pressures or by the stresses of installation.
 7. Attach cutting teeth to the casing, if required to penetrate to the planned depth.
 8. Use casing length so that at the end of drilling, the top of the casing projects above the ground surface and any adjacent mound of drill cuttings.
 9. Provide positive control to make certain that the bottom of the casing is at least 3 feet below the top of the concrete being placed to prevent a reduction in the diameter of the pier shaft due to earth pressure and to prevent insitu materials from falling into and mixing with the concrete.
- G. Cave-ins:
1. Remove soil which sloughs into the excavated pier shaft prior to concrete placement:
 2. During concrete placement, if the Engineer has reasons to suspect that concrete was breached by the soil or that the pier, for any other reason, may contain extraneous material, or otherwise is not in conformance with Drawings and Specifications, the Engineer may order testing of the pier by coring or other methods:
 - a. Pay for testing and additional construction as required by the Engineer, if the work is found defective.
 - b. If work is found to be not defective, testing cost will be paid by the Owner.
- H. Where required due to pier being constructed too high, cut off piers to the butt elevations indicated on the Drawings.
- I. Site tolerances:
1. Pier installation tolerances:
 - a. Deviation of center of pier butts: Not deviate from locations indicated on the Drawings more than 6 inches in any direction.
 - b. Deviation of elevation of pier butts: Not more than 1 inch higher nor more than 3 inches lower than elevation indicated on the Drawings.
 - c. Deviation of piers from vertical: Not more than 1/4 inch per foot of length.
 - d. After installation, a line from center of butt to center of tip shall be wholly within body of pier.

3.02 FIELD QUALITY CONTROL

- A. Inspection of drilled hole:
1. If inspection of hole is required by Engineer, dewater holes to make the holes accessible to inspection and construction personnel.
 2. Provide fresh air and adequate light for workmen and Engineer during such time that they occupy the shafts.
 3. Test each drilled hole for toxic or explosive gas prior to entry into the hole.
- B. Field measurements:
1. Pier location survey:
 - a. After piers are installed and prior to placing reinforcing steel, formwork, or concrete for the structure, prepare pier location survey showing

- coordinates of final location of butt of piers and elevations of butt of piers to accuracy of plus or minus 0.01 feet.
- b. Pier location survey shall be performed by Surveyor licensed in the state where the Project is located.
 - c. Provide survey that includes as minimum following information:
 - 1) Location coordinates of:
 - a) Location of pier butts as indicated on the Drawings.
 - b) Location of pier butts as installed.
 - c) Calculate distance between location coordinates of pier butts as indicated on the Drawings and actual location coordinates of pier butts as installed.
 - 2) Elevation of pier butts:
 - a) Elevation of pier butts as indicated on the Drawings.
 - b) Elevation of pier butts as installed.
 - c) Calculate difference in elevations of pier butts as indicated on the Drawings and actual elevation of pier butts as installed.
 - 3) Highlight piers that are not within specified tolerances for location in plan and butt elevation.
 - 4) Provide preceding information in tabular form and keyed to a pier plan by pier number:
 - a) Submit pier plan that shows each pier for each structure.
 - d. Engineer will utilize pier location survey information to evaluate acceptability of pier locations and elevations.

C. Concrete testing:

1. See concrete testing requirements listed in the Section under Concrete Strength.
2. Contractor shall coordinate with Construction Manager for scheduling Quality Assurance and Field Quality Control inspection and testing. Contractor shall provide access for the Construction Manager, as needed, to perform testing. Contractor shall provide Construction Manager a minimum 1 working day advance notice before inspection or testing is needed. ^{AD1}

3.03 ADJUSTING

- A. Correction of defective pier work:
1. Pier work not in accordance with the requirements indicated on the Drawings and specified in the Specifications is considered defective.
 2. Take corrective measures acceptable to the Engineer, if piers are damaged, out of tolerance, mislocated, or otherwise defective:
 - a. Cost of redesign of foundation elements by the Engineer required by reason of defective pier work shall be paid by Contractor.
 - b. Allow 15 working days from submittal of pier location survey, for design of corrections for defective pier work.
 3. Measures to be used to correct defective pier work will be selected by the Engineer. Corrective measures that may be acceptable to the Engineer include:
 - a. Installing additional piers at locations selected by the Engineer.
 - b. Pier caps will be redesigned by the Engineer and required details of modifications to pier caps will be given to the Contractor to accommodate piers that were installed out of tolerance.

4. Leave piers which are not accepted in the ground. Cut off such piers at least 2 feet below bottom of pier cap and fill such holes with compacted aggregate base course material.
5. Fill holes drilled for piers that are not used with Class C concrete.

END OF SECTION

AD1 Addendum No. 1

SECTION 02742A

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Asphalt pavement on prepared subgrade or aggregate base course to lines, grades, and compacted thickness as indicated on the Drawings.
- B. Related sections:
 - 1. Section 02050 - Soils and Aggregates for Earthwork.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D 1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft. lbf/f³)(2,700 kN-m/m³).
 - 2. D 1561 - Standard Practice for Preparation of Bituminous Mixture Test Specimens by Means of California Kneading Compactor.
- B. Caltrans Standard Test Methods:
 - 1. Calif Test 202 - Sieve Analysis of Fine and Coarse Aggregates.
 - 2. Calif Test 304 - Preparation of Bituminous Mixtures for Testing.
 - 3. Calif Test 362 - Determining Asphalt Content in Bituminous Mixtures by Vacuum Extraction.
 - 4. Calif Test 375 - Determining the In-Place Density and Relative Compaction of AC Pavement.
 - 5. Calif Test 379 - Determining Asphalt Content in Bituminous Mixtures (Troxler Nuclear Gauge Model 3241).
- C. State of California Department of Transportation Standard Specifications, latest edition (Caltrans Standard Specifications):
 - 1. Section 39 - Hot Mix Asphalt.

1.03 SYSTEM DESCRIPTION

- A. This Work shall consist of furnishing and mixing aggregate and asphalt binder at a central mixing plant, spreading and compaction of the mixture as specified and as indicated on the Drawings.
- B. In general, asphalt concrete and asphalt concrete base shall conform to the requirements of the local agency owning the road. Where not elsewhere required, asphalt concrete and asphalt concrete base shall conform to Section 39 "Hot Mix Asphalt," and all applicable referenced sections of the Caltrans Standard Specifications:
 - 1. Where conflicts exist, this specification shall govern.

1.04 DEFINITIONS

- A. "Asphalt Concrete" as used by Caltrans shall be considered the "Surface Course," or the final lift of the pavement section.
- B. "Asphalt Concrete Base" as used by Caltrans shall be the remaining portion of the asphalt pavement section excluding the final lift.
- C. "Asphalt Pavement" shall be the total pavement section of asphalt including Asphalt Concrete and Asphalt Concrete Base.

1.05 SUBMITTALS

- A. Mix design.
- B. Shop drawings.
- C. Product Data:
 - 1. Asphalt.
 - 2. Asphalt aggregate.
 - 3. Pavement reinforcing fabric.
- D. Quality control submittals:
 - 1. Test results.
 - 2. Certificate of Compliance.
 - 3. Certificate of Competence.
- E. Equipment list.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Asphalt pavement delivery:
 - 1. Transport the mixture from the mixing plant to the point of use in vehicles having tight bodies previously cleaned of all foreign materials.
 - 2. Treat bodies as necessary to prevent material from sticking to the bodies.
 - 3. Cover each load with canvas or other suitable material of sufficient size and thickness to protect the asphalt mixture from the weather.

1.07 PROJECT CONDITIONS

- A. Environmental requirements:
 - 1. Asphalt concrete:
 - a. Place asphalt concrete only when surface is dry, and when atmospheric temperature in the shade is 40 degrees Fahrenheit and rising, or above 50 degrees Fahrenheit if falling.
 - b. Do not place asphalt concrete when weather is foggy or rainy, when base on which material is to be placed is in wet or frozen conditions, or when, in the opinion of the Engineer, weather conditions will prevent proper handling, finishing, or compaction of the mixtures.
 - 2. Prime coat:
 - a. Do not apply prime coat when atmospheric temperature is below 60 degrees Fahrenheit.

- b. Apply prime coat only when base course is dry or contains moisture not in excess of that which will permit uniform distribution and desired penetration.

PART 2 PRODUCTS

2.01 ASPHALT PAVEMENT MATERIALS

- A. Asphalt pavement materials shall comply with the requirements of the local agency that owns the road. Where not elsewhere required, asphalt concrete and asphalt pavement materials shall meet the following requirements:
- B. Asphalts:
 - 1. Asphalt binder: Steam-refined paving asphalt, PG 64-10, conforming to Section 92-1.02C "Grades" of the Caltrans Standard Specifications.
 - 2. Prime coat and tack coat: Grade SC-70, conforming to Section 93 of the Caltrans Standard Specifications.
- C. Asphalt aggregate:
 - 1. Aggregate for asphalt concrete shall conform to Section 02050
 - 2. Aggregate for asphalt concrete base shall conform to Section 02050.
 - 3. The use of reclaimed asphalt pavement (RAP) in asphalt concrete and asphalt concrete base is prohibited.
- D. Asphalt pavement shall be produced in a batch mixing plant, a continuous pugmill mixing plant, or dryer-drum mixing plant:
 - 1. Proportioning shall conform to Section 39-3.03 of the Caltrans Standard Specifications.
 - 2. Mixing shall conform to Section 39-3.04 of the Caltrans Standard Specifications.

2.02 AGGREGATE BASE COURSE

- A. Aggregate base course: As specified in Section 02050.
- B. Aggregate base course shall be placed at the following locations:
 - 1. At all locations indicated on the Drawings.
- C. Compacted thickness of aggregate base course shall be as indicated on the local agency encroachment permit. If not in the local agency permit, thicknesses shall be per the Drawings and specifications.

2.03 EQUIPMENT

- A. Spreading and compacting equipment:
 - 1. Spreading equipment shall conform to Section 39-1.10 and all applicable referenced sections of the Caltrans Standard Specifications:
 - a. Only in areas inaccessible to the machine, by approval of the Engineer, will hand spreading be permitted.
 - 2. Compaction equipment shall conform to Section 39-1.10 and all applicable referenced sections of the Caltrans Standard Specifications.

2.04 SOURCE QUALITY CONTROL

- A. The Contractor shall perform sampling and tests of materials in accordance with California Test Method Number 304 and California Test Method Number 362 or 379, as applicable. Samples shall be taken from materials as delivered to the site.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of conditions: Verify surfaces and site conditions are ready to receive work. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning application means acceptance of existing conditions.

3.02 PREPARATION

- A. Protection:
 - 1. Protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials.
 - 2. Building and other surfaces shall be covered with paper or other protection, when required.
 - 3. Contractor shall be responsible for any damage caused by Contractor's employees. All damage caused by the Contractor's operations shall be repaired to the satisfaction of the Engineer at no additional cost to Owner.
- B. Subgrade preparation:
 - 1. Immediately prior to applying prime coat or tack coat, or immediately prior to placing the asphalt pavement when prime coat or tack coat is not required, the subgrade to receive asphalt pavement shall conform to the compaction requirement and elevation tolerances specified for the material involved and shall be cleaned to remove any loose or extraneous material.
 - 2. If the asphalt pavement is to be placed on an existing base or pavement that was not constructed as part of the contract, the Contractor shall clean the surface by sweeping, flushing, or other means to remove all loose particles of paving, all dirt, and all other extraneous material immediately before applying the a prime coat or tack coat.

3.03 PRIME COAT AND TACK COAT

- A. Prime coat:
 - 1. A prime coat of liquid asphalt shall be applied on all surfaces of base course material to be paved.
 - 2. Prime coat shall be applied at a rate of 0.25 gallons per square yard and shall conform to Section 93-1.03 of the Caltrans Standard Specifications for the distributor application of the grade of liquid asphalt being used.
- B. Tack coat:
 - 1. A tack coat of asphaltic emulsion shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, or as otherwise specified in this Section.

2. Tack coat shall be applied in one application at a rate of 0.1 gallons per square yard of surface covered.

3.04 ASPHALT PAVEMENT

- A. Placing materials in a windrow, then picking it up and placing it in the asphalt paver with loading equipment, will be permitted provided that:
 1. The asphalt paver is of such design that the material will fall into a hopper that has a movable bottom conveyor to feed and screed.
 2. The loader is constructed and operated so that substantially all of the material deposited into windrows is picked up and deposited into the paving machine.
 3. The windrow is deposited only so far in advance of the paver to provide for continuous operation of the paver and not so far as to allow the temperature of the asphalt pavement in the windrow to fall below 260 degrees Fahrenheit.
- B. Asphalt pavement and aggregate base course shall be spread and compacted in the number of layers and of the thicknesses as required by the local agency or to match the existing thicknesses, whichever is greater..
- C. A layer shall not be placed over another layer which exceeds 3 inches in compacted thickness until the temperature of the layer which exceeds 3 inches in compacted thickness is less than 160 degrees Fahrenheit at mid depth:
 1. If the temperature of any layer drops below 140 degrees Fahrenheit, or if directed by the Engineer, apply tack coat before placing next layer.
- D. Unless otherwise indicated on the Drawings, asphalt mixtures shall not be handled, spread, or windrowed in a manner that will stain the finished surface of any pavement or other improvements.
- E. The completed mixture shall be deposited on the prepared subgrade at a uniform quantity per linear foot, as necessary to provide the required compacted thickness without resorting to spotting, picking up, or otherwise shifting the mixture.
- F. Spreading:
 1. All layers of asphalt pavement shall be spread with an asphalt paver and shall conform to Section 39-1.11 and all applicable referenced sections of the Caltrans Standard Specifications.
 2. At locations where the asphalt pavement is to be placed over areas inaccessible to spreading and rolling equipment, all layers of asphalt pavement shall be distributed directly out of the back of the dump truck and spread by hand:
 - a. Asphalt pavement spread by hand shall be compacted thoroughly to the required lines, grades, and cross-sections by means of pneumatic tampers, or by other methods that will produce the same degree of compaction as pneumatic tampers.
- G. Compaction:
 1. Compaction of asphalt pavement shall conform to Sections 39-1.11, 39-3.03, 39-3.04, and all applicable referenced sections of the Caltrans Standard Specifications.
 2. Minimum percent of that obtained in the laboratory in accordance with ASTM Test Method D 1561.

- H. Segregation shall be avoided, and the surfacing shall be free of pockets of coarse or fine material. Asphalt pavement containing hardened lumps shall not be used:
 - 1. In areas inaccessible to paving and compacting equipment where spreading is done by hand, minimize the amount of segregation.
- I. Location of longitudinal joints in the top layer will be determined by the Engineer and shall not adversely affect the quality of the finished product.
- J. At all locations, or as directed by the Engineer, the asphalt concrete shall be square and at least 1-inch thick when conforming to existing surfacing. Tapering or feathering is not allowed.

3.05 FIELD QUALITY CONTROL

A. Scheduling:

- 1. Contractor shall coordinate with Construction Manager for scheduling Field Quality Control testing. Contractor shall provide access for the Construction Manager, as needed, to perform inspection and testing. Contractor shall provide Construction Manager a minimum 1 working day advance notice before inspection or testing is needed. ^{AD1}

A.B. The Contractor shall control the quality of Work ~~and~~. The Construction Manager shall provide adequate testing to ensure compliance with these Specifications:

- 1. ~~The~~ The Construction Manager shall determine the type and size of the samples ~~shall be~~ suitable to determine conformance with stability, density, thickness, and other specified requirements. ~~Use and use~~ an approved power saw or core drill for cutting samples. Furnish Construction Manager shall furnish all tools, labor, and materials for cutting samples, and performing testing, and replacing. Contractor shall replace the pavement where samples were removed. ~~Take a minimum of 1~~ Construction Manager shall sample and test 1 location for every 4,000 square feet of asphalt pavement placed. ^{AD1}

B.C. All asphalt pavement shall match the grades indicated on the Drawings and shall be completely free from unintended hollows and high spots. Contractor shall perform the following: ^{AD1}

- 1. After completion of paving work, all paving shall be flooded with water. Any ponding that results in standing water greater than 3/4 inch in depth shall be ringed with chalk. Such hollows shall be corrected by removing and replacing the asphalt concrete. The asphalt concrete patch shall be square and at least 1-inch thick when conforming to existing surfacing. Tapering or feathering is not allowed.

C.D. ~~Contractor~~ The Construction Manager shall ~~perform~~ provide ^{AD1} in-place density and compaction tests of the completed pavement in accordance with California Test Method Number 375, to determine compliance with the specified requirements. Submit test results to Engineer for approval. ^{AD1}

D.E. Cracks, settling of surface, improper drainage, improper compaction, and sloppy connection to previously laid surfaces will be construed as improper workmanship and will not be accepted.

3.06 MAINTENANCE OF PAVEMENT

- A. Upon completion of final rolling, traffic shall not be permitted on the finished pavement for at least 6 hours, or until the asphalt pavement has cooled sufficiently to withstand traffic without being deformed.

3.07 WORKMANSHIP AND WARRANTY

- A. Contractor shall provide written warranty against defects in materials or workmanship for a period of not less than 1 year upon completion of Work.

END OF SECTION

AD1 Addendum No. 1

SECTION 05190

MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Cast-in anchors and fasteners:
 - a. Anchor bolts.
 - 2. Post-installed steel anchors and fasteners:
 - a. Concrete anchors.
 - 3. Appurtenances for anchoring and fastening:
 - a. Anchor bolt sleeves.
 - b. Isolating sleeves and washers.
 - c. Thread coating for threaded stainless steel fasteners.
- B. Related sections:
 - 1. Section 01330 - Submittals.
 - 2. Section 01410 - Regulatory Requirements.
 - 3. Section 01450 - Quality Control.
 - 4. Section 01455 - Special Tests and Inspections.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. 355.2 - Qualification of Post-Installed Mechanical Anchors in Concrete & Commentary.
- B. American National Standards Institute (ANSI):
 - 1. B212.15 - Cutting Tools - Carbide-tipped Masonry Drills and Blanks for Carbide-tipped Masonry Drills.
- C. American Welding Society (AWS):
 - 1. D1.1 - Structural Welding Code - Steel.
 - 2. D1.6 - Structural Welding Code - Stainless Steel.
- D. ASTM International (ASTM):
 - 1. A36 - Standard Specification for Carbon Structural Steel.
 - 2. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. A108 - Standard Specification for Steel Bars, Carbon and Alloy, Cold Finished.
 - 4. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 6. A240 - Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

7. A308 - Standard Specification for Steel Sheet, Terne (Lead-Tin Alloy) Coated by the Hot-Dip Process.
 8. A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 9. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 10. B633 - Standard Specification for *Electrodeposited* Coatings of Zinc on Iron and Steel.
 11. B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 12. E488 - Standard Test Methods for Strength of Anchors in Concrete Elements.
 13. F436 - Standard Specification for Hardened Steel Washers.
 14. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
 15. F594 - Standard Specification for Stainless Steel Nuts.
 16. F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength.
 17. F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- E. International Code Council Evaluation Service, Inc. (ICC-ES):
1. AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements.

1.03 DEFINITIONS

- A. Built-in anchor: Headed bolt or assembly installed in position before filling surrounding masonry units with grout.
- B. Cast-in anchor: Headed bolt or assembly installed in position before placing plastic concrete around.
- C. Overhead installations: Fasteners installed on overhead surfaces where the longitudinal axis of the fastener is more than 60 degrees above a horizontal line so that the fastener resists sustained tension loads.
- D. Passivation: Chemical treatment of stainless steel with a mild oxidant for the purpose of enhancing the spontaneous formation of the steel's protective passive film.
- E. Post-installed anchor: Fastener or assembly installed in hardened concrete or finished masonry construction, typically by drilling into the structure and inserting a steel anchor assembly.
- F. Terms relating to structures or building environments as used with reference to anchors and fasteners:
1. Corrosive locations: Describes interior and exterior locations as follows:
 - a. Locations used for delivery, storage, transfer, or containment (including spill containment) of chemicals used for plant treatment processes.
 - b. Exterior and interior locations at the following treatment structures:
 2. Wet and moist locations: Describes locations, other than "corrosive locations," that are submerged, are immediately above liquid containment structures, or are subject to frequent wetting, splashing, or wash down. Includes:
 - a. Exterior portions of buildings and structures.

- b. Liquid-containing structures:
 - 1) Locations at and below the maximum operating liquid surface elevation.
 - 2) Locations above the maximum operating liquid surface elevation and:
 - a) Below the top of the walls containing the liquid.
 - b) At the inside faces and underside surfaces of a structure enclosing or spanning over the liquid (including walls, roofs, slabs, beams, or walkways enclosing the open top of the structure).
- c. Liquid handling equipment:
 - 1) Bases of pumps and other equipment that handles liquids.
- d. Indoor locations exposed to moisture, splashing, or routine wash down during normal operations, including floors with slopes toward drains or gutters.
- e. Other locations indicated on the Drawings.
- 3. Other locations:
 - a. Interior dry areas where the surfaces are not exposed to moisture or humidity in excess of typical local environmental conditions.

1.04 SUBMITTALS

- A. General:
 - 1. Submit as specified in Section 01330.
 - 2. Submit information listed for each type of anchor or fastener to be used.
- B. Action submittals:
 - 1. Product data:
 - a. Cast-in anchors:
 - 1) Manufacturer's data including catalog cuts showing anchor sizes and configuration, materials, and finishes.
 - b. Post-installed anchors:
 - 1) For each anchor type, manufacturer's data including catalog cuts showing anchor sizes and construction, materials and finishes, and load ratings.
 - 2. Samples:
 - a. Samples of each type of anchor, including representative diameters and lengths, if requested by the Engineer.
 - 3. Certificates:
 - a. Cast-in anchors:
 - 1) Mill certificates for steel anchors that will be supplied to the site.
 - b. Post-installed anchors:
 - 1) Manufacturer's statement or certified test reports demonstrating that anchors that will be supplied to the site comply with the materials properties specified.
 - 4. Test reports:
 - a. Post-installed anchors: For each anchor type used for the Work:
 - 1) Current ICC-ES Report (ESR) demonstrating:
 - a) Acceptance of that anchor for use under the building code specified in Section 01410.
 - 5. Manufacturer's instructions:
 - a. Requirements for storage and handling.

- b. Recommended installation procedures including details on drilling, hole size (diameter and depth), hole cleaning and preparation procedures, anchor insertion, and anchor tightening.
 - c. Requirements for inspection or observation during installation.
- 6. Qualification statements:
 - a. Post-installed anchors: Installer qualifications:
 - 1) Submit list of personnel performing installations and include date of manufacturer's training for each.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Post installed anchors shall be in accordance with building code specified in Section 01410.
- B. Special inspection:
 - 1. Provide special inspection of post-installed anchors as specified in Section 01455 and this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver post-installed anchors in manufacturer's standard packaging with labels visible and intact. Include manufacturer's installation instructions.
- B. Handle and store anchors and fasteners in accordance with manufacturer's recommendations and as required to prevent damage.
- C. Protect anchors from weather and moisture until installation.

1.07 PROJECT CONDITIONS

- A. Seismic Design Category (SDC) for structures is indicated on the Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

- A. General:
 - 1. Furnish threaded fasteners with flat washers and hex nuts fabricated from materials corresponding to the material used for threaded portion of the anchor.
 - a. Cast-in anchors: Provide flat washers and nuts as listed in the ASTM standard for the anchor materials specified.
 - b. Post-installed anchors: Provide flat washers and nuts supplied for that product by the manufacturer of each anchor.
 - 2. Size of anchors and fasteners, including diameter and length or minimum effective embedment depth: As indicated on the Drawings or as specified in this Section. In the event of conflicts, contact Engineer for clarification.
 - 3. Where anchors and connections are not specifically indicated on the Drawings or specified, their material, size and form shall be equivalent in quality and workmanship to items specified.

- B. Materials:
 - 1. Provide and install anchors of materials as in this Section.

2.02 CAST-IN ANCHORS AND FASTENERS

- A. Anchor bolts:
 - 1. Description:
 - a. Straight steel rod having one end with an integrally forged head, and one threaded end. Embedded into concrete with the headed end cast into concrete at the effective embedment depth indicated on the Drawings or specified, and with the threaded end left to project clear of concrete face as required for the connection to be made.
 - b. Furnish anchor bolts with heavy hex forged head or equivalent acceptable to Engineer.
 - 1) Rods or bars with angle bend for embedment in concrete (i.e., "L" or "J" shaped anchor bolts) are not permitted in the Work.
 - 2. Materials:
 - a. Type 316 stainless steel:
 - 1) Surfaces descaled, pickled, and passivated in accordance with ASTM A308.
 - 2) Bolts: ASTM F593, Group 2, Condition CW, coarse threads.
 - 3) Nuts: ASTM F594. Match alloy (group and UNS designation) and threads of bolts.
 - 4) Washers: Type 316 stainless steel.
 - b. Galvanized steel:
 - 1) Hot-dip galvanized coating in accordance with ASTM F2329.
 - 2) Bolt: ASTM F1554, Grade 36, heavy hex, coarse thread.
 - 3) Nuts: ASTM A563, Grade A, heavy hex, threads to match bolt.
 - 4) Washers: ASTM F436, Type 1.

2.03 POST-INSTALLED ANCHORS AND FASTENERS – MECHANICAL

- A. General:
 - 1. Post-installed anchors used for the Work shall hold a current ICC Evaluation Service Report demonstrating acceptance for use under the building code specified in Section 01410.
 - a. Conditions of use: The acceptance report shall indicate acceptance of the product for use under the following conditions:
 - 1) In regions of concrete where cracking has occurred or may occur.
 - 2) To resist short-term loads due to wind forces.
 - 3) To resist short-term loading due to seismic forces for the Seismic Design Category of the structure where the product will be used.
 - 2. Substitutions: When requesting product substitutions, submit calculations, indicating the diameter, effective embedment depth and spacing of the proposed anchors, and demonstrating that the substituted product will provide load resistance that is equal to or greater than that provided by the anchors listed in this Section.
 - a. Calculations shall be prepared by and shall bear the signature and seal of a Professional Engineer licensed in the State of California.
 - b. Decisions regarding the acceptability of proposed substitutions shall be at the discretion of the Engineer.

- B. Concrete anchors:
1. Description. Post-installed anchor assembly consisting of a threaded stud and a surrounding wedge expansion sleeve that is forced outward by torquing the center stud to transfer loads from the stud to the concrete through bearing, friction, or both. (Sometimes referred to as “expansion anchors” or “wedge anchors.”)
 - a. Do not use slug-in, lead cinch, and similar systems relying on deformation of lead alloy or similar materials to develop holding power.
 2. Concrete anchors for anchorage to concrete:
 - a. Acceptance criteria:
 - 1) Concrete anchors shall have a current ICC-ES Report demonstrating that the anchors have been tested and qualified for performance in both cracked and un-cracked concrete, and for short-term loading due to wind and seismic forces for Seismic Design Categories A through F in accordance with ACI 355.2 and with ICC-ES AC193 (including all mandatory tests and optional tests for seismic tension and shear in cracked concrete).
 - 2) Concrete anchor performance in the current ICC-ES Report shall be “Category 1” as defined in ACI 355.2.
 - b. Manufacturers: One of the following or equal:
 - 1) Hilti: Kwik Bolt TZ Expansion Anchor.
 - 2) Powers fasteners: PowerStud+ SD2.
 - 3) Simpson Strong-Tie: Strong Bolt 2 Wedge Anchor.
 - c. Materials. Integrally threaded stud, wedge, washer, and nut:
 - 1) Stainless steel: Type 316.
 - 2) Galvanized: Carbon steel, zinc plated in accordance with ASTM B633, minimum 5 microns (Fe/Zn 5).
- C. Flush shells:
1. Description: Post-installed anchor assembly consisting of an internally threaded mandrel that is forced into a pre-drilled concrete hole with a setting tool until the top of the anchor is flush with the face of the concrete. Once installed, a removable threaded bolt is installed in the mandrel.
 2. Flush shell anchors are not permitted in the Work.

2.04 APPURTENANCES FOR ANCHORING AND FASTENING

- A. Anchor bolt sleeves:
1. Having inside diameter approximately 2 inches greater than bolt diameter and minimum 10-bolt diameters long.
 2. Plastic sleeves:
 - a. High-density polyethylene, corrugated sleeve, threaded to provide adjustment of location on the anchor bolt.
 - b. Manufacturers: One of the following, or equal:
 3. Fabricated steel sleeves: Construct as specified in Section 05500:
 - a. At galvanized carbon steel anchor bolts, provide galvanized carbon steel sleeves.
 - b. At stainless steel anchor bolts, provide stainless steel sleeves of same Type (304 or 316) as bolt, except that sleeves shall be constructed from low carbon stainless steel for welding (Type 304L or 316L).

- B. Isolating sleeves and washers:
 - 1. Manufacturers: One of the following or equal:
 - a. Central Plastics Company, Shawnee, Oklahoma.
 - b. Corrosion Control Products, PSI Inc., Gardena, CA.
 - 2. Sleeves: Mylar, 1/32-inch thick, 4,000 volts per mil dielectric strength, of proper size to fit bolts and extending half way into both steel washers.
 - 3. One sleeve required for each bolt.
 - 4. Washers: The inside diameter of all washers shall fit over the isolating sleeve, and both the steel and isolating washers shall have the same inside diameter and outside diameter.
 - a. Proper size to fit bolts.
 - b. Two 1/8-inch thick steel washers for each bolt.
 - c. G3 Phenolic: 2 insulating washers are required for each bolt:
 - 1) Thickness: 1/8 inch.
 - 2) Base material: Glass.
 - 3) Resin: Phenolic.
 - 4) Water absorption: 2 percent.
 - 5) Hardness (Rockwell): 100.
 - 6) Dielectric strength: 450 volts per mil.
 - 7) Compression strength: 50,000 pounds per square inch.
 - 8) Tensile strength: 20,000 pounds per square inch.
 - 9) Maximum operating temperature: 350 degrees Fahrenheit.
- C. Coating for repair of galvanized surfaces:
 - 1. Manufacturers: One of the following or approved equal:
 - a. Galvinox.
 - b. Galvo-Weld.
- D. Thread coating: For use with threaded stainless steel fasteners:
 - 1. Manufacturers: One of the following or equal:
 - a. Never Seez Compound Corporation, Never-Seez.
 - b. Oil Research, Inc., WLR No. 111.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine Work in place to verify that it is satisfactory to receive the Work of this Section. If unsatisfactory conditions exist, do not begin this Work until such conditions have been corrected.

3.02 INSTALLATION: GENERAL

- A. Where anchors and fasteners are not specifically indicated on the Drawings or specified, make attachments with materials specified in this Section.
- B. Substitution of anchor types:
 - 1. Post-installed anchors may not be used as an alternative to cast-in/built-in anchors at locations where the latter are indicated on the Drawings.
 - 2. Cast-in/built-in anchors may be used as an alternative to post-installed mechanical anchors at locations where the latter are indicated on the Drawings.

- C. Protect products from damage during installation. Take special care to protect threads and threaded ends.
- D. Accurately locate and position anchors and fasteners:
 - 1. Unless otherwise indicated on the Drawings, install anchors perpendicular to the surfaces from which they project.
 - 2. Install anchors so that at least 2 threads, but not more than 1/2 inch of threaded rod, projects past the top nut.
- E. Interface with other products:
 - 1. Where steel anchors come in contact with dissimilar metals (aluminum, stainless steel, etc.), use stainless steel anchors and separate or isolate dissimilar metals using isolating sleeves and washers.
 - 2. Prior to installing nuts, coat threads of stainless steel fasteners with thread coating to prevent galling of threads.

3.03 INSTALLATION: CAST-IN ANCHORS

- A. General:
 - 1. Accurately locate cast-in and built-in anchors.
 - a. Provide anchor setting templates to locate anchor bolts and anchor rods. Secure templates to formwork.
 - b. Brace or tie off embeddings as necessary to prevent displacement during placement of plastic concrete or of surrounding masonry construction.
 - c. Position and tie cast-in and built-in anchors in place before beginning placement of concrete or grout. Do not “stab” anchors into plastic concrete, mortar, or grout.
 - d. Do not allow cast-in anchors to touch reinforcing steel. Where cast-in anchors are within 1/4 inch of reinforcing steel, isolate the metals by wrapping the anchors with a minimum of 4 wraps of 10-mil polyvinyl chloride tape in area adjacent to reinforcing steel.
 - 2. For anchoring at machinery bases subject to vibration, use 2 nuts, with 1 serving as a locknut.
 - 3. Where anchor bolts or anchor rods are indicated on the Drawings as being for future use, thoroughly coat exposed surfaces that project from concrete or masonry with non-oxidizing wax. Turn nuts down full length of the threads, and neatly wrap the exposed thread and nut with a minimum of 4 wraps of 10-mil waterproof polyvinyl tape.
- B. Anchor bolts:
 - 1. Minimum effective embedment: 10-bolt diameters, unless a longer embedment is indicated on the Drawings.
 - 2. Where indicated on the Drawings, set anchor bolts in plastic, galvanized steel or stainless steel sleeves to allow for adjustment.

3.04 INSTALLATION: POST-INSTALLED MECHANICAL ANCHORS

- A. General:
 - 1. Install anchors in accordance with the manufacturer's instructions, ACI 355.2, the anchor's ICC-ES Report. Where conflict exists between the ICC-ES Report and the requirements in this Section, the requirements of the ICC-ES Report shall control.

2. Where anchor manufacturer recommends the use of special tools and/or specific drill bits for installation, provide and use such tools.
 3. After anchors have been positioned and inserted into concrete or masonry, do not:
 - a. Remove and reuse/reinstall anchors.
 - b. Loosen or remove bolts or studs.
- B. Holes drilled into concrete and masonry:
1. Do not drill holes in concrete or masonry until the material has achieved its minimum specified compression strength (f'_c or f'_m).
 2. Accurately locate holes:
 - a. Before drilling holes, use a reinforcing bar locator to identify the position of all reinforcing steel, conduit, and other embedded items within a 6-inch radius of each proposed hole.
 - b. If the hole depth exceeds the range of detection for the rebar locator, the Engineer may require radiographs of the area designated for investigation before drilling commences.
 3. Exercise care to avoid damaging existing reinforcement and other items embedded in concrete and masonry.
 - a. If embedments are encountered during drilling, immediately stop work and notify the Engineer. Await Engineer's instructions before proceeding.
 4. Unless otherwise indicated on the Drawings, drill holes perpendicular to the concrete surface into which they are placed.
 5. Drill using anchor manufacturer's recommended equipment and procedures.
 - a. Unless otherwise recommended by the manufacturer, drill in accordance with the following:
 - 1) Drilling equipment: Electric or pneumatic rotary type with light or medium impact. Where edge distances are less than 2 inches, use lighter impact equipment to prevent micro-cracking and concrete spalling during drilling process.
 - 2) Drill bits: Carbide-tipped in accordance with ANSI B212-15. Hollow drills with flushing air systems are preferred.
 6. Drill holes at manufacture's recommended diameter and to depth required to provide the effective embedment indicated.
 7. Clean and prepare holes as recommended by the manufacturer and as required by the ICC-ES Report for that anchor.
 - a. Unless otherwise recommended by anchor manufacturer, remove dust and debris using brushes and clean compressed air.
 - b. Repeat cleaning process as required by the manufacturer's installation instructions.
 - c. When cleaning holes for stainless steel anchors, use only stainless steel or non-metallic brushes.
- C. Insert and tighten (or torque) anchors in full compliance with the manufacturer's installation instructions.
1. Once anchor is tightened (torque), do not attempt to loosen or remove its bolt or stud.

- D. Concrete anchors: Minimum effective embedment lengths unless otherwise indicated on the Drawings:

Concrete Anchors			
Nominal Diameter	Minimum Effective Embedment Length		Minimum Member Thickness
	In Concrete	In Grouted Masonry	
3/8 inch	2 1/2 inch	2 5/8 inch	8 inch
1/2 inch	3 1/2 inch	3 1/2 inch	8 inch
5/8 inch	4 1/2 inch	4 1/2 inch	10 inch
3/4 inch	5 inch	5 1/4 inch	12 inch

- E. Flush shell anchors:
1. Flush shell anchors are not permitted in the Work.
 2. If equipment manufacturer's installation instructions recommend the use of flush shell anchors, contact Engineer for instructions before proceeding.

3.05 FIELD QUALITY CONTROL

- A. Contractor shall provide quality control over the Work of this Section as specified in Section 01450.
1. Expenses associated with work described by the following paragraphs shall be paid by the Contractor.
- B. Post-installed anchors:
1. Review anchor manufacturer's installation instructions and requirements of the Evaluation Service Report (hereafter referred to as "installation documents") for each anchor type and material.
 2. Observe hole-drilling and cleaning operations for conformance with the installation documents.
 3. Certify in writing to the Engineer that the depth and location of anchor holes, and the torque applied for setting the anchors conforms to the requirements of the installation documents.

3.06 FIELD QUALITY ASSURANCE

- A. ~~Contractor~~^{AD1} ~~DB-Entity~~ will provide on-site observation and field quality assurance for the Work of this Section.
1. Expenses associated with work described by the following paragraphs shall be paid by the ~~Contractor~~^{AD1} ~~DB-Entity~~.
- B. Field inspections and special inspections:
1. Required inspections: Observe construction for conformance to the approved Contract Documents, the accepted submittals, and manufacturer's installation instructions for the products used.
 2. Record of inspections:
 - a. Maintain record of each inspection.
 - b. Submit copies to City upon request.
 3. Statement of special inspections: At the end of the project, prepare and submit to the Engineer and the authority having jurisdiction inspector's statement that

the Work was constructed in general conformance with the approved Contract Documents, and that deficiencies observed during construction were resolved.

- C. Special inspections: Anchors cast into concrete and built into masonry.
 - 1. Provide special inspection during positioning of anchors and placement of concrete or masonry (including mortar and grout) around the following anchors:
 - a. Anchor bolts.
 - 2. During placement, provide continuous special inspection at each anchor location to verify that the following elements of the installation conform to the requirements of the Contract Documents.
 - a. Anchor:
 - 1) Type and dimensions.
 - 2) Material: Galvanized steel, Type 304 stainless steel, or Type 316 stainless steel as specified in this Section or indicated on the Drawings.
 - 3) Positioning: Spacing, edge distances, effective embedment, and projection beyond the surface of the construction.
 - 4) Reinforcement at anchor: Presence, positioning, and size of additional reinforcement at anchors indicated on the Drawings.
 - 3. Following hardening and curing of the concrete or masonry surrounding the anchors, provide periodic special inspection to observe and confirm the following:
 - a. Base material (concrete or grouted masonry):
 - 1) Solid and dense concrete or grouted masonry material within required distances surrounding anchor.
 - 2) Material encapsulating embedment is dense and well-consolidated.
- D. Special Inspections: Post-installed mechanical anchors placed in hardened concrete and in grouted masonry.
 - 1. Provide special inspection during installation of the following anchors:
 - a. Concrete anchors.
 - 2. Unless otherwise noted, provide periodic special inspection during positioning, drilling, placing, and torqueing of anchors.
 - a. Provide continuous special inspection for post-installed anchors in "overhead installations" as defined in this Section.
 - 3. Requirements for periodic special inspection:
 - a. Verify items listed in the following paragraphs for conformance to the requirements of the Contract Documents and the Evaluation Report for the anchor being used. Observe the initial installation of each type and size of anchor, and subsequent installation of the same anchor at intervals of not more than 4 hours.
 - 1) Any change in the anchors used, in the personnel performing the installation, or in procedures used to install a given type of anchor shall require a new "initial inspection."
 - b. Substrate: Concrete or masonry surfaces receiving the anchor are sound and of a condition that will develop the anchor's rated strength.
 - c. Anchor:
 - 1) Manufacturer, type, and dimensions (diameter and length).
 - 2) Material (galvanized, Type 304 stainless steel, or Type 316 stainless steel).

- d. Hole:
 - 1) Positioning: Spacing and edge distances.
 - 2) Drill bit type and diameter.
 - 3) Diameter, and depth.
 - 4) Hole cleaned in accordance with manufacturer's required procedures. Confirm multiple repetitions of cleaning when recommended by the manufacturer.
 - 5) Anchor's minimum effective embedment.
 - 6) Anchor tightening/installation torque.
 - 4. Requirements for continuous special inspection:
 - a. The special inspector shall observe all aspects of anchor installation, except that holes may be drilled in his/her absence provided that he/she confirms the use of acceptable drill bits before drilling, and later confirms the diameter, depth, and cleaning of drilled holes.
- E. Field tests:
- 1. City may, at any time, request testing to confirm that materials being delivered and installed conform to the requirements of the Specifications.
 - a. If such additional testing shows that the materials do not conform to the specified requirements, the Contractor shall pay the costs of these tests.
 - b. If such additional testing shows that the materials do conform to the specified requirements, the Owner shall pay the costs of these tests.

3.07 NON-CONFORMING WORK

- A. Remove misaligned or non-performing anchors.
- B. Fill empty anchor holes and repair failed anchor locations using high-strength, non-shrink, non-metallic grout.
- C. If more than 10 percent of all tested anchors of a given diameter and type fail to achieve their specified torque or proof load, the Engineer will provide directions for required modifications. Make such modifications, up to and including replacement of all anchors, at no additional cost to the Owner.

3.08 SCHEDULES

- A. Stainless steel. Provide and install stainless steel anchors at the following locations:
 - 1. "Corrosive locations" as defined in this Section: Type 316 stainless steel
 - 2. "Wet and moist locations" as defined in this Section: Type 316 stainless steel.
 - 3. At locations indicated on the Drawings.
- B. Galvanized: Provide and install galvanized carbon steel anchors at the following locations:
 - 1. Locations not requiring stainless steel.

END OF SECTION

AD1 Addendum No. 1

SECTION 09960

HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Field-applied coatings.
- B. Related sections:
 - 1. Section 01140 - Work Restrictions.
 - 2. Section 01312 - Project Meetings.
 - 3. Section 01330 - Submittal Procedures.
 - 4. Section 01600 - Product Requirements.
 - 5. Section 01770 - Closeout Procedures.
 - 6. Section 15075 - Equipment Identification.
 - 7. Section 16075 - Identification for Electrical Systems.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - 2. D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
- B. International Concrete Repair Institute (ICRI):
 - 1. Guideline 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.
- C. NACE International (NACE):
 - 1. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
 - 2. SP0188 - Discontinuity (Holiday) Testing of Protective Coatings.
- D. National Association of Pipe Fabricators (NAPF):
 - 1. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
- E. NSF International (NSF):
 - 1. 61 - Drinking Water System Components - Health Effects.
- F. Society for Protective Coatings (SSPC):
 - 1. SP COM - Surface Preparation Commentary for Steel and Concrete Substrates.
 - 2. SP 1 - Solvent Cleaning.
 - 3. SP 2 - Hand Tool Cleaning.
 - 4. SP 3 - Power Tool Cleaning.
 - 5. SP 5 - White Metal Blast Cleaning.
 - 6. SP 6 - Commercial Blast Cleaning.

- 7. SP 7 - Brush-Off Blast Cleaning.
 - 8. SP 10 - Near-White Blast Cleaning.
 - 9. SP 13 - Surface Preparation of Concrete.
- G. United States Environmental Protection Agency (EPA):
- 1. Method 24 - Surface Coatings.

1.03 DEFINITIONS

- A. Submerged metal: Steel or iron surfaces below tops of channel or structure walls that will contain water even when above expected water level.
- B. Submerged concrete and masonry surfaces: Surfaces that are or will be:
 - 1. Underwater.
 - 2. In structures that normally contain water.
 - 3. Below tops of walls of water-containing structures.
- C. Exposed surface: Any metal or concrete surface, indoors or outdoors, that is exposed to view.
- D. Dry film thickness (DFT): Thickness of fully cured coating, measured in mils.
- E. Volatile organic compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.
- F. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.
- G. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAPF surface preparation standard shall be substituted for the SSPC standard.

1.04 PERFORMANCE REQUIREMENTS

- A. Coating materials shall be especially adapted for use in wastewater treatment plants.
- B. Coating materials used in contact with potable water supply systems shall be certified to NSF 61.

1.05 SUBMITTALS

- A. General: Submit as specified in Section 01330.
- B. Shop drawings:
 - 1. Schedule of proposed coating materials.
 - 2. Schedule of surfaces to be coated with each coating material.
- C. Product data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips:

1. Regulatory requirements: Submit data concerning the following:
 - a. VOC limitations.
 - b. Coatings containing lead compounds and polychlorinated biphenyls.
 - c. Abrasives and abrasive blast cleaning techniques, and disposal.
 - d. NSF certification of coatings for use in potable water supply systems.
- D. Samples: Include 8-inch square drawdowns or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number, sheen name, and gloss units.
- E. Certificates: Submit in accordance with requirements for Product Data.
- F. Manufacturer's instructions: Include the following:
 1. Special requirements for transportation and storage.
 2. Mixing instructions.
 3. Shelf life.
 4. Pot life of material.
 5. Precautions for applications free of defects.
 6. Surface preparation.
 7. Method of application.
 8. Recommended number of coats.
 9. Recommended DFT of each coat.
 10. Recommended total DFT.
 11. Drying time of each coat, including prime coat.
 12. Required prime coat.
 13. Compatible and non-compatible prime coats.
 14. Recommended thinners, when recommended.
 15. Limits of ambient conditions during and after application.
 16. Time allowed between coats (minimum and maximum).
 17. Required protection from sun, wind, and other conditions.
 18. Touch-up requirements and limitations.
 19. Minimum adhesion of each system submitted in accordance with ASTM D4541.
 20. Material Safety Data Sheet.
- G. Manufacturer's Representative's Field Reports.
- H. Operations and Maintenance Data: Submit as specified in Section 01770.
 1. Reports on visits to project site to view and approve surface preparation of structures to be coated.
 2. Reports on visits to project site to observe and approve coating application procedures.
 3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."
- I. Quality Assurance Submittals:
 1. Quality assurance plan.
 2. Qualifications of coating applicator including List of Similar Projects.
- J. Certifications:
 1. Submit notarized certificate that:
 - a. All paints and coatings to be used on this project comply with current federal, state, and local VOC regulations.

2. California certifications:
 - a. All paints and coatings to be used on this project comply with the current VOC regulations of the State of California Air Management District in which the coatings will be used.

1.06 QUALITY ASSURANCE

- A. Applicator qualifications:
 1. Minimum of 5 years of experience applying specified type or types of coatings under conditions similar to those of the Work:
 - a. Provide qualifications of applicator and references listing 5 similar projects completed in the past 2 years.
 2. Manufacturer-approved applicator when manufacturer has approved applicator program.
 3. Approved and licensed by polymorphic polyester resin manufacturer to apply polymorphic polyester resin coating system.
 4. Approved and licensed by elastomeric polyurethane (100-percent solids) manufacturer to apply 100-percent solids elastomeric polyurethane system.
 5. Applicator of off-site application of coal-tar epoxy shall have successfully applied coal-tar epoxy on similar surfaces in material, size, and complexity as on the Project.
- B. Regulatory requirements: Comply with governing agencies regulations by using coatings that do not exceed permissible VOC limits and do not contain lead:
 1. Do not use coal-tar epoxy in contact with drinking water or exposed to ultraviolet radiation.
- C. Field samples:
 1. Prepare and coat a minimum 100-square-foot area between corners or limits such as control or construction joints of each system.
 2. Approved field sample may be part of the Work.
 3. Obtain approval before painting other surfaces.
- D. Pre-installation conference: Conduct as specified in Section 01312.
- E. Compatibility of coatings: Use products by same manufacturer for prime coats, intermediate coats, and finish coats on same surface, unless specified otherwise.
- F. Services of coating manufacturer's representative: Arrange for coating manufacturer's representative to attend pre-installation conferences. Make periodic visits to the project site to provide consultation and inspection services during surface preparation and application of coatings, and to make visits to coating plants to observe and approve surface preparation procedures and coating application of items to be "shop-primed and coated."

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as specified in Section 01600.
- B. Remove unspecified and unapproved paints from Project site immediately.

- C. Deliver new unopened containers with labels identifying the manufacturer's name, brand name, product type, batch number, date of manufacture, expiration date or shelf life, color, and mixing and reducing instructions.
 - 1. Do not deliver materials aged more than 12 months from manufacturing date.
- D. Store coatings in well-ventilated facility that provides protection from the sun, weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.
- E. Take precautions to prevent fire and spontaneous combustion.

1.08 PROJECT CONDITIONS

- A. Surface moisture contents: Do not coat surfaces that exceed manufacturer-specified moisture contents, or when not specified by the manufacturer, with the following moisture contents:
 - 1. Plaster and gypsum wallboard: 12 percent.
 - 2. Masonry, concrete, and concrete block: 12 percent.
 - 3. Interior located wood: 15 percent.
 - 4. Concrete floors: 7 percent.
- B. Do not apply coatings:
 - 1. Under dusty conditions or adverse environmental conditions, unless tenting, covers, or other such protection is provided for structures to be coated.
 - 2. When light on surfaces measures less than 15 foot-candles.
 - 3. When ambient or surface temperature is less than 55 degrees Fahrenheit unless manufacturer allows a lower temperature.
 - 4. When relative humidity is higher than 85 percent.
 - 5. When surface temperature is less than 5 degrees Fahrenheit above dew point.
 - 6. When surface temperature exceeds the manufacturer's recommendation.
 - 7. When ambient temperature exceeds 90 degrees Fahrenheit, unless manufacturer allows a higher temperature.
 - 8. Apply clear finishes at minimum 65 degrees Fahrenheit.
- C. Provide fans, heating devices, dehumidifiers, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
- D. Provide adequate continuous ventilation and sufficient heating facilities to maintain minimum 55 degrees Fahrenheit for 24 hours before, during, and 48 hours after application of finishes.
- E. Dehumidification and heating for coating of digester interiors, wet wells, and high humidity enclosed spaces:
 - 1. Provide dehumidification and heating of digester interior spaces in which surface preparation, coating application, or curing is in progress according to the following schedule:
 - a. October 1 to April 30: Provide continuous dehumidification and heating as required to maintain the tanks within environmental ranges as specified in this Section and as recommended by the coating material manufacturer. For the purposes of this Section, "continuous" is defined as 24 hours per day and 7 days per week.

- b. May 1 to September 30: Provide temporary dehumidification and heating as may be required to maintain the tanks within the specified environmental ranges in the event of adverse weather or other temporary condition. At Contractor's option and at his sole expense, Contractor may suspend work until such time as acceptable environmental conditions are restored, in lieu of temporary dehumidification and heating. Repair or replace any coating or surface preparation damaged by suspension of work, at Contractor's sole expense.
- 2. Equipment requirements:
 - a. Capacity: Provide dehumidification, heating, and air circulation equipment with minimum capacity to perform the following:
 - 1) Maintain the dew point of the air in the tanks at a temperature at least 5 degrees Fahrenheit less than the temperature of the coldest part of the structure where work is underway.
 - 2) Reduce dew point temperature of the air in the tanks by at least 10 degrees Fahrenheit in 20 minutes.
 - 3) Maintain air temperature in the tanks at 60 degrees Fahrenheit minimum.
 - b. Systems:
 - 1) Site electrical power: Not available for Contractor's use.
 - 2) Internal combustion engine generators: May be used; Contractor shall obtain all required permits and provide air pollution and noise control devices on equipment as required by permitting agencies.
 - 3) Dehumidification: Provide desiccant or refrigeration drying. Desiccant types shall have a rotary desiccant wheel capable of continuous operation. No liquid, granular, or loose lithium chloride drying systems will be allowed.
 - 4) Heating: Electric, indirect combustion, or steam coil methods may be used. Direct-fired combustion heaters will not be allowed during abrasive blasting, coating application, or coating cure time.
- 3. Design and submittals:
 - a. Contractor shall prepare dehumidification and heating plan for this project, including all equipment and operating procedures.
 - b. Suppliers of services and equipment shall have not less than 3 years' experience in similar applications.
 - 1) Supplier: The following or equal:
 - a) Cargocaire Corporation (Munters) or equal.
 - c. Submit dehumidification and heating plan for Engineer's review.
- 4. Monitoring and performance:
 - a. Measure and record relative humidity and temperature of air, and structure temperature twice daily (beginning and end of work shifts) to verify that proper humidity and temperature levels are achieved inside the work area after the dehumidification equipment is installed and operational. Test results shall be made available to the Engineer upon request.
 - b. Interior space of the working area and tank(s) shall be sealed, and a slight positive pressure maintained as recommended by the supplier of the dehumidification equipment.

- c. The filtration system used to remove dust from the air shall be designed so that it does not interfere with the dehumidification equipment's ability to control the dew point and relative humidity inside the reservoir:
 - 1) The air from the tank, working area, or dust filtration equipment shall not be recirculated through the dehumidifier during coating application or when solvent vapors are present.

1.09 SEQUENCING AND SCHEDULING

- A. Sequence and Schedule: As specified in Section 01140.

1.10 MAINTENANCE

- A. Extra materials: Deliver as specified in Section 01770. Include minimum 1 gallon of each type and color of coating applied:
 - 1. When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory.
 - 2. When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type, and color.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Special coatings: One of the following or equal:
 - 1. Carboline: Carboline, St. Louis, MO.
 - 2. Ceilcote: International Protective Coatings, Berea, OH.
 - 3. Dampney: The Dampney Company, Everett, MA.
 - 4. Devoe: International Protective Coatings, Louisville, KY.
 - 5. Dudick: Dudick, Inc., Streetsboro, OH.
 - 6. GET: Global Eco Technologies, Pittsburg, CA.
 - 7. Henkel: Henkel North America, Madison Heights, MI.
 - 8. IET: Integrated Environmental Technologies, Santa Barbara, CA.
 - 9. PPC: Polymorphic Polymers Corp., North Miami, FL.
 - 10. PPG Amercoat: PPG Protective & Marine Coatings, Brea, CA.
 - 11. Rustoleum: Rustoleum Corp., Sommerset, NJ.
 - 12. Sanchem: Sanchem, Chicago, IL.
 - 13. Superior: Superior Environmental Products, Inc., Addison, TX.
 - 14. S-W: Sherwin-Williams Co., Cleveland, OH.
 - 15. Tnemec: Tnemec Co., Kansas City, MO.
 - 16. Wasser: Wasser High Tech Coatings, Kent, WA.
 - 17. ZRC: ZRC Worldwide Innovative Zinc Technologies, Marshfield, MA.

2.02 PREPARATION AND PRETREATMENT MATERIALS

- A. Metal pretreatment: As manufactured by one of the following or equal:
 - 1. Henkel: Galvaprep 5.
 - 2. International: AWLGrip Alumiprep 33.
- B. Surface cleaner and degreaser: As manufactured by one of the following or equal:
 - 1. Carboline Surface Cleaner No. 3.

2. Devoe: Devprep 88.
3. S-W: Clean and Etch.

2.03 COATING MATERIALS

- A. Alkali-resistant bitumastic: As manufactured by one of the following or equal:
 1. Carboline: Bitumastic No. 50.
 2. S-W: Targuard.
 3. Wasser: MC-Tar.
- B. Wax coating: As manufactured by the following or equal:
 1. Sanchem: No-Ox-Id A special.
- C. High solids epoxy (self-priming) not less than 72 percent solids by volume: As manufactured by one of the following or equal:
 1. Carboline: Carboguard 891.
 2. Devoe: Bar Rust 233H.
 3. PPG Amercoat: Amerlock 2.
 4. S-W: Macropoxy 646.
 5. Tnemec: HS Epoxy Series 104.
- D. Aliphatic or aliphatic-acrylic polyurethane: As manufactured by one of the following or equal:
 1. Carboline: Carbothane 134 VOC.
 2. Devoe: Devthane 379.
 3. PPG Amercoat: Amershield VOC.
 4. Non-submerged: S-W High Solids Polyurethane CA.
 5. Tnemec: Endura-Shield II Series 1075 (U).
- E. Polymorphic polyester resin coating system: 2-component, modified styrene based thermoset resin, EPA approved for potable water, with 100 percent solids and maximum 10 grams per liter VOC. As manufactured by one of the following or equal:
 1. IET: IET Prime Coat DS-101, Intermediate Coat DS-301, and Finish Coat DS 401.
 2. PPC: PPC Prime Coat, IC-Filler Coat, and FC-Final Coat.
- F. High-temperature coating 150 to 350 degrees Fahrenheit: As manufactured by one of the following or equal:
 1. Carboline: Thermaline 4900.
 2. Dampney: Thermalox 245 Silicone - Zinc Dust.
 3. PPG Amercoat: Amerlock 2/400 GFK.
- G. High-temperature coating 400 to 1,000 degrees Fahrenheit (dry): As manufactured by one of the following or equal:
 1. Carboline: Thermaline 4700.
 2. Dampney: Thermolox 230C Series Silicone.
 3. Devoe: HT-12, High Heat Silicone.
- H. High-temperature coating up to 1,400 degrees Fahrenheit: As manufactured by the following or equal:
 1. Dampney: Thermalox 240 Silicone Ceramix.

- I. Asphalt varnish: AWWA C 500.
- J. Protective coal tar: As manufactured by one of the following or equal:
 - 1. Carboline: Bitumastic No. 50.
 - 2. PPG Amercoat: 78HB
- K. Coal-tar epoxy: As manufactured by one of the following or equal:
 - 1. Carboline: 300-M, Bitumastic.
 - 2. PPG Amercoat: 78HB.
 - 3. S-W: Tar Guard 100.
 - 4. Tnemec: Series 46H-413.
- L. Coal tar: Where coal tar, coal-tar epoxy, or coal-tar mastic are specified or indicated on the Drawings, use coal-tar epoxy substitute in their place. Coal tar shall not be allowed.
- M. Coal-tar epoxy substitute: As manufactured by one of the following or equal:
 - 1. Devoe: Devtar 5A HS.
 - 2. S-W: Macropoxy 646 Black.
- N. Vinyl ester: Glass mat reinforced, total system 125 mils DFT. As manufactured by one of the following or equal:
 - 1. Carboline: Semstone 870.
 - 2. Ceilcote: 6640 Ceilcrete.
 - 3. Dudick: Protecto-Flex 800.
 - 4. Tnemec: Chembloc Series 239SC.
- O. Elastomeric polyurethane, 100-percent solids, ASTM D16, Type V, (Urethane P): As manufactured by the following or equal:
 - 1. GET: Endura-Flex EF-1988.
- P. Concrete floor coatings: As manufactured by one of the following or equal:
 - 1. Carboline: Semstone 140SL.
 - 2. Devoe: Devran 124.
 - 3. Dudick: Polymer Alloy 1000.
 - 4. Tnemec: Tneme-Glaze Series 282.
- Q. Waterborne acrylic emulsion: As manufactured by one of the following or equal:
 - 1. S-W: DTM Acrylic B66W1.
 - 2. Tnemec: Tneme-Cryl Series 6.
- R. Galvanizing zinc compound: As manufactured by one of the following or equal:
 - 1. ZRC: Cold Galvanizing Compound.

2.04 COATING MATERIALS

- A. Alkali-resistant bitumastic: As manufactured by one of the following or equal:
 - 1. Carboline: Bitumastic No. 50 WB.
 - 2. S-W: Targuard 100.
- B. Wax coating: As manufactured by one of the following or equal:
 - 1. Sanchem: No-Ox-Id A special.

- C. High solids epoxy (self-priming) not less than 72-percent solids by volume with a mixed applied flash point of 140 degrees Fahrenheit or less: As manufactured by one of the following or equal:
 - 1. Carboline:
 - a. Non-submerged: Carboguard 890 VOC.
 - b. Submerged: Phenoline 341 (100-percent solids, 2-component epoxy).
 - 2. Devoe:
 - a. Bar Rust 233 Low VOC.
 - b. Devran 133 (100-percent solids, 2-component epoxy).
 - 3. Non-submerged: S-W Macropoxy 646-100.
 - 4. PPG Amercoat: Amerlock 2 VOC.
- D. Aliphatic or aliphatic-acrylic polyurethane not less than 80-percent solids with a mixed flash point of 140 degrees Fahrenheit or less: As manufactured by one of the following or equal:
 - 1. Carboline: Carbothane 134MC.
 - 2. Devoe: Devthane 379 H.
 - 3. S-W: High Solids Polyurethane 100.
 - 4. PPG Amercoat: Amershield VOC.
- E. Polymorphic polyester resin coating system: 2-component, modified styrene based thermoset resin, EPA approved for potable water, with 100 percent solids and maximum 10 grams per liter VOC. As manufactured by one of the following or equal:
 - 1. IET: IET Prime Coat DS-101, Intermediate Coat DS-301, and Finish Coat DS 401.
 - 2. PPC: PPC Prime Coat, IC-Filler Coat, and FC-Final Coat.
- F. High-temperature coating 150 to 350 degrees Fahrenheit: As manufactured by one of the following or equal:
 - 1. Carboline: Thermaline 4900.
 - 2. Dampney: Thermalox 245 Silicone - Zinc Dust.
 - 3. PPG Amercoat: Amerlock 2/400 GFK.
- G. High-temperature coating 400 to 1,000 degrees Fahrenheit (Dry): As manufactured by one of the following or equal:
 - 1. Carboline: Thermaline 4700 VOC.
 - 2. Dampney: Thermolox 230C Series Silicone.
 - 3. Devoe: HT-12, High Heat Silicone.
- H. High-temperature coating up to 1,400 degrees Fahrenheit: As manufactured by the following or equal:
 - 1. Dampney: Thermalox 240 Silicone Ceramix.
- I. Asphalt varnish: AWWA C 500.
- J. Coal tar: Where coal tar, coal-tar epoxy, or coal-tar mastic are specified or indicated on the Drawings, coal-tar epoxy substitute, as specified, shall be used in their place. Coal tar shall not be allowed.
- K. Coal-tar epoxy substitute: As manufactured by one of the following or equal:
 - 1. Devoe: Devtar 5A HS.
 - 2. S-W: Macropoxy 646 Black.

- L. Vinyl ester: Glass mat reinforced, total system 125 mils DFT, manufacturer's recommended topcoat. As manufactured by one of the following or equal:
 - 1. Carboline: Semstone 870.
 - 2. Ceilcote: 6640 Ceilcrete.
 - 3. Dudick: Protecto-Flex 800.
 - 4. Tnemec: Chembloc Series 239SC.
- M. Elastomeric polyurethane 100-percent solids, ASTM D16, Type V, (Urethane P): As manufactured by the following or equal:
 - 1. GET: Endura-Flex EF-1988.
- N. Concrete floor coatings: As manufactured by one of the following or equal:
 - 1. Devoe: Devran 124.
 - 2. Dudick: Polymer Alloy 1000.
 - 3. Tnemec: Tneme-Glaze Series 282.
- O. Waterborne acrylic emulsion: As manufactured by one of the following or equal:
 - 1. S-W: DTM Acrylic B66W1.
 - 2. Tnemec: Tneme-Cryl Series 6.
- P. Galvanizing zinc compound: As manufactured by the following or equal:
 - 1. ZRC: Cold Galvanizing Compound.

2.05 MIXES

- A. Mix in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.01 GENERAL PROTECTION

- A. Protect adjacent surfaces from coatings and damage. Repair damage resulting from inadequate or unsuitable protection.
- B. Protect adjacent surfaces not to be coated from spatter and droppings with drop cloths and other coverings:
 - 1. Mask off surfaces of items not to be coated or remove items from area.
- C. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being coated and, in particular, surfaces within storage and preparation areas.
- D. Place cotton waste, cloths, and material that may constitute a fire hazard in closed metal containers and remove daily from site.
- E. Remove electrical plates, surface hardware, fittings, and fastenings prior to application of coating operations. Carefully store, clean, and replace on completion of coating in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

3.02 GENERAL PREPARATION

- A. Prepare surfaces in accordance with coating manufacturer's instructions, unless more stringent requirements are specified in this Section.
- B. Protect the following surfaces from abrasive blasting by masking or other means:
 - 1. Threaded portions of valve and gate stems, grease fittings, and identification plates.
 - 2. Machined surfaces for sliding contact.
 - 3. Surfaces to be assembled against gaskets.
 - 4. Surfaces of shafting on which sprockets are to fit.
 - 5. Surfaces of shafting on which bearings are to fit.
 - 6. Machined surfaces of bronze trim, including slide gates.
 - 7. Cadmium-plated items except cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment requiring abrasive blasting.
 - 8. Galvanized items, unless scheduled to be coated.
- C. Protect installed equipment, mechanical drives, and adjacent coated equipment from abrasive blasting to prevent damage caused by entering sand or dust.
- D. Concrete:
 - 1. Allow new concrete to cure for minimum of 28 days before coating.
 - 2. Clean concrete surfaces of dust, mortar, fins, loose concrete particles, form release materials, oil, and grease. Fill voids so that surface is smooth. Prepare concrete surface for coating in accordance with SSPC SP 13. Provide ICRI 310.2 CSP-3 surface profile, or as recommended by coating manufacturer. All concrete surfaces shall be vacuumed clean prior to coating application.
- E. Ferrous metal surfaces:
 - 1. Remove grease and oil in accordance with SSPC SP 1.
 - 2. Remove rust, scale, and welding slag and spatter, and prepare surfaces in accordance with appropriate SSPC standard as specified.
 - 3. Abrasive blast surfaces prior to coating.
 - a. When abrasive blasted surfaces rust or discolor before coating, abrasive blast surfaces again to remove rust and discoloration.
 - b. When metal surfaces are exposed because of coating damage, abrasive blast surfaces and feather in to a smooth transition before touching up.
 - c. Ferrous metal surfaces not to be submerged: Abrasive blast in accordance with SSPC SP 10, unless blasting may damage adjacent surfaces, prohibited, or specified otherwise. Where not possible to abrasive blast, power tool clean surfaces in accordance with SSPC SP 3.
 - d. Ferrous metal surfaces to be submerged: Unless specified otherwise, abrasive blast in accordance with SSPC SP 5 to clean and provide roughened surface profile of not less than 2 mils and not more than 4 mils in depth when measured with Elcometer 123, or as recommended by the coating manufacturer.
 - 4. All abrasive blast cleaned surfaces shall be blown down with clean dry air and/or vacuumed.
- F. Ductile iron pipe and fittings to be lined or coated: The manufacturer shall install a zinc rich primer in the factory. Remove dirt and oil in the field prior to field painting.

- G. Sherardized, aluminum, copper, and bronze surfaces: Prepare in accordance with coating manufacturer's instructions.
- H. Galvanized surface:
 - 1. Degrease or solvent clean (SSPC SP 1) to remove oily residue.
 - 2. Power tool or hand tool clean or whip abrasive blast.
 - 3. Test surface for contaminants using copper sulfate solution.
 - 4. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded physically, such as bolts, nuts, or preformed channels.
- I. Shop-primed metal:
 - 1. Certify that primers applied to metal surfaces in the shop are compatible with coatings to be applied over such primers in the field.
 - 2. Remove shop primer from metal to be submerged by abrasive blasting in accordance with SSPC SP 10, unless greater degree of surface preparation is required by coating manufacturer's representative.
 - 3. Correct abraded, scratched, or otherwise damaged areas of prime coat by sanding or abrasive blasting to bare metal in accordance with SSPC SP 2, SP 3, or SP 6, as directed by the Engineer. When entire shop priming fails or has weathered excessively (more than 25 percent of the item), or when recommended by coating manufacturer's representative, abrasive blast shop prime coat to remove entire coat and prepare surface in accordance with SSPC SP 10.
 - 4. When incorrect prime coat is applied, remove incorrect prime coat by abrasive blasting in accordance with SSPC SP 10.
 - 5. When prime coat not authorized by Engineer is applied, remove unauthorized prime coat by abrasive blasting in accordance with SSPC SP 10.
 - 6. Shop applied bituminous paint or asphalt varnish: Abrasive blast clean shop applied bituminous paint or asphalt varnish from surfaces scheduled to receive non-bituminous coatings.
- J. Cadmium-plated, zinc-plated, or sherardized fasteners:
 - 1. Abrasive blast in the same manner as unprotected metal when used in assembly of equipment designated for abrasive blasting.
- K. Abrasive blast components that are to be attached to surfaces that cannot be abrasive blasted before components are attached.
- L. Grind sharp edges to approximately 1/16-inch radius before abrasive blast cleaning.
- M. Remove and grind smooth all excessive weld material and weld spatter before blast cleaning in accordance with NACE SP0178.
- N. Polyvinyl chloride (PVC) and FRP surfaces:
 - 1. Prepare surfaces to be coated by light sanding (de-gloss) and wipe-down with clean cloths, or by solvent cleaning in strict accordance with coating manufacturer's instructions.
- O. Cleaning of previously coated surfaces:
 - 1. Utilize cleaning agent to remove soluble salts such as chlorides and sulfates from concrete and metal surfaces:
 - a. Cleaning agent: Biodegradable non-flammable and containing no VOC.

- b. Manufacturer: The following or equal:
 - 1) CHLOR*RID International, Inc.
- 2. Cleaning of surfaces utilizing the decontamination cleaning agent may be accomplished in conjunction with abrasive blast cleaning, steam cleaning, high-pressure washing, or hand washing as approved by the coating manufacturer's representative and the Engineer.
- 3. Test cleaned surfaces in accordance with the cleaning agent manufacturer's instructions to ensure all soluble salts have been removed. Additional cleaning shall be carried out as necessary.
- 4. Final surface preparation prior to application of new coating system shall be made in strict accordance with coating manufacturer's printed instructions.

3.03 MECHANICAL AND ELECTRICAL EQUIPMENT PREPARATION

- A. Identify equipment, ducting, piping, and conduit as specified in Section 15075 and Section 16075.
- B. Remove grilles, covers, and access panels for mechanical and electrical system from location and coat separately.
- C. Prepare and finish coat primed equipment with color selected by the Engineer.
- D. Prepare and prime and coat insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars, and supports, except where items are covered with prefinished coating.
- E. Replace identification markings on mechanical or electrical equipment when coated over or spattered.
- F. Prepare and coat interior surfaces of air ducts, and convactor and baseboard heating cabinets that are visible through grilles and louvers with 1 coat of flat black paint, to limit of sight line.
- G. Prepare and coat dampers exposed immediately behind louvers, grilles, and convactor and baseboard heating cabinets to match face panels.
- H. Prepare and coat exposed conduit and electrical equipment occurring in finished areas with color and texture to match adjacent surfaces.
- I. Prepare and coat both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.
- J. Color code equipment, piping, conduit, and exposed ductwork and apply color banding and identification, such as flow arrows, naming, and numbering, in accordance with the Contract Documents.

3.04 GENERAL APPLICATION REQUIREMENTS

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Coat metal unless specified otherwise:
 - 1. Aboveground piping to be coated shall be empty of contents during application of coatings.

- C. Verify metal surface preparation immediately before applying coating in accordance with SSPC SP COM.
- D. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
- E. Wash coat and prime sherardized, aluminum, copper, and bronze surfaces, or prime with manufacturer's recommended special primer.
- F. Prime shop-primed metal surfaces. Spot prime exposed metal of shop-primed surfaces before applying primer over entire surface.
- G. Multiple coats:
 - 1. Apply minimum number of specified coats.
 - 2. Apply additional coats when necessary to achieve specified thicknesses.
 - 3. Apply coats to thicknesses specified, especially at edges and corners.
 - 4. When multiple coats of same material are specified, tint prime coat and intermediate coats with suitable pigment to distinguish each coat.
 - 5. Lightly sand and dust surfaces to receive high-gloss finishes, unless instructed otherwise by coating manufacturer.
 - 6. Dust coatings between coats.
- H. Coat surfaces without drops, overspray, dry spray, runs, ridges, waves, holidays, laps, or brush marks.
- I. Remove spatter and droppings after completion of coating.
- J. Apply coating by brush, roller, trowel, or spray, unless particular method of application is required by coating manufacturer's instructions or these Specifications.
- K. Plural component application: Drums shall be premixed each day. All gauges shall be in working order prior to the start of application. Ratio checks shall be completed prior to each application. A spray sample shall be sprayed on plastic sheeting to ensure set time is complete prior to each application. Hardness testing shall be performed after each application.
- L. Spray application:
 - 1. Stripe coat edges, welds, nuts, bolts, and difficult-to-reach areas by brush before beginning spray application, as necessary, to ensure specified coating thickness along edges.
 - 2. When using spray application, apply coating to thickness not greater than that recommended in coating manufacturer's instructions for spray application.
 - 3. Use airless spray method, unless air spray method is required by coating manufacturer's instruction or these Specifications.
 - 4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist, fumes, or overspray.
- M. Drying and recoating:
 - 1. Provide fans, heating devices, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.

2. For submerged service, the Contractor shall provide a letter to the Engineer that the lining system is fully cured and ready to be placed into service.
3. Limit drying time to that required by these Specifications or coating manufacturer's instructions.
4. Do not allow excessive drying time or exposure, which may impair bond between coats.
5. Recoat epoxies within time limits recommended by coating manufacturer.
6. When time limits are exceeded, abrasive blast clean and de-gloss clean prior to applying another coat.
7. When limitation on time between abrasive blasting and coating cannot be met before attachment of components to surfaces that cannot be abrasive blasted, coat components before attachment.
8. Ensure primer and intermediate coats of coating are unscarred and completely integral at time of application of each succeeding coat.
9. Touch-up suction spots between coats and apply additional coats where required to produce finished surface of solid, even color, free of defects.
10. Leave no holidays.
11. Sand and feather in to a smooth transition and recoat scratched, contaminated, or otherwise damaged coating surfaces so damages are invisible to the naked eye.

N. Concrete:

1. Apply first coat (primer) only when surface temperature of concrete is decreasing in order to eliminate effects of off-gassing on coating.

3.05 ALKALI-RESISTANT BITUMASTIC

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements.

B. Application:

1. Apply in accordance with general application requirements and as follows:
 - a. Apply at least 2 coats, 8 to 14 mils DFT each.

3.06 WAX COATING

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements.

B. Application:

1. Apply in accordance with general application requirements and as follows:
 - a. Apply at least 1/32-inch thick coat with 2-inch or shorter bristle brush.
 - b. Thoroughly rub coating into metal surface with canvas covered wood block or canvas glove.

3.07 HIGH SOLIDS EPOXY SYSTEM

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast ferrous metal surfaces to be submerged at jobsite in accordance with SSPC SP 5 prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 10.

- b. Abrasive blast non-submerged ferrous metal surfaces at jobsite in accordance with SSPC SP 10, prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 6.
- c. Abrasive blast clean ductile iron surfaces at jobsite in accordance with SSPC SP 7.

B. Application:

- 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 2-coat system with minimum total DFT of 12 mils.
 - b. Recoat or apply succeeding epoxy coats within time limits recommended by manufacturer. Prepare surfaces for recoating in accordance with manufacturer's instructions.
 - c. Coat metal to be submerged before installation when necessary, to obtain acceptable finish, and to prevent damage to other surfaces.
 - d. Coat entire surface of support brackets, stem guides, pipe clips, fasteners, and other metal devices bolted to concrete.
 - e. Coat surface of items to be exposed and adjacent 1 inch to be concealed when embedded in concrete or masonry.

3.08 HIGH SOLIDS EPOXY AND POLYURETHANE COATING SYSTEM

A. Preparation:

- 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Prepare concrete surfaces in accordance with general preparation requirements.
 - b. Touch up shop-primed steel and miscellaneous iron.
 - c. Abrasive blast ferrous metal surfaces at jobsite prior to coating. Abrasive blast clean rust and discoloration from surfaces.
 - d. Degrease or solvent clean, whip abrasive blast, power tool, or hand tool clean galvanized metal surfaces.
 - e. Lightly sand (de-gloss) fiberglass and PVC pipe to be coated and wipe clean with dry cloths, or solvent clean in accordance with coating manufacturer's instructions.
 - f. Abrasive blast clean ductile iron surfaces.

B. Application:

- 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply a 3-coat system consisting of:
 - 1) Primer: 4 to 5 mils DFT high solids epoxy.
 - 2) Intermediate coat: 4 to 5 mils DFT high solids epoxy.
 - 3) Topcoat: 2.5 to 3.5 mils DFT aliphatic or aliphatic-acrylic polyurethane topcoat.
- 2. Recoat or apply succeeding epoxy coats within 30 days or within time limits recommended by manufacturer, whichever is shorter. Prepare surfaces for recoating in accordance with manufacturer's instructions.

3.09 POLYMORPHIC POLYESTER RESIN SYSTEM

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - 2. Prepare concrete to obtain clean, open pore with exposed aggregate in accordance with manufacturer's instructions.
 - 3. Prepare ferrous metal surfaces in accordance with SSPC SP 5, with coating manufacturer's recommended anchor pattern.
 - 4. Complete abrasive blast cleaning within 6 hours of applying prime coat. Dew point shall remain 5 degrees above dew point 8 hours after application of coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 5.
 - 5. When handling steel, wear gloves to prevent hand printing.
 - 6. Adjust pH of concrete to within 5.5 to 8.0 before applying prime coat.
- B. Application:
 - 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum DFT system consisting of primer, tie coat and top coat in accordance with manufacturer's instructions as follows:
 - 1) Steel: 35 mils.
 - 2) Concrete: 45 mils.

3.10 HIGH-TEMPERATURE COATING

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast surface in accordance with SSPC SP 10.
- B. Application:
 - 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply number of coats in accordance with manufacturer's instructions.

3.11 ASPHALT VARNISH

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements.
- B. Application:
 - 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 2 coats.

3.12 PROTECTIVE COAL TAR

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation of coal-tar requirements.

- B. Application:
1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 20 mils DFT coating.

3.13 COAL-TAR EPOXY

- A. Preparation:
1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast iron or steel surfaces to be coated as submerged metal in accordance with SSPC SP 5. Prepare other metal surfaces to be coated with coal-tar epoxy in accordance with epoxy manufacturer's instructions.
- B. Application:
1. Apply coatings in accordance with general application requirements and as follows:
 - a. Waterproofing outside surfaces of concrete structures: Apply minimum 2 coats with total DFT of 40 mils.
 - b. Apply 2 coats of 8 mils each for a total 16 mils DFT.
 - c. Apply coal-tar epoxy on blasted steel on same day that steel is blasted.
 - d. Apply succeeding coats over previous coat as soon as application does not cause sagging, within the following times, or as recommended by the coating manufacturer, whichever is sooner.

Average Temperature Degrees (Fahrenheit)	Maximum Time Between Coats (Hours)
50 to 60	36
60 to 70	24
70 to 80	12
80 to 120	4

- e. Apply additional coats required to obtain specified thickness.
- f. When previous coat has cured or set, or Maximum Time Between Coats has lapsed, abrasive blast previous coat until surface film is removed. Wash and clean surface with cleaning solvent. Apply succeeding coat within Maximum Time Between Coats or as recommended by coating manufacturer, whichever is sooner.
- g. When succeeding coat is applied over previous coat that has cured or set, or Maximum Time Between Coats has lapsed, and surface has not been abrasive blasted, remove entire coating system to substrate, and apply new coating system.
- h. Where coating system is applied to exterior concrete surfaces below grade, extend system at least 3 inches above finish grade in straight level. Step extended system down 3 inches when extended system reaches 6 inches above finish grade.

3.14 COAL-TAR EPOXY SUBSTITUTE

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements and in accordance with the coating manufacturer's printed instructions.
- B. Application:
 - 1. Apply 2 coats at 6 mils to 8 mils each, for a minimum total DFT of 12 mils.

3.15 VINYL ESTER

- A. Preparation:
 - 1. Prepare surfaces in accordance with coating manufacturer's recommendations and as directed and approved by coating manufacturer's representative.
- B. Application:
 - 1. Apply prime coat, as required by coating manufacturer, base coat, glass mat, and topcoat to total dry film thickness of 125 mils minimum:
 - a. Final topcoat on floors shall include non-skid surface, applied in accordance with manufacturer's instructions.
 - 2. Perform high-voltage holiday detection test in accordance with NACE SP0188, over 100 percent of coated surface areas to ensure pinhole-free finished coating system.
 - 3. All work shall be accomplished in strict accordance with coating manufacturer's instructions and under direction of coating manufacturer's representative.

3.16 ELASTOMERIC POLYURETHANE (100 PERCENT SOLIDS)

- A. Preparation:
 - 1. Prepare surfaces in strict accordance with coating manufacturer's instructions and as directed and approved by coating manufacturer's representative.
- B. Application:
 - 1. Apply epoxy primer at DFT of 1 to 2 mils, in strict accordance with manufacturer's instructions.
 - 2. Apply polyurethane coating at minimum total DFT as follows:
 - a. Steel: 60 mils DFT.
 - b. Ductile iron and ductile iron pipe coating and lining: 30 mils DFT.
 - c. Concrete: 120 mils DFT.
 - d. Or as recommended by the coating manufacturer and accepted by the Engineer.
 - 3. For concrete application, provide saw cutting for coating terminations in strict accordance with manufacturer's instructions.
 - 4. Perform high voltage holiday detection test in accordance with NACE SP0188, over 100 percent of coated surface areas to ensure pinhole free finished coating system.

3.17 CONCRETE FLOOR COATINGS

- A. Preparation:
 - 1. Prepare surfaces in accordance with general application requirements and in strict accordance with coating manufacturer's instructions.

- B. Application:
 - 1. Apply primer if required by coating manufacturer.
 - 2. Apply 1 or more coats as recommended by coating manufacturer to receive a minimum total DFT of 25 mils; color as selected by the Owner.
- C. Final topcoat shall include non-skid surface, applied in strict accordance with coating manufacturer's instructions.

3.18 WATERBORNE ACRYLIC EMULSION

- A. Preparation:
 - 1. Remove all oil, grease, dirt, and other foreign material by solvent cleaning in accordance with SSPC SP 1.
 - 2. Lightly sand all surfaces and wipe thoroughly with clean cotton cloths before applying coating.
- B. Application:
 - 1. Apply 2 or more coats to obtain a minimum DFT of 5.0 mils.

3.19 FIELD QUALITY CONTROL

- A. Each coat will be inspected. Strip and remove defective coats, prepare surfaces, and recoat. When approved, apply next coat.
- B. Control and check DFT and integrity of coatings and repair coatings where required after field quality control testing.^{AD1}
- C. Construction Manager shall perform the following field quality control testing:^{AD1}
 - ~~G-1.~~ Measure DFT with calibrated thickness gauge.
 - ~~D-2.~~ DFT on ferrous-based substrates may be checked with Elcometer Type 1 Magnetic Pull-Off Gauge or PosiTector® 6000.
 - ~~E-3.~~ Verify coat integrity with low-voltage sponge or high-voltage spark holiday detector, for submerged service, in accordance with NACE SP0188. Allow Engineer to use detector for additional checking.
- D. Contractor shall coordinate with Construction Manager for scheduling inspection and testing. Contractor shall provide access for the Construction Manager, as needed, to perform inspection and testing. Contractor shall provide Construction Manager a minimum 1 working day advance notice before inspection or testing is needed.^{AD1}
- ~~F-E.~~ Check wet film thickness before coal-tar epoxy coating cures on concrete or nonferrous metal substrates.
- ~~G-F.~~ Arrange for services of coating manufacturer's field representative to provide periodic field consultation and inspection services to ensure proper surface preparation of facilities and items to be coated, and to ensure proper application and curing:
 - 1. Notify ~~Engineer~~ Construction Manager^{AD1} 24 hours in advance of each visit by coating manufacturer's representative.
 - 2. Provide Construction Manager and^{AD1} Engineer with a written report by coating manufacturer's representative within 48 hours following each visit.

3.20 SCHEDULE OF ITEMS NOT REQUIRING COATING

- A. General: Unless specified otherwise, the following items do not require coating:
1. Items that have received final coat at factory and are not listed to receive coating in field.
 2. Aluminum, brass, bronze, copper, plastic (except PVC pipe), rubber, stainless steel, chrome, Everdur, or lead.
 3. Buried or encased piping or conduit.
 4. Exterior concrete.
 5. Galvanized steel wall framing, galvanized electrical conduits, galvanized pipe trays, galvanized cable trays, and other galvanized items:
 - a. Areas on galvanized items or parts where galvanizing has been damaged during handling or construction shall be repaired as follows:
 - 1) Clean damaged areas by SSPC SP 1, SP 2, SP 3, or SP 7 as required.
 - 2) Apply 2 coats of a galvanizing zinc compound in strict accordance with manufacturer's instructions.
 6. Grease fittings.
 7. Fiberglass ducting or tanks in concealed locations.
 8. Steel to be encased in concrete or masonry.

3.21 SCHEDULE OF SURFACES TO BE COATED IN THE FIELD

- A. In general, apply coatings to steel, iron, galvanized surfaces, and wood surfaces unless specified or otherwise indicated on the Drawings. Coat concrete surfaces and anodized aluminum only when specified or indicated on the Drawings. Color coat all piping as specified in Section 15075.
1. Vinyl ester:
 - a. Secondary containment: All concrete surfaces inside chemical containment areas including inside wall surfaces, top of wall surfaces, sump area, and tank fill area, including equipment pads and tank pads.
 - b. Suitable for 72 hours submerged in:
 - 1) 12-percent to 15-percent sodium hypochlorite.
 - 2) 39-percent to 47-percent ferric chloride solution.
 - 3) 40-percent active polymer.
 - c. Concrete floor surfaces in chemical containment areas shall have a nonskid surface.
 2. High solids epoxy and polyurethane system: Interior and exterior non immersed ferrous metal surfaces including:
 - a. Doors, doorframes, ventilators, louvers, grilles, exposed sheet metal, and flashing.
 - b. Pipe, valves, pipe hangers, supports and saddles, conduit, cable tray hangers, and supports.
 - c. Motors and motor accessory equipment.
 - d. Drive gear, drive housing, coupling housings, and miscellaneous gear drive equipment.
 - e. Valve and gate operators and stands.
 - f. Structural steel including galvanized structural steel.
 - 1) Exposed metal decking.
 - g. Crane and hoist rails.
 - h. Exterior of tanks and other containment vessels.
 - i. Mechanical equipment supports, drive units, and accessories.

- j. Pumps not submerged.
 - k. Degritters, grit classifiers, frames, supports, and associated equipment.
 - l. Other miscellaneous metals.
 - m. Grit separation and washer, frames, supports, and associated equipment.
 - 3. High solids epoxy system:
 - a. Field priming of ferrous metal surfaces with defective shop-prime coat where no other prime coat is specified; for non-submerged service.
 - b. Bell rings, underside of manhole covers and frames.
 - c. Sump pumps and grit pumps, including underside of base plates and submerged suction and discharge piping.
 - d. Chlorine diffuser supports.
 - e. Exterior of submerged piping and valves other than stainless steel or PVC piping.
 - f. Submerged pipe supports and hangers.
 - g. Stem guides.
 - h. Vertical shaft mixers and aerators below supports.
 - i. Other submerged iron and steel metal unless specified otherwise.
 - 4. Protective coal tar:
 - a. Underground pipe flanges, excluding pipe, corrugated metal pipe couplings, flexible pipe couplings and miscellaneous underground metals not otherwise specified to receive another protective coating.
- B. Fiberglass and PVC pipe surfaces:
- 1. Waterborne acrylic emulsion.
 - a. Exterior of fiberglass ducting and fan housings.
 - b. Fiberglass expose to sunlight.
 - c. PVC piping exposed to view.
 - d. ABS piping as determined by Engineer.

END OF SECTION

AD1 Addendum No. 1

SECTION 15052

COMMON WORK RESULTS FOR GENERAL PIPING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Basic materials and methods for metallic and plastic piping systems.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through 24.
 - 2. B16.47 - Large Diameter Steel Flanges: NPS 26 Through NPS 60 Metric/Inch Standard.
- B. American Water Work Association (AWWA):
 - 1. C105 - Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - 2. C207 - Standard for Steel Pipe Flanges for Waterworks Services-Size 4 In. Through 144 In.
- C. ASTM International (ASTM):
 - 1. A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
 - 2. A194 - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
 - 3. A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
 - 4. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 - 5. F37 - Standard Test Methods for Sealability of Gasket Materials.
 - 6. F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements of Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- D. California Health and Safety Code.
- E. NSF International (NSF).

1.03 DEFINITIONS

- A. Buried pipes: Pipes that are buried in the soil with or without a concrete pipe encasement.
- B. Exposed pipe: Pipes that are located above ground, or located inside a structure, supported by a structure, or cast into a concrete structure.
- C. Underground pipes: Buried pipes - see A. above.

- D. Underwater pipes: Pipes below the top of walls in basins or tanks containing water.
- E. Wet wall: A wall with water on at least 1 side.

PART 2 PRODUCTS

2.01 GENERAL

- A. Materials as specified in Section 01600 - Product Requirements including special requirements for materials in contact with drinking water.
- B. All pipelines, components, and appurtenances shall be designed for a working pressure not less than 150 psi, unless otherwise noted as a higher working pressure.

2.02 ESCUTCHEONS

- A. Material: Chrome-plated steel plate.
- B. Manufacturers: One of the following or equal:
 - 1. Dearborn Brass Co., Model Number 5358.
 - 2. Keeney Manufacturing Co., Model Number 102 or Number 105.

2.03 LINK TYPE SEALS

- A. Characteristics:
 - 1. Modular mechanical type, consisting of interlocking neoprene or synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening.
 - 2. Links to form a continuous rubber belt around the pipe.
 - 3. Provide a nylon polymer pressure plate with Type 316 stainless steel hardware. Isolate pressure plate from contact with wall sleeve.
 - 4. Hardware to be Type 316 stainless steel.
 - a. Provide anti-galling lubricant for threads.
- B. One of the following or equal:
 - 1. Link-Seal.
 - 2. Pipe Linx.

2.04 FLANGE BOLTS AND BOLTS

- A. General:
 - 1. Provide a washer for each nut. Washer shall be of the same material as the nut.
 - 2. Nuts shall be Heavy hex-head.
 - 3. Cut and finish flange bolts to project a maximum of 1/4-inch beyond outside face of nut after assembly.
 - 4. Tap holes for cap screws or stud bolts when used.
 - 5. Lubricant for stainless steel bolts and nuts:
 - a. Chloride-free.
 - b. Manufacturers: One of the following or equal:
 - 1) Huskey FG-1800 Anti-Seize.

2) Weicon Anti-Seize High-Tech.

B. For ductile iron pipe:

1. On exposed pipes with pressures equal to or less than 150 psig:
 - a. Bolts: ASTM A307, Grade B.
 - b. Nuts: ASTM A563, Grade A.
 - c. Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
2. On exposed pipes with pressures greater than 150 psig:
 - a. Bolts: ASTM A193, Grade B.
 - b. Nuts: ASTM A194, Grade 2H.
 - c. Bolts and nuts: Hot-dip galvanized in accordance with ASTM F2329.
3. On underwater pipes and pipes adjacent to wet walls:
 - a. Bolts: ASTM A193, Grade B8M.
 - b. Nuts: ASTM A194, Grade 8M.
4. On buried pipes:
 - a. Bolts: ASTM A193, Grade B8M.
 - b. Nuts: ASTM A194, Grade 8M for nuts.

C. Plastic pipe:

1. On exposed pipes:
 - a. Bolts: ASTM A307, Grade B.
 - b. Nuts: ASTM A563, Grade A.
 - c. Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
2. On underwater pipes and pipes adjacent to wet walls:
 - a. Bolts: ASTM A193, Grade B8M.
 - b. Nuts: ASTM A194, Grade 8M.

D. Steel pipe:

1. On exposed pipes:
 - a. For ASME B16.5 Class 150 flanges and AWWA C207 Class D flanges:
 - 1) Bolts: ASTM A307, Grade B.
 - 2) Nuts: ASTM A563, Grade A.
 - 3) Bolts and Nuts: Hot-dip galvanized in accordance with ASTM F2329.
 - b. For ASME B16.5 and B16.47 Class 300 flanges and AWWA C207 Class E and F flanges:
 - 1) Bolts: ASTM A193, Grade B7.
 - 2) Nuts: ASTM A194, Grade 2H.
2. On underwater pipes and pipes adjacent to wet walls:
 - a. Bolts: ASTM A193, Grade B8M.
 - b. Nuts: ASTM A194, Grade 8M.

2.05 GASKETS

A. General.

1. Gaskets shall be suitable for the specific fluids, pressure, and temperature conditions.

B. Gaskets for non-steam cleaned ductile iron and steel piping:

1. Suitable for pressures equal and less than 150 pounds per square inch gauge, temperatures equal and less than degrees Fahrenheit, and raw sewage service.

2. Gasket material:
 - a. Neoprene elastomer with minimum Shore A hardness value of 70.
 - b. Reinforcement: Cloth or synthetic fiber.
 - c. Thickness: Minimum 3/32-inch thick for less than 10-inch pipe; minimum 1/8-inch thick for 10-inch and larger pipe.
 3. Manufacturers: One of the following or equal:
 - a. Pipe less than 48 inches in diameter:
 - 1) Garlock, Style 7797.
 - 2) John Crane, similar product.
 - b. Pipe 48 inches in diameter and larger:
 - 1) Garlock, Style 3760.
 - 2) John Crane, similar product.
- C. Gaskets for flanged joints in ductile iron or steel water piping:
1. Suitable for hot or cold water, pressures equal and less than 150 pounds per square inch gauge, and temperatures equal and less than 160 degrees Fahrenheit.
 2. Material:
 - a. Neoprene elastomer, compressed, with non-asbestos fiber reinforcement.
 3. Manufacturers: One of the following or equal:
 - a. Garlock, Bluegard 3300.
 - b. John Crane, similar product.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General:
1. Piping drawings:
 - a. Except in details, piping is indicated diagrammatically. Not every offset and fitting, or structural difficulty that may be encountered has been indicated on the Drawings. Sizes and locations are indicated on the Drawings.
 - b. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed.
 - 1) Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Times.
 2. Piping alternatives:
 - a. Provide piping as specified in this Section, unless indicated on the Drawings or specified otherwise.
 - b. Alternative pipe ratings:
 - 1) Piping with greater pressure rating than specified may be substituted in lieu of specified piping without changes to the Contract Price.
 - 2) Piping of different material may not be substituted in lieu of specified piping.
 - c. Valves in piping sections: Capable of withstanding specified test pressures for piping sections and fabricated with ends to fit piping.
 - d. For grooved joints, use couplings, flange adapters, and fittings of the same manufacturer.

- 1) The grooved joint manufacturer's factory trained representative shall provide on-site training for Contractor's field personnel.
- 2) The representative shall periodically visit the jobsite and review Contractor is following best recommended practices in grooved product installation.
- 3) A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).
- e. For flanged joints, where 1 of the joining flanges is raised face type, provide a matching raised face type flange for the other joining flange.
3. Unless otherwise indicated on the Drawings, piping at pipe joints, fittings, couplings, and equipment shall be installed without rotation, angular deflection, vertical offset, or horizontal offset.

B. Wall and slab penetrations:

1. Provide sleeves for piping penetrations through aboveground masonry and concrete walls, floors, ceilings, roofs, unless specified or otherwise indicated on the Drawings.
2. For piping 1 inch in nominal diameter and larger, provide sleeves with minimum inside diameters of 1 inch plus outside diameter of piping. For piping smaller than 1 inch in nominal diameter, provide sleeve of minimum twice the outside diameter of piping.
 - a. Arrange sleeves and adjacent joints so piping can be pulled out of sleeves and replaced without disturbing the structure.
 - b. Cut ends of sleeves flush with surfaces of concrete, masonry, or plaster.
 - c. Conceal ends of sleeves with escutcheons where piping runs through floors, walls, or ceilings of finished spaces within buildings.
 - d. Seal spaces between pipes and sleeves with link-type seals when not otherwise specified or indicated on the Drawings.
3. Provide flexibility in piping connecting to structures to accommodate movement due to soil settlement and earthquakes. Provide flexibility using details indicated on the Drawings.
4. Core drilled openings:
 - a. Do not damage or cut existing reinforcing bars, electrical conduits, or other items embedded in the existing concrete without acceptance by Engineer.
 - b. Determine location of reinforcing bars or other obstructions with a non-destructive indicator device.
 - c. Remove dust and debris from hole using compressed air.

C. Exposed piping:

1. Install exposed piping in straight runs parallel to the axes of structures, unless otherwise indicated on the Drawings:
 - a. Install piping runs plumb and level, unless otherwise indicated on the Drawings.
 - 1) Slope plumbing drain piping with a minimum of 1/4-inch per foot downward in the direction of flow.
2. Install exposed piping after installing equipment and after piping and fitting locations have been determined.
3. Support piping: As specified in Sections 15061 - Pipe Supports and 15062 - Preformed Channel Pipe Support System:
 - a. Do not transfer pipe loads and strain to equipment.

4. In addition to the joints indicated on the Drawings, provide unions, flexible couplings, flanged joints, flanged coupling adapters, and other types of joints or means which are compatible with and suitable for the piping system, and necessary to allow ready assembly and disassembly of the piping.
 5. Assemble piping without distortion or stresses caused by misalignment:
 - a. Match and properly orient flanges, unions, flexible couplings, and other connections.
 - b. Do not subject piping to bending or other undue stresses when fitting piping.
 - c. Do not correct defective orientation or alignment by distorting flanged joints or subjecting flange bolts to bending or other undue stresses.
 - d. Flange bolts, union halves, flexible connectors, and other connection elements shall slip freely into place.
 - e. Alter piping assembly to fit, when proper fit is not obtained.
 - f. Install eccentric reducers or increasers with the top horizontal for pump suction piping.
- D. Buried piping:
1. Bury piping with minimum 3-foot cover without air traps, unless otherwise indicated on the Drawings.
 2. Where 2 similar services run parallel to each other, piping for such services may be laid in the same trench.
 - a. Lay piping with sufficient room for assembly and disassembly of joints, for thrust blocks, for other structures, and to meet separation requirements of public health authorities having jurisdiction.
 3. Laying piping:
 - a. Lay piping in finished trenches free from water or debris. Begin at the lowest point with bell ends up slope.
 - b. Place piping with top or bottom markings with markings in proper position.
 - c. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.
 - d. Where joints require external grouting, banding, or pointing, provide space under and immediately in front of the bell end of each section laid with sufficient shape and size for grouting, banding, or pointing of joints.
 - e. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.
- E. Venting piping under pressure:
1. Lay piping under pressure flat or at a continuous slope without air traps, unless otherwise indicated on the Drawings.
- F. Restraining piping:
1. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - a. When piping is underground, use concrete thrust blocks, mechanical restraints, or push-on restraints.
 - b. When piping is aboveground or underwater, use mechanical or structural restraints.
 - c. Determine thrust forces by multiplying the nominal cross-sectional area of the piping by design test pressure of the piping.

2. Provide restraints with ample size to withstand thrust forces resulting from test pressures:
 - a. During testing, provide suitable temporary restraints where piping does not require permanent restraints.
 3. Place concrete thrust blocks against undisturbed soil.
 4. Place concrete so piping joints, fittings, and other appurtenances are accessible for assembly and disassembly.
 5. Provide underground mechanical restraints where specified in the Piping Schedule.
- G. Connections between ferrous and nonferrous metals:
1. Connect ferrous and nonferrous metal piping, tubing, and fittings with dielectric couplings especially designed for the prevention of chemical reactions between dissimilar metals.
 2. Nonferrous metals include aluminum, copper, and copper alloys.
- H. Flanged connections between dissimilar metals such as ductile iron pipe and steel pipe:
1. Provide stainless steel bolts with isolation bushings and washers, and full-face flange gaskets.

3.02 CLEANING

- A. Piping cleaning:
1. Upon completion of installation, clean piping interior of foreign matter and debris.
 2. Perform special cleaning when required by the Contract Documents.
- B. Conduct pressure and leak test, as specified.

3.03 PIPING SCHEDULE

PIPING SCHEDULE											
Process Abbrev.	Service	Nominal Diameter (inches)	Material	Pressure Class Special Thickness Class Schedule Wall Thickness	Pipe Spec. Section	Joints/ Fittings	Test Pressure/ Method	Lining	Coating	Service Conditions	Comments
RW	Recycled Water										
	Below Ground	24-42	Steel	0.1875 in min Steel Wall Thickness and 0.500 in locations indicated on the Drawings	15277	Flanged, Double Lap Welded, Butt Welded	75 psig hydrostatic (HH)	Cement Mortar	Cement Mortar		
	Above Ground <u>and in Vaults</u> ^{AD1}	24-42	Steel	0.1875 in min Steel Wall Thickness	15277	Flanged	75 psig hydrostatic (HH)	Cement Mortar	EPP (purple)		
	Below Ground	24-42	DIP	Class 150	15211	Flanged, Self-Restrained Joints, Mechanical Joints with Restrainers	75 psig hydrostatic (HH)	Cement Mortar	Bituminous Coating with Polyethylene Wrap		
	Above Ground <u>and in Vaults</u> ^{AD1}	24-42	DIP	Class 150	15211	Flanged	75 psig hydrostatic (HH)	Cement Mortar	EPP (purple)		
	Below Ground	3-8	DIP	Class 350	15211	Flanged, Self-Restrained Joints, Mechanical Joints with Restrainers	75 psig hydrostatic (HH)	Cement Mortar	Bituminous Coating with Polyethylene Wrap		
	Above Ground	3-8	DIP	Class 350	15211	Flanged	75 psig hydrostatic (HH)	Cement Mortar	EPP (purple)		

PIPING SCHEDULE											
Process Abbrev.	Service	Nominal Diameter (inches)	Material	Pressure Class Special Thickness Class Schedule Wall Thickness	Pipe Spec. Section	Joints/ Fittings	Test Pressure/ Method	Lining	Coating	Service Conditions	Comments
Abbreviations: 1. The following abbreviations used in the column of test method refer to the respective methods as specified in Section 15956 - Piping Systems Testing. AM Air method GR Gravity method HH High head method LH Low head method SC Special case 2. Abbreviations to designate piping include the following: B&SP Bell and spigot CI Cast iron CISP Cast iron soil pipe CL Class, followed by the designation CM Cement mortar CTP Coal tar pitch DIP Ductile iron piping EPP High solids epoxy polyurethane coating per Section 09960, Part 2.03. ^{AD1} GA Gauge, preceded by the designation						GE Grooved end joint GL Glass lined GSP Galvanized steel pipe MJ Mechanical joint NPS Nominal pipe size, followed by the number in inches psi pounds per square inch psig pounds per square inch gauge PE Polyethylene PEE Polyethylene encasement PTW Polyethylene tape wrap PVC Polyvinyl Chloride SCH Schedule, followed by the designation SCRD Screwed-On SST Stainless steel SW Solvent welded VCP Vitrified clay piping WLD Weld					

END OF SECTION

^{AD1} Addendum No. 1

SECTION 15277

STEEL TRANSMISSION PIPE: WELDED, GREATER THAN 22-INCH DIAMETER, AWWA C200

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Steel transmission piping 24 inches through 42 inches in nominal diameter and internal pressures up to 300 pounds per square inch, including joints, fittings, pipe lining and coating.
- B. Related sections:
 - 1. Section 01330 - Submittal Procedures.
 - 2. Section 09960 - High-Performance Coatings.
 - 3. Section 13100 - Impressed Current Cathodic Protection System.
 - 4. Section 15052 - Common Work Results for General Piping.

1.02 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. Standard H-20.
- B. American Society of Mechanical Engineers (ASME):
 - 1. B16.5 - Pipe Flanges and Flanged Fittings.
 - 2. Boiler and Pressure Vessel Code.
- C. American Water Works Association (AWWA):
 - 1. C200 - Steel Water Pipe 6 Inches and Larger.
 - 2. C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipelines- Enamel and Tape-Hot Applied.
 - 3. C205 - Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe-4 Inches and Larger-Shop Applied.
 - 4. C206 - Field Welding of Steel Water Pipe.
 - 5. C207 - Standard for Steel Pipe Flanges for Waterworks Service-Sizes 4 inches Through 144 inches.
 - 6. C208 - Standard for Dimensions for Fabricated Steel Water Pipe Fittings.
 - 7. C209 - Standard for Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
 - 8. C214 - Standard for Tape-Coating Systems for the Exterior of Steel Water Pipelines.
 - 9. C215 - Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines.
 - 10. C216 -Standard for Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
 - 11. C602 - Standard for Cement-Mortar Lining of Water Pipelines in Place -4 Inches and Larger.
 - 12. Manual M11 - Steel Pipe - A Guide for Design and Installation.

- D. ASTM International (ASTM):
 - 1. C150 - Standard Specification for Portland Cement.
 - 2. D297 - Standard Test Methods for Rubber Products-Chemical Analysis.
 - 3. D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
 - 4. E709 - Standard Guide for Magnetic Particle Examination.
- E. NSF International:
 - 1. 61 - Drinking Water System Components - Health Effects.

1.03 SUBMITTALS

- A. Submit as specified in Section 01330.
- B. Qualifications of the pipeline manufacturer.
- C. Product data.
 - 1. Qualifications of the manufacturer.
 - 2. Shop drawings: Detailed layout drawings showing stations, lengths and invert elevations for each joint.
 - 3. Thickness of steel pipe wall, lining and coating, type of joint and joint restraint, if any.
 - 4. Details of straight pipe, fittings, and specials, showing thickness and dimensions of plates.
 - 5. Detail of welds and materials.
 - 6. Listing of proposed service and tabulated layout schedules.
 - 7. Design calculations.
 - a. Wall thicknesses for external earth, live loading, and special loading.
 - b. Internal pressures including working pressure, surge pressure and test pressure.
 - c. Buckling resistance.
- D. Calculations: Surge pressure and test pressure. Include design calculations against buckling.
- E. Resume and certifications of certified welding inspector.

1.04 QUALIFICATIONS OF MANUFACTURER

- A. The pipe manufacturer shall have not less than five (5) years' experience manufacturing spirally welded pipe, including steel cylinders. The pipe manufacturer shall be experienced in fabrication of AWWA C200 pipelines.
- B. The pipe manufacturer shall be certified to ISO 9001, or a similar quality management and quality assurance standard.
- C. All pipe manufacturing operations including fabrication of steel cylinders, fabricated specials, lining, and coating shall be performed at the same manufacturing facility unless otherwise approved by the Engineer.
- D. The pipe manufacturer shall demonstrate successful completion of several projects of similar scope. Pipe manufacture shall provide project references for five projects,

each having steel pipe 36-inches in diameter or larger, 5,000 LF or longer, manufactured during the last seven years.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Deliver, store, and handle pipe in accordance with AWWA C200, M-11 and as specified.
- B. Preparations for shipping:
 - 1. Minor repairs to cement mortar lining or coating:
 - a. If the repair area exceeds 100 square inches, reject the pipe sections and do not allow repairs.
 - b. Only 2 repaired areas are allowed to the coating and lining of each pipe section in the field or the plant.
 - c. Do not make minor repairs without prior acceptance by the Engineer of the written repair procedures.
 - d. Compact coating repairs to the same density as the original machine applied mortar.
 - e. Do not apply curing compound to the repair where a barrier coating is specified over the mortar coating.
 - f. Repair in accordance with AWWA C602 or AWWA C205.
- C. Stulling:
 - 1. Greater than 30 inch to 48 inch diameter pipe:
 - a. Install nominal 3 inch by 3 inch, 4-point wooden stulls or equivalent with nailed wooden wedges at the quarter points, following the cure of the lining.
 - b. Install a similar single strut 2 feet from each end of the pipe.
 - 2. 30 Inch and smaller diameter pipe:
 - a. Install 2-inch by 4-inch (nominal) stulls both ways 2 feet from the end of each pipe.
 - 3. Keep the stulls in place during:
 - a. Subsequent manufacturing process and curing.
 - b. Transport to the job site.
 - c. Placement in the trench for pipe 30 to 42 inches in diameter:
 - 1) Horizontal stulls must be removed prior to backfilling.
 - 2) Vertical stulls should remain in place until after the trench is backfilled.
 - 4. Remove stulls prior to testing.
 - 5. Temporary removal of stulls will be allowed for repairs to the lining, if required.
- D. Plastic covers:
 - 1. Attach to the ends of the pipe and fittings during curing of lining storage and shipment, and on the installation site.
 - a. They may be removed just prior to installation.
 - 2. Banding:
 - a. Steel bands, or
 - b. Reinforced plastic straps.
 - 3. Temporary holes may be cut into the covers during curing or to add water to facilitate repairs.
 - a. Promptly tape the holes closed after completing the curing or repair.

- E. Loading, transporting, unloading and handling pipe and fittings:
 - 1. Handle pipe in a manner and by methods that prevent damage to pipe, lining, and coatings.
 - 2. Use padded slings and supports during handling as necessary to prevent damage.
 - 3. Take all necessary precautions to maintain the integrity of the coating.
 - 4. Handle pipe with proper equipment and do not be push or drag along the ground.
 - 5. Do not stack or otherwise loaded externally pipe such that the dimensional integrity of the joint configuration and/or roundness of the pipe may be compromised.
- F. Storage:
 - 1. Store pipe and fittings on skids, sand or dirt berms, sand bags, old tires, or other suitable means to prevent damage to pipe and fittings.
 - 2. Store and protect pipe from damage from equipment, traffic, and vandalism.
- G. Inspection:
 - 1. Inspect pipe lining and coating immediately before installation for damage and holidays.
 - 2. Repair damaged pipe lining and coatings or reject in accordance with specified criteria for identifying and making minor repairs.
 - 3. Remove rejected pipe from the project site.

1.06 QUALITY ASSURANCE

- A. If steel is selected as the 42" transmission main pipeline material:
 - 1. Arrange for Manufacturer's Technical Representative to make periodic visits to factory or shop to inspect surface preparation of pipe, fittings, and accessories; and to inspect application of linings to interior and coatings to exterior of pipe, fittings, and accessories.
 - 2. Witnessed pipeline production and factory testing: Contractor is responsible for providing costs for witnessed pipeline production and factory testing as indicated in the Source Testing in Section 01756. Witness of the source testing shall occur during the first week of pipeline production for this project where all phases of the production and testing of this project's pipeline can be witnessed.
 - 3. Arrange for Manufacturer's representative train pipeline installers, as needed, prior to pipeline installation and to make a site visit during the first 1,000 linear feet of pipeline installation to inspect the pipeline and installation.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. The ~~entire~~ pipeline shall be restrained with welded joints. ~~and flanged connections as shown in the Drawings.~~^{AD1}
- B. Design requirements:
 - 1. ~~Where pipe thickness is not indicated on the drawings,~~^{AD1} Contractor shall design the pipe, fittings and specials in accordance with AWWA Manual M11 with the following modifications:^{AD1}

- a. Steel wall thickness: As designed, or minimum 3/16 inch, whichever is greater.
- b. Deflection of pipe and fittings: Maximum of 2%.
- c. Working stress of steel: 50 percent of working pressure or 75% of working plus surge pressure.
- d. Contractor shall design the pipeline for an internal design pressure of 150psi, which consists of the working pressure, surge pressure, and safety factor. ^{AD1}
- ~~d-e.~~ Calculate earth loads using the following formula:

$$W_T = W_C + W_I$$

the various terms have the following meaning:

W_T = Total load on pipe, pounds per linear foot of pipe.

W_C = Earth load, pounds per linear foot of pipe calculated as outlined in M11 (prism load) and using the weight of local soils or backfills.

W_I = Live loads, pounds per linear foot of pipe, as outlined in AWWA M11. Add AASHTO's H-20 loading to earth loads for all locations where pipeline is placed in an area of an existing or future street or roadway.

~~e-f.~~ A Bedding constant $K = 0.100$ and a Deflection Lag Factor of 1.00.

~~f-g.~~ Modulus of soil reaction as indicated in the Geotechnical Report, or an E' value of 1,000 pounds per square inch if not indicated in the Geotechnical Report.

- 2. Where piping is designated to be restrained for thrust, include in the design the effect of stresses caused by thrust loads on the cylinder and welded joint.
- 3. Subject steel cylinder to no more than the lesser of 15,000 pounds per square inch or 50 percent of the steel yield stress under working and surge pressure.
- 4. Use only the area of the steel to calculate the total pipe stiffness for pipelines 42 inches in diameter and larger.
 - a. Do not include the area of the lining or coating in the calculation.

2.02 MATERIALS

- A. Steel pipe, fittings, and specials:
 - 1. General:
 - a. Steel pipe in accordance with AWWA C200, and as specified.
 - b. Fittings and specials dimensions in accordance with AWWA C208.
 - c. Provide identification marks in accordance with AWWA C200.
 - d. Diameter designation: The pipe diameter specified or indicated on the Drawings is the clear inside diameter after application of the lining with a tolerance of minus 0 inch and plus 1/16 inch.

2.03 FABRICATION

- A. Shop fabricate steel piping fittings and specials in units as long as practicable for safe hauling and installation.
 - 1. Minimize number of field welds.
 - 2. Do not exceed 50 feet for pipe lengths unless approved in writing by Engineer.

- B. Fabricate fittings and specials to uniform lengths with proper end clearance for the specified types of joint or attachment.
- C. Fabricate fittings and specials to allow field assembly without cutting or special work.
 - 1. Do not weld flanges to nozzles until the nozzles and reinforcements are completely welded to the header.
 - 2. Accurately space and align flanges so that when connections have been made there will be no stress on the header, piping, or equipment.
 - 3. Perform a factory tests on all fittings and specials per AWWA C200 Section 5.2.1.2.
- D. Identification marks: Stenciled or otherwise shown at the top of the piping items exterior, and include the following information:
 - 1. Date of manufacture of the item.
 - 2. Name or trademark of the manufacturer.
 - 3. Internal diameter in inches.
 - 4. Number of the item, sequential from initial to end station.
 - 5. NSF approval (if installed for potable water service).

2.04 LINING - STEEL PIPE FITTING AND SPECIALS

- A. General: Mortar line steel pipe except where otherwise specified or indicated on the Drawings.
 - 1. Finish joints of fabricated steel piping fittings and specials as specified for pipe lining after field welding is complete.
 - 2. All materials used in the pipe lining ~~for pipe used in potable water systems~~ shall be in^{AD1} accordance with NSF Part 61.
- B. Cement mortar lining:
 - 1. For the inside of fabricated steel pipe fittings and specials in accordance with AWWA C205.
 - 2. Reinforcement: Reinforce lining of fittings and specials, 24 inches in diameter and larger with wire mesh if not cutout of straight pipe previously lined.
 - 3. Cement: ASTM C150, Type II, low alkali.
 - 4. Sand: AWWA C205 except that the total percentage of deleterious material not exceed 3 percent.

2.05 COATING - STEEL PIPE, FITTINGS AND SPECIALS

- A. General:
 - 1. Mortar coat outside pipe surfaces of steel pipe, except when otherwise specified or indicated on the Drawings.
 - 2. Extend pipe coating for underground piping 6 inches above finish grade or 3 inches above finish floor, and neatly terminate.
 - 3. Field paint aboveground steel pipe as specified in Section 09960.
- B. Cement-mortar coating: Coat steel pipe in accordance with AWWA C205, modified as follows:
 - 1. Portland cement: ASTM C150, Type II, low alkali.
 - 2. Sand: AWWA C205 except that the total percentage of deleterious material not exceed 3 percent.

2.06 STEEL PIPE JOINTS AND CONNECTIONS

A. General:

1. Joints:

- a. Provide lap welded or bell and spigot type joints with rubber gaskets for pipelines 54 inches and smaller, except as otherwise specified or indicated on the Drawings.
- b. Use lap joints on field-welded joints for restraint. The joint shall be double lap welded as shown in the Drawings. ^{AD1}
- ~~c. Welded Carnegie joints can be used if working pressure is less than 75 pounds per square inch.~~ ^{AD1}
- ~~d-c.~~ ^{AD1} Use butt-strap joints only where required for closures or where indicated on the Drawings.
- ~~e-d.~~ Provide deep bells where required for shrinkage expansion control joints.
- ~~f-e.~~ Provide joints with the same or higher pressure rating as the abutting pipe.
- ~~g-f.~~ Install cathodic protection bonding cables as indicated on the drawings.

2. Connections:

- a. Make connections to existing systems using a flange isolation joint.
- b. If an existing pipeline or facility does not include a flange at or near the connection point, place an isolation flange in the first length of pipe.
- c. Use a butt-strap joint to connect the first length of pipe to the existing pipeline.

B. Bell and spigot joint rings:

1. Contractor shall submit a bid alternate for unrestrained bell and spigot joints along straight sections with welded joints at the bends. Refer to Drawings for restraint requirements.
2. Rolled Carnegie shape M-3818 with rubber gaskets.
3. Rubber gasket requirements:
 - a. Minimum tensile strength, tested in accordance with ASTM D412, between 2,000 and 2,700 pounds per square inch.
 - b. Minimum elongation at rupture, tested in accordance with ASTM D412, between 350 and 400 percent.
 - c. Specific gravity, tested in accordance with ASTM D297, between 0.90 and 1.50.
4. Furnish joints with recesses in the coating or lining exposing the joint for attachment of electrical bonds. Install 2 exterior recesses at each joint.

C. Bell and rolled spigot joints:

1. Contractor shall submit a bid alternate for unrestrained bell and spigot joints along straight sections with welded joints at the bends. Refer to Drawings for restraint requirements.
2. Bell and rolled spigot joints with rubber gaskets.
3. Manufactured joints with the clearance between the bells and spigots such that when combined with the gasket groove configuration and the gasket itself, will provide watertight joints under all operating conditions when installed.
4. Submit details complete with dimensions and tolerances.
5. Form bell ends by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. No process will be permitted in which the bell is formed by rolling.

6. Yield strength of the steel used in the spigot rolling operation: limited to 52,000 pounds per square inch.
7. Rubber gaskets requirements:
 - a. Minimum tensile strength, tested in accordance with ASTM D412, between 2,000 and 2,700 pounds per square inch.
 - b. Minimum elongation, tested in accordance with ASTM D412, between 350 and 400 percent.
 - c. Specific gravity, tested in accordance with ASTM D297, between 0.90 and 1.50.
8. Furnish joints with recesses in the coating exposing the joint for attachment of electrical bonds. Install 2 recesses at each joint. ^{AD1}

B.D. Flanges: AWWA C207, Class D, Pressure Class 150 steel ring, and as follows:

1. Match pipe flanges to the valve flanges.
2. Provide a shop coating of primer on flanges and portions of pipe not covered with cement-mortar.
3. Flange bolts: As specified in Section 15052.
4. Provide washer on the nut end of each bolt to protect the flange coatings.
5. Gaskets: As specified in Section 15052.

G.E. Welded joints:

1. Lap welded joints:
 - a. Lap welded joints shall be double lap welded as shown in the Drawings. ^{AD1}
 - a.b. Lap joints prepared for electric field welding in accordance with AWWA C206.
 - b.c. Joint forming:
 - 1) Joint geometry and joint field weld will be such that no part of any field weld will be closer than 1 inch to the nearest point of tangency to the bell radius.
 - 2) Form bell ends by and expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape.
 - e.d. Provide surfaces of the bell and spigot that are parallel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Cleaning: Thoroughly clean pipe and fittings before placement.
- B. Pipe laying:
 1. Lay pipe to the lines and grades indicated on the Drawings unless they are amended or supplemented by the manufacturer's tabulated lay schedule and accepted by the Engineer.
 2. Contractor shall backfill or plate the pipeline trench after completion of work each day. Refer to section 01550 for all requirements. It is not acceptable to leave the trench open at the end of the working day. ^{AD1}
 - 2.3. Lower pipe into the trench slowly and gently with slings or properly padded calipers.
 - 3.4. Make the bell end of the pipe face the direction of laying wherever practicable.

- 4.5. Keep the pipe trench free from water which might impair the bedding or joining and welding operations.

C. Joints:

1. Gasket joints:

- a. Lubricate the spigot groove, and the first 2 inches of the bell, with an approved soft vegetable soap compound.
- b. Position the gasket in the spigot groove such that the rubber is distributed uniformly around the circumference.
- c. Lay the pipes in such manner that the blockouts on the interior linings are at the spring line of the pipe to facilitate electrical connection of adjacent pipes.
- d. The width of the space provided at the joint may be varied to compensate for the permissible manufacturing tolerance in pipe lengths plus or minus 1/4 inch to maintain the laying length indicated on the Drawings and lay schedule.
- e. Place metal or wooden spacers against the inside shoulder of the bells.
- f. Joints may be pulled on one side and most joint designs can be closed on the opposite side of pipe for long radius curves and slight changes or correction of alignment and grade.
 - 1) Joint deflections are limited to the manufacturer's recommendations and must include at least a safety factor of 2.
- g. Insert a thin metal feeler gauge between the bell and spigot after the joint is assembled in order to check the position of the gasket around the complete circumference of the pipe.
- h. If the gasket is not in its proper position, disassemble the joint and inspect the gasket for cuts or damage.
 - 1) If gasket is damaged relay the pipe with a new gasket.
 - 2) If the gasket is not damaged, relay the pipe.
- i. Install cathodic protection bonding cables as indicated on the drawings.

2. Flange joints:

- a. Flanges:
 - 1) Apply cement-mortar lining and coating to the steel pipe section.
 - 2) Coat buried flanges with Plastic Tape Wrap Coating.
- b. Flange bolts: As specified in Section 15052.

3. Welded joints:

- a. Use lap type electric welded joints for field welded joints in accordance with AWWA C206. Perform field welding by welders certified by ASME Boiler and Pressure Vessel Code.
- b. Where exterior welds are performed, provide adequate space for welding and inspection of the joints.
- c. During installation of welded steel pipe in either straight alignment or on curves, lay the pipe so that at any point around the circumference of the joint where is a minimum lap of 3 inches and a minimum space of 1 inch between the end of the fillet weld or the spigot end of the pipe and the nearest tangent to a bell radius.
- d. Prior to the beginning of the welding procedure, remove any tack welds used to position the pipe during laying.
 - 1) Equally distribute any annular space between the faying surfaces of the bell and spigot around the circumference of the joint by shimming, jacking, or other suitable means.
- e. Make weld in accordance with AWWA C206.

- 1) Where more than 1 pass is required, peek to relieve shrinkage stresses on each pass except the first and final one; and remove all dirt, slag and flux before the succeeding bead is applied.
 - f. Place no more than a 1/8 inch of weld material on each weld pass using a combination of stitch and weave weld.
 4. Restrained joints:
 - a. ~~Double fillet-~~ The joint shall be double lap welded ~~lap joints are required~~ as shown ~~on~~in the Drawings. ^{AD1}
 5. Shrinkage/expansion control joints:
 - a. Location:
 - 1) At intervals not exceeding 1,000 feet along welded reaches of the pipeline.
 - 2) The first regular lap-welded field joints outside of each concrete encasement or structure.
 - 3) Where the shrinkage/expansion control joints occur in a traveled roadway or other inconvenient location, the location of the joint may be adjusted to a convenient location.
 - b. Installation:
 - 1) Lay the pipe with an initial lap of not less than 1 inch greater than the typical lap.
 - 2) Install welded shrinkage control joint when:
 - a) The temperature is approximately the lowest during the workday.
 - b) At least 500 feet of pipe have been laid and the joints have been welded ahead of and in back of the shrinkage control joint.
 - c) After backfill has been completed to at least 1 foot above the top of the pipe ahead and in back of the joint.
 6. Butt-strap joints:
 - a. A minimum of 10 inches wide.
 - b. The same thickness as the pipe wall.
 - c. Provide for a minimum of 2-inch lap at each pipe joint.
 - d. Joint stress analysis will be required for restrained joint areas on pipelines 36 inches and larger.
- D. Joint coating:
1. Coat joints on mortar-coated pipe with field placed mortar. Place mortar by:
 - a. Placing closed-cell polyethylene strips with cloth backing around the pipe joint:
 - 1) Using plastic bands at least 8 inches in width.
 - 2) Centered and secured over the exterior joint recess.
 - 3) Use box strapping or equivalent methods to bind the band to the pipe so that it encases the outside joint recess completely and snugly.
 - 4) Provide an opening near the top of the joint.
 - b. After the band is secure, moisten the joint recess with water.
 - c. Mix mortar grout, consisting of 1 part Portland cement to 2 parts of sand mixed with water to the consistency of thick cream.
 - d. Pour mortar grout into the opening to fill the joint recess.
 - e. Fill the outside annular space between the ends of the adjacent pipes with the mortar grout for its full circumference.
 - f. Do not bed and backfill at the joint until the top opening has been closed and the mortar allowed to take initial set.
 - g. Provide a smooth finished joint.

- E. Corrosion protection - steel pipe:
 - 1. Monitor steel pipe for external corrosion as specified in Section 13100.
- F. Joint lining:
 - 1. Line joints on cement mortar lined pipe by hand placing field mixed cement mortar in the joint recess to the level to provide a smooth pipe interior across the joint.
 - 2. The joint material must be properly cured before water is placed into the pipeline.

3.02 FIELD QUALITY CONTROL

A. Scheduling:

- 1. Contractor shall coordinate with Construction Manager for scheduling Field Quality Control testing. Contractor shall provide access for the Construction Manager, as needed, to perform inspection and testing. Contractor shall provide Construction Manager a minimum 1 working day advance notice before inspection or testing is needed. ^{AD1}

A.B. Testing:

- 1. Test as specified in Section 15052 and Section 15956.

B.C. Field weld testing shall be provided by Contractor hired third party certified welding inspector the Construction Manager: ^{AD1}

- 1. Full-penetration butt welds shall be inspected as follows: ^{AD1}
 - a. All root passes of all full-penetration butt-welds shall be 100 percent examined visually (VT). The root pass shall be ground prior to VT examination.
 - b. All final cover passes of all full-penetration butt-welds shall be 100 percent examined visually (VT) and by radiography (RT).
 - c. Acceptance criteria shall be as specified in Table 341.3.2 in ASME B31.3 for the scheduled fluid service.
- 2. Fillet welds shall be inspected as follows:
 - a. 100 percent of fillet welds, including root and cover passes, shall be examined by VT.
 - b. For the first 1,300 linear feet of pipeline installed, 100 percent of the fillet welds, including root and cover passes, shall be examined using magnetic particle (MP)
 - c. ~~For the~~The first two pipeline joints with fillet welds shall be completely welded with the joint mortar coating installed. The ~~contractor~~Contractor shall then remove the mortar coating at the two joints for the Construction Manager to confirm the interior weld did not damage the steel cylinder of the bell at the joint. Once confirmed, the mortar coating shall be re-installed by the Contractor. ^{AD1}
 - d. After the first 1,300 linear feet of pipeline installed, ~~50 the Construction Manager will test 50~~ percent of fillet welds, including root and cover passes, ~~shall be examined~~ ^{AD1} using magnetic particle (MP). Test welds shall be ^{AD1} at regular intervals, approximately equally spaced, throughout the pipeline alignment. Test interior and exterior welds equally.
 - e. Acceptance criteria shall be as specified in Table 341.3.2 in ASME B31.3 3 in accordance with the scheduled fluid service.

3. 100 percent of field welds associated with segmented bolted sleeve couplings on STL3 piping shall be inspected by VT and RT for full penetration butt welds or VT and MP for fillet welds.
4. Non-destructive radiographic examination shall be carried out in accordance with the following requirements:
 - ~~a.~~ ~~The radiographic inspection procedure and all radiographs be developed and interpreted by a qualified technician hired by the Owner or Engineer.~~
AD1
 - ~~b.~~ a. Construction Manager.^{AD1} All radiographs of welds shall be made in accordance with ASTM E94 and ASTM E1032, and approved based upon the criteria specified in ASME BPVC, Section V. At least one penetrometer shall be used with each radiographic negative. ~~One set duplicate films shall be taken and submitted to the Engineer.~~^{AD1}
 - ~~c.~~ b. Radiographic film shall be developed at the location where the radiography is performed. The Contractor and ~~Engineer~~ Construction Manager^{AD1} shall view the radiographs and have them interpreted independently by a qualified NDE technician.
 - ~~d.~~ c. Sharp protrusions made by film clips shall be removed. Penetrometers shall be selected and placed in accordance with ASTM E94. If the penetrometer cannot be placed on the source side, a technique shot shall be made in accordance with the procedures included in ASTM E94, to demonstrate the ability to produce an acceptable technique. The technique shot radiograph shall be submitted for approval.
5. Magnetic particle weld testing shall be carried out as soon as practicable after welding of joints joint, test all field-welded joints using the magnetic particle examination procedure in accordance with ASTM E709.~~---~~

G.D. Test results:

1. Chip out, rebell and retested all defects.
2. Upon retest, the repaired area shall show no leaks or other defects.
3. Close the threaded openings with pipe plugs or by welding.^{AD1}

E. Mandrel Testing:

1. Contractor shall perform mandrel testing to confirm roundness of the full-length of the pipeline.
 - a. The pipe internal diameter shall be within the tolerances and allowable deflection specified within this specification section.
 - b. Mandrel testing shall be performed after backfill is complete with the struts removed immediately before hydrostatic testing.^{AD1}

F. Video Inspection

1. The Contractor shall perform a video inspection of the full-length of the 42-inch RW pipeline. Refer to 15956 for all requirements^{AD1}

END OF SECTION

SECTION 15956

PIPING SYSTEMS TESTING

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Test requirements for piping systems.
- B. Related sections:
 - 1. Section 01330 - Submittal Procedures.
 - 2. Section 01410 - Regulatory Requirements.
 - 3. Section 01500 - Temporary Facilities and Controls.
 - 4. Section 02240 - Dewatering
 - 5. Section 15052 - Common Work Results for General Piping.

1.02 REFERENCES

- A. National Fuel Gas Code (NFGC).
- B. American Society of Mechanical Engineers (ASME):
 - 1. B31.1 - Power Piping.
 - 2. B31.3 - Process Piping.
 - 3. B31.8 - Gas Transmission and Distribution Piping Systems.
- C. Underwriters Laboratories Inc. (UL).

1.03 TESTING REQUIREMENTS

- A. General requirements:
 - 1. Testing requirements are stipulated in Laws and Regulations; are included in the Piping Schedule in Section 15052; are specified in the specifications covering the various types of piping; and are specified in this Section.
 - 2. Requirements in Laws and Regulations supersede other requirements of Contract Documents, except where requirements of Contract Documents are more stringent, including higher test pressures, longer test times, and lower leakage allowances.
 - 3. Test plumbing piping in accordance with Laws and Regulations, the plumbing code, as specified in Section 01410, and UL requirements.
 - 4. Test natural gas or digester gas piping:
 - a. For less than 125 pounds per square inch gauge working pressure, test in accordance with mechanical code, as specified in Section 01410, or the National Fuel Gas Code, whichever is more stringent.
 - b. For 125 pounds per square inch gauge or greater working pressure, test per ASME B31.3 or ASME B31.8, whichever is more stringent.
 - 5. When testing with water, the specified test pressure is considered to be the pressure at the lowest point of the piping section under test.
 - a. Lower test pressure as necessary (based on elevation) if testing is performed at higher point of the pipe section.

- B. Furnish necessary personnel, materials, and equipment, including bulkheads, restraints, anchors, temporary connections, pumps, water, pressure gauges, and other means and facilities required to perform tests.
- C. Water for testing, cleaning, and disinfecting:
 - 1. Water for testing, cleaning, and disinfecting will be provided as specified in Section 01500.
- D. Pipes to be tested: Test only those portions of pipes that have been installed as part of this Contract. Test new pipe sections prior to making final connections to existing piping. Furnish and install test plugs, bulkheads, and restraints required to isolate new pipe sections. Do not use existing valves as test plug or bulkhead.
- E. Do not test against closed valves.
- F. Unsuccessful tests:
 - 1. Where tests are not successful, correct defects or remove defective piping and appurtenances and install piping and appurtenances that comply with the specified requirements.
 - 2. Repeat testing until tests are successful.
- G. Test completion: Drain and leave piping clean after successful testing.
- H. Test water disposal: Dispose of testing water as if it was dewatering water in accordance with requirements of Section 02240.

1.04 SUBMITTALS

- A. Submit as specified in Section 01330.
- B. Schedule and notification of tests:
 - 1. Submit a list of scheduled piping tests by noon of the working day preceding the date of the scheduled tests.
 - 2. Notification of readiness to test: Immediately before testing, notify Engineer in writing of readiness, not just intention, to test piping.
 - 3. Have personnel, materials, and equipment specified in place before submitting notification of readiness.

1.05 SEQUENCE

- A. Clean piping before pressure or leak tests.
- B. Test gravity piping underground, including sanitary sewers, for visible leaks before backfilling and compacting.
- C. Underground pressure piping may be tested before or after backfilling when not indicated or specified otherwise.
- D. Backfill and compact trench, or provide blocking that prevents pipe movement before testing underground piping with a maximum leakage allowance.
- E. Test underground piping before encasing piping in concrete or covering piping with slab, structure, or permanent improvement.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 TESTING ALIGNMENT, GRADE, AND DEFLECTION

- A. Alignment and grade:
 - 1. Visually inspect the interior of gravity piping with artificial light, reflected light, or laser beam.
 - 2. Consider inspection complete when no broken or collapsed piping, no open or poorly made joints, no grade changes that affect the piping capacity, or no other defects are observed.
- B. Deflection test:
 - 1. Pull a mandrel through the clean piping section under test.
 - 2. Perform the test not sooner than 30 days after installation and not later than 60 days after installation.
 - 3. Use a 9-rod mandrel with a contact length of not less than the nominal diameter of the pipe within 1 percent plus or minus.
 - 4. Consider test complete when the mandrel can be pulled through the piping with reasonable effort by 1 person, without the aid of mechanical equipment.

3.02 AIR TESTING METHOD FOR PRESSURE PIPING

- A. Air test piping, indicated with "AM" in the Piping Schedule, with air or another nonflammable or inert gas.
- B. Test gas, air, liquefied petroleum gas, liquid chlorine, and chlorine gas piping by the air test method:
 - 1. Test chlorine piping with dry air or nitrogen having a dew point of minus 40 degrees Fahrenheit or less. Supply temporary air dryers as necessary.
- C. Test at pressure as specified in Piping Schedule in Section 15052:
 - 1. Provide temporary pressure relief valve for piping under test:
 - a. Set at the lesser of 110 percent of the test pressure or 50 pounds per square inch gauge over the test pressure.
 - 2. Air method test pressures shall not exceed 110 percent of the piping maximum allowable working pressure calculated in accordance with the most stringent of ASME B31.1, ASME B31.3, ASE B31.8, or the pipe manufacturer's stated maximum working pressure.
 - 3. Gradually increase test pressure to an initial test pressure equal to the lesser of 1/2 the test pressure or 25 pounds per square inch gauge.
 - 4. Perform initial check of joints and fittings for leakage.
 - 5. Gradually increase test pressure in steps no larger than the initial pressure. Check for leakage at each step increase until test pressure reached.
 - 6. At each step in the pressure, examine and test piping being air tested for leaks with soap solution.
 - 7. Consider examination complete when piping section under test holds the test pressure for 15 minutes without losses.

3.03 TESTING GRAVITY FLOW PIPING

- A. Test gravity flow piping indicated with "GR" in the Piping Schedule, as follows:
 - 1. Unless specified otherwise, subject gravity flow piping to the following tests:
 - a. Alignment and grade.
 - b. For plastic piping test for deflection.
 - c. Visible leaks and pressure with maximum leakage allowance, except for storm drains and culverts.
 - 2. Inspect piping for visible leaks before backfilling.
 - 3. Provide temporary restraints when needed to prevent movement of piping.
 - 4. Pressure test piping with maximum leakage allowance after backfilling.
 - 5. With the lower end plugged, fill piping slowly with water while allowing air to escape from high points. Keep piping full under a slight head for the water at least 24 hours:
 - a. Examine piping for visible leaks. Consider examination complete when no visible leaks are observed.
 - b. Maintain piping with water, or allow a new water absorption period of 24 hours for the performance of the pressure test with maximum leakage allowance.
 - c. After successful completion of the test for visible leaks and after the piping has been restrained and backfilled, subject piping to the test pressure for minimum of 4 hours while accurately measuring the volume of water added to maintain the test pressure:
 - 1) For polyvinyl chloride (PVC) gravity sewer pipe: 25 gallons per day per inch diameter per mile of piping under test:
 - a) Consider the test complete when leakage is equal to or less than the following maximum leakage allowances:
 - (1) For concrete piping with rubber gasket joints: 80 gallons per day per inch of diameter per mile of piping under test:
 - (a) Advise manufacturer of concrete piping with rubber gasket joints of more stringent than normal maximum leakage allowance.
 - (2) For vitrified claypiping: 500 gallons per day per inch of diameter per mile of piping under test.
 - (3) For other piping: 80 gallons per day per inch diameter per mile of piping under test.

3.04 TESTING HIGH-HEAD PRESSURE PIPING

- A. Test piping for which the specified test pressure in the Piping Schedule is 20 pounds per square inch gauge or greater, by the high head pressure test method, indicated "HH" in the Piping Schedule.
- B. General:
 - 1. Test connections, hydrants, valves, blowoffs, and closure pieces with the piping.
 - 2. Do not use installed valves for shutoff. Provide blinds or other means to isolate test sections.
 - 3. Do not include valves, equipment, or piping specialties in test sections if test pressure exceeds the valve, equipment, or piping specialty safe test pressure allowed by the item's manufacturer.

4. During the performance of the tests, test pressure shall not vary more than plus or minus 5 pounds per square inch gauge with respect to the specified test pressure.
5. Select the limits of testing to sections of piping. Select sections that have the same piping material and test pressure.
6. When test results indicate failure of selected sections, limit tests to piping:
 - a. Between valves.
 - b. Between a valve and the end of the piping.
 - c. Less than 500 feet long.
7. Test piping for minimum 2 hours for visible leaks test and minimum 2 hours for the pressure test with maximum leakage allowance.

C. Testing procedures:

1. Fill piping section under test slowly with water while venting air:
 - a. Use potable water for all potable waterlines and where noted on the Piping Schedule.
2. Before pressurizing for the tests, retain water in piping under slight pressure for a water absorption period of minimum 24 hours.
3. Raise pressure to the specified test pressure and inspect piping visually for leaks:
 - a. Consider visible leakage testing complete when no visible leaks are observed.

D. Pressure test with maximum leakage allowance:

1. Leakage allowance is zero for piping systems using flanged, National Pipe Thread threaded and welded joints.
2. Pressure test piping after completion of visible leaks test.
3. For piping systems using joint designs other than flanged, threaded, or welded joints, accurately measure the makeup water necessary to maintain the pressure in the piping section under test during the pressure test period:
 - a. Consider the pressure test to be complete when makeup water added is less than the allowable leakage and no damage to piping and appurtenances has occurred.
 - b. Successful completion of the pressure test with maximum leakage allowance shall have been achieved when the observed leakage during the test period is equal or less than the allowable leakage and no damage to piping and appurtenances has occurred.
 - c. When leakage is allowed, calculate the allowable leakage by the following formula:

$$L = S \times D \times P^{1/2} \times 133,200^{-1}$$

wherein the terms shall mean:

L = Allowable leakage in gallons per hour.

S = Length of the test section in feet.

D = Nominal diameter of the piping in inches.

P = Average observed test pressure in pounds per square inches gauge, at the lowest point of the test section, corrected for elevation of the pressure gauge.

x = The multiplication symbol.

3.05 TESTING LOW-HEAD PRESSURE PIPING

- A. Test piping for which the specified test pressure is less than 20 pounds per square inch gauge, by the low head pressure test method, indicated "LH" in the Piping Schedule.
- B. General:
 - 1. Test pressures shall be as scheduled in Section 15052.
 - 2. During the performance of the tests, test pressure shall not vary more than plus or minus 2 pounds per square inch gauge with respect to the specified test pressure.
 - 3. Test connections, blowoffs, vents, closure pieces, and joints into structures, including existing bell rings and other appurtenances, with the piping.
 - 4. Test piping for minimum 2 hours for visible leaks test and minimum 2 hours for the pressure test with maximum leakage allowance.
- C. Visible leaks test:
 - 1. Subject piping under test to the specified pressure measured at the lowest end.
 - 2. Fill piping section under test slowly with water while venting air:
 - a. Use potable water for all potable waterlines and where noted on the Piping Schedule.
 - 3. Before pressurizing for the tests, retain water in piping under slight pressure for the water absorption period of minimum 24 hours.
 - 4. Raise pressure to the specified test pressure and inspect piping visually for leaks. Consider testing complete when no visible leaks are observed.
- D. Pressure test with maximum leakage allowance:
 - 1. Pressure test piping after completion of visible leaks test.
 - 2. Accurately measure the makeup water necessary to maintain the pressure in the piping section under test during the pressure test period:
 - a. Consider the pressure test to be complete when makeup water added is less than the allowable leakage of 80 gallons per inch of nominal diameter, per mile of piping section under test after 24 hours, and no damage to piping and appurtenances has occurred.
 - b. Successful completion of the leakage test shall have been achieved when the observed leakage is equal or less than the allowable leakage and no damage to piping and appurtenances has occurred.
- E. Optional joint test:
 - 1. When joint testing is allowed by note in the Piping Schedule, the procedure shall be as follows:
 - a. Joint testing will be allowed only for low head pressure piping.
 - b. Joint testing does not replace and is not in lieu of any testing of the piping system or trust restraints.
 - 2. Joint testing may be performed with water or air.

3. Joint test piping after completion of backfill and compaction to the top of the trench.
4. Joint testing with water:
 - a. Measure test pressure at the invert of the pipe. Apply pressure of 4 feet plus the inside diameter of the pipe in water column within 0.20 feet in water column.
 - b. Maintain test pressure for 1 minute.
 - c. Base the allowable leakage per joint on 80 gallons per inch nominal diameter, per mile of piping, per 24 hours equally distributed to the actual number of joints per mile for the type of piping.
 - d. Consider the pressure test to be complete when makeup water added is less than the allowable leakage.
 - e. Successful completion of the joint test with water shall have been achieved when the observed leakage is equal or less than the allowable leakage.
5. Joint testing with air:
 - a. Apply test pressure of 3 pounds per square inch gauge with a maximum variation of plus 0.20 and minus 0.00 pounds per square inch.
 - b. Maintain test pressure for 2 minutes.
 - c. Consider the pressure test to be complete when the test pressure does not drop below 2.7 pounds per square inch for the duration of the test.

3.06 PIPELINE PRESSURE TESTING SEGMENTS

- A. Turlock NVRWP pipeline shall be pressure tested in segments no longer than the following approximate locations:
 1. City of Modesto Jennings Wastewater Treatment Plant generally defined as all work between the Modesto Effluent Pump Station Site and STA 91+00.
 2. Jennings Road generally defined as STA 91+00 to STA 173+00.
 3. West Main Ave generally defined as STA 173+00 to STA 281+00.
 4. South Carpenter Road generally defined as all work between STA 281+00 and the Turlock Outfall Site.

3.07 PIPELINE VIDEO INSPECTION

1. The full length of the 42-inch RW pipeline shall be inspected by video according to the following requirements. The video inspection is required for both welded steel and/or ductile iron pipe.
2. It is the intent of this inspection to assess the internal structural and service condition of pipeline systems, including tees, collar locations, and fittings prior to commissioning and startup. Assessment will be performed using visual inspection and pan and tilt color camera-CCTV.
3. CCTV (closed circuit television) Specifications: Current PACP certification of all CCTV operators will be required for all CCTV work.
4. Database shall be an unmodified NASSCO-PACP Certified Access Database.
5. CCTV Software shall be NASSCO-PACP certified.
6. The 42-inch RW shall be inspected by means of remote CCTV. The recorded video must show the entire circumference of the pipeline.
7. Perform all CCTV inspections in accordance with NASSCO's Pipeline Assessment Certification Program (PACP). CCTV inspections will be conducted entirely in digital format. The entire inspection survey shall be recorded in MPEG-1 format written to DVD and submitted with digital links to the survey. All television inspection reports shall be with-in +/- 2 (two) feet of

the measured linear footage between bypass outlets along the pipe centerline from the end of pipe to end of pipe. Work not following these specifications may be rejected for payment and the contractor may be required to re do the work.

8. The documentation of the work shall consist of PACP CCTV Reports, Unmodified PACP database, logs, electronic reports, etc. noting important features encountered during the inspection. The speed of travel shall be slow enough to inspect each pipe joint, tee connection, structural features, but should not, at any time, be faster than 30 feet per minute. The camera must be centered in the pipe to provide accurate distance measurements to provide exact locations of important features in the pipe and these footage measurements shall be displayed and documented on the video. The completed DVD will become the property of the City.
9. Every section of pipe shall be identified by audio and alphanumeric on the video display and shall include: project name, City, pipe name, CAGIS, pipe type, inspector's name, pipe diameter and length, and date of inspection. Important features shall be identified by audio and on PACP log to include all fitting locations, collar locations, change of pipe diameters, change of pipe type, and lining changes. All video must be continuously metered from start to finish. In addition to televising the pipelines, all tees shall be panned with the video camera and visually inspected.
10. The surveying/inspecting equipment shall be capable of surveying/inspecting equipment shall be capable of surveying/inspecting a length of sewer up to at least 1000 ft.

B. Qualifications of CCTV Contractor:

1. Completion of a minimum of 100,000 linear feet of internal pipe condition assessment on projects of similar size and scope to this project.
2. All CCTV operator(s) responsible for direct reporting of sewer condition shall have a minimum of 3 years previous experience in surveying, processing, and interpretation of data associated with CCTV surveys/inspections.

C. Manufacturers, one of the following or equal:

1. Video Inspection Specialists 4705 W Santa Ana, Fresno 93722 (559) 276-0186.
Pipeline Services SI, Inc., PO Box 30396, Stockton 95213, (209) 931-3331.^{AD1}

END OF SECTION

^{AD1} Addendum No. 1

APPENDIX E
INCIDENTAL TAKE PERMIT
(Preliminary)



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4005
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director



May 11, 2018

Michael Cooke, Municipal Services Director
City of Turlock, Utilities Department
156 South Broadway
Turlock, California 95380-5454

**Subject: Incidental Take Permit for North Valley Regional Recycled Water
Program - Turlock Segment (2081-2017-038-04)**

Dear Mr. Cooke:

Enclosed you will find two originals of the incidental take permit for the above referenced Project, which have been signed by the California Department of Fish and Wildlife (Department). Please read the permit carefully, sign the acknowledgement on both copies of the permit, and return one original **no later than 30 days from Department signature**, and prior to initiation of ground-disturbing activities, to:

California Department of Fish and Wildlife
Habitat Conservation Planning Branch, CESA Permitting
Post Office Box 944209
Sacramento, California 94244-2090

You are advised to keep the other original signature permit in a secure location and distribute copies to appropriate Project staff responsible for ensuring compliance with the conditions of approval of the permit. Note that you are required to comply with certain conditions of approval prior to initiation of ground-disturbing activities. Additionally, a copy of the permit must be maintained at the Project work site and made available for inspection by Department staff when requested.

The permit will not take effect until the signed acknowledgement is received by the Department. If you wish to discuss these instructions or have questions regarding the permit, please contact Annette Tenneboe, Senior Environmental Scientist (Specialist), at (559) 243-4014, extension 231.

Sincerely,

Julie A. Vance, Regional Manager
Central Region
California Department of Fish and Wildlife

Enclosures (2)



California Department of Fish and Wildlife
Central Region
1234 EAST SHAW AVENUE
FRESNO, CALIFORNIA 93710

California Endangered Species Act
Incidental Take Permit No. 2081-2017-038-04

North Valley Regional Recycled Water Program – Turlock Segment

Authority:

This California Endangered Species Act (CESA) incidental take permit (ITP) is issued by the California Department of Fish and Wildlife (CDFW) pursuant to Fish and Game Code section 2081, subdivisions (b) and (c), and California Code of Regulations, Title 14, section 783.0 et seq. CESA prohibits the take¹ of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.² CDFW may authorize the take of any such species by permit if the conditions set forth in Fish and Game Code section 2081, subdivisions (b) and (c) are met. (See Cal. Code Regs., tit. 14, § 783.4).

Permittee:	City of Turlock, Utilities Department
Principal Officer:	Michael Cooke, Municipal Services Director
Contact Person:	Brian Piontek (510) 899-4808
Mailing Address:	156 South Broadway Turlock, California 95380-5454

Effective Date and Expiration Date of this ITP:

This ITP shall be executed in duplicate original form and shall become effective once a duplicate original is acknowledged by signature of the Permittee on the last page of this ITP and returned to CDFW's Habitat Conservation Planning Branch at the address listed in the Notices section of this ITP. Unless renewed by CDFW, this ITP's authorization to take the Covered Species shall expire on **December 31, 2020**.

Notwithstanding the expiration date on the take authorization provided by this ITP, Permittee's obligations pursuant to this ITP do not end until CDFW accepts as complete the Permittee's Final Mitigation Report required by Condition of Approval 6.7 of this ITP.

¹Pursuant to Fish and Game Code section 86, "'take' means hunt, pursue, catch, capture, or kill; or attempt to hunt, pursue, catch, capture, or kill." (See also *Environmental Protection Information Center v. California Department of Forestry and Fire Protection* (2008) 44 Cal.4th 459, 507 [for purposes of incidental take permitting under Fish and Game Code section 2081, subdivision (b), "'take' ... means to catch, capture or kill"].)

²The definition of an endangered, threatened, and candidate species for purposes of CESA are found in Fish and Game Code sections 2062, 2067, and 2068, respectively.

Project Location:

Project facilities will be constructed in the northwestern portion of the San Joaquin Valley approximately three miles east of the City of Patterson, Stanislaus County, California (Figure 1). Specifically, the Project extends from the pumping facility at the Jennings Wastewater Treatment Plant, east through the Modesto Ranch Lands (i.e., effluent spray fields), south along Jennings Road, east along East Las Palmas Road/South Main Avenue (Main Avenue), and south along South Carpenter Road to the City's outfall site at Harding Drain (Figure 2). Table 1 provides the Township, Range, and Sections defined within the Project footprint; however, Township, Range, and Sections have not been delineated in much of the site.

Table 1. Project Township, Range and Sections

Township	Range	Sections
5S	R8E	S11
5S	R9E	S18, 19, 30, 31, 36

The proposed pipeline alignment is approximately 38,700 feet in length with a maximum construction footprint of approximately 300 acres (Project Area). Project-related construction activities will occur to the east of the San Joaquin River within public rights-of-way, lands owned by the cities of Modesto and Turlock, and various other public and privately owned parcels.

Project Description:

The Project includes activities related to the installation of a 38,700-foot long pipeline to convey recycled water from the City of Turlock's Harding Drain Outfall Site to Modesto's Jennings Wastewater Treatment Plant. At the Jennings Wastewater Treatment Plant, the pipeline will connect with the Modesto Segment of the North Valley Regional Recycled Water Program, which will convey the recycled water to the Delta-Mendota Canal. The recycled water will be provided to the Del Puerto Water District service area, which extends from San Joaquin County through Stanislaus County to Merced County. Water will also be provided to certain Central Valley Project Improvement Act designated wildlife refuges.

The pipeline will be constructed of cement mortar lined and coated steel pipe, with a diameter of up to 42 inches. The pipeline will be equipped with air valves to release air from high points to prevent air binding that can reduce the pipeline capacity. These air valves may be located above or below ground; if aboveground, the air valves will be housed on a concrete slab in a protective steel cage (approximately 4 feet by 4 feet) on the shoulder of an existing road. If located underground, they will be located either within or on the roadway shoulders in below-ground covered concrete vaults with vent pipes extending aboveground. The pipeline will also

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be equipped with drain valves at low points to allow the pipeline to be drained for maintenance and repairs. The pipeline will include up to 15 drain valves spaced approximately every 2,000 feet of pipe, depending on topography. The drains will discharge to existing drainage or irrigation supply ditches along the pipeline alignment.

Open-cut Pipeline Construction. Open-cut construction will be used for installing the majority of the pipeline, along existing roadways and private and municipal agricultural lands (i.e., Modesto Ranch Lands). The open-cut method includes excavation of a trench that will range from 6 to 8 feet wide and approximately 8 to 10 feet deep. Shoring will be required to provide trench stability. Open-cut construction will involve cutting, removing, and replacing pavement in existing paved areas. Where possible, the pipelines will be installed along the shoulder of the roads to minimize paving and traffic disruption, though the pipeline will cross roads in five locations (see Figure 3). To accommodate construction equipment and the work area, the entire construction corridor (active work area including the trench) will be approximately 45 to 60 feet wide. Within the Modesto Ranch Lands, portions of the agricultural fields may be fallowed or plowed prior to construction. It is expected that open-cut construction within paved roadways will proceed at the rate of 100 to 400 feet per day within rural areas. Excavated trench materials will be temporarily stockpiled within the overall 300-acre construction easement and reused to backfill trenches; surplus material will be hauled off-site to the Modesto Jennings Wastewater Treatment Plant. All grades will be restored to pre-project conditions. Upon completion of pipeline installation, affected roadways will be repaved.

Open-cut construction will also be used to install the pipeline across three stream drainages (see Figure 3) which will be conducted under Streambed Alteration Agreement No. 1600-2016-0247-R4 issued by CDFW. Water will not be present in the waterways at the time of pipeline installation. The following describes open-cut construction methods across drainages:

- At Site ND-4/D-8, the trench across the stream will be approximately 6 feet wide, 13 feet deep, and 25 feet long. Approximately 75 cubic yards of material will be excavated and approximately 45 cubic yards will be used as backfill. Around and up to one foot above the pipeline, approximately 15 cubic yards of imported aggregate base material will be used to support the pipeline.
- At Site D-20/D-21, the trench across the stream will be approximately 6 feet wide, 8.5 feet deep, and 25 feet long. Approximately 45 cubic yards of material will be excavated and approximately 20 cubic yards will be used as backfill. Around and up to one foot above the pipeline approximately 15 cubic yards of imported aggregate base material will be used to support the pipeline.

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- At Site D-25/D-26, the trench will be approximately 6 feet wide, 7.5 feet deep, and 25 feet long. Approximately 40 cubic yards of material will be excavated and none will be used as backfill. The backfill material around the pipe and up to the surface will consist of approximately 30 cubic yards of a cement-slurry mix to support the pipeline and prevent heavy compaction from equipment operating above the existing culvert.

Trenchless Pipeline Construction. The trenchless construction method of microtunneling will be used to minimize the area of surface disruption required for pipeline installation or where open-cut construction is not practical. Microtunneling is a remotely-controlled pipe jacking process that uses a boring machine advanced through the ground by incrementally adding pipe segments to the end of the pipe string and advancing the pipe string from a jacking pit to a receiving pit that are excavated at each end. The locations of the three trenchless crossings are shown on Figure 3.

- At Site ND-2/ND-3, the trenchless crossing will be made within the alignment of an existing road. The launching and receiving pits will each be approximately one foot wide, 30 feet long, and 24 feet deep. Between the pits, the microtunneled pipeline will be approximately 290 feet long and approximately 20 feet deep under the ground surface. The total excavation volume of the launching and receiving pits and microtunneled pipeline will be approximately 785 cubic yards. The backfill material around the pipe and up to one foot above the pipe will consist of approximately 145 cubic yards of imported aggregate base material to support the pipeline. Approximately 640 cubic yards of native material will be backfilled between the ground surface and aggregate base.
- At the Agricultural Culvert, the crossing will be made within the alignment of an existing road. The launching and receiving pits will each be approximately 15 feet wide, 30 feet long, and 20 feet deep. Between the pits, the microtunneled pipeline will be approximately 80 feet long and approximately 16 feet deep under the ground surface. The total excavation volume of the launching and receiving pits and microtunneled pipeline will be approximately 720 cubic yards. The volume of backfill material (volume excavated less the volume of the pipe) will be approximately 660 cubic yards. The backfill material around the pipe and up to one foot above the pipe will consist of approximately 145 cubic yards of imported aggregate base material to support the pipeline. Approximately 510 cubic yards of native material will be backfilled between the ground surface and aggregate base.
- At Site ND-5/ND-6, the launching and receiving pits will each be approximately 15 feet wide, 30 feet long, and 26 feet deep. Between the pits, the microtunneled pipeline will be approximately 230 feet long and 22 feet deep. The total excavation volume of launching and receiving pits and microtunneled pipeline will be approximately

1,010 cubic yards. The volume of backfill material (volume excavated less the volume of the pipe) is approximately 845 cubic yards. The backfill material around the pipe and up to one foot above the pipe will consist of approximately 135 cubic yards of an imported aggregate base material to support the pipeline. Approximately 710 cubic yards of native material will be backfilled between the ground surface and aggregate base.

In summary, the Project Area encompasses 300 acres and will result in the disturbance of 0.01 acre of the three stream drainages.

Construction Schedule. Construction is scheduled to last approximately 16 months. The duration of this ITP will cover the 16-month construction period and provide a buffer in the event of Project delays. Work hours will be from 7:00 AM to 6:00 PM, and construction might also take place at night. Night work may include a maximum of two nights at each of the five road crossings. Night work may also include each trenchless crossing, to facilitate continuous work without interruption; this work will be limited to one night at each trenchless crossing location.

Construction Equipment and Machinery. The installation of the proposed facilities will require, but is not limited to, excavator, backhoe, front-end loaders, pavement saw, dump trucks, diesel generator, water tank, water truck, flat-bed truck, drill rig, compactors, double transfer trucks for soil hauling, concrete trucks, dewatering equipment (e.g., pumps), and paving equipment.

Staging Areas. Equipment, material, and vehicle staging will be accommodated either at the construction sites within the Project Area, or at existing off-site facilities, such as the existing Jennings Plant Pump Station and the City of Turlock outfall site along Carpenter Road east of the San Joaquin River.

Covered Species Subject to Take Authorization Provided by this ITP:

This ITP covers the following species:

Name	CESA Status
1. Swainson's hawk (<i>Buteo swainsoni</i>)	Threatened ³

This species and only this species is the "Covered Species" for the purposes of this ITP.

³See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(5)(A).

Impacts of the Taking on Covered Species:

Project activities and their resulting impacts are expected to result in the incidental take of individuals of the Covered Species. The activities described above expected to result in incidental take of individuals of the Covered Species include excavating material such as soil, vegetation, and existing roads; moving, temporarily storing, and removing stockpiled material; backfilling excavated areas; pouring or pumping concrete; compacting backfill material; road reconstruction and paving; microtunneling activity and related equipment operation; moving equipment; and performing any of these activities at night (Covered Activities). The Covered Species is known to use trees at and within 0.5 mile of the Project Area as nesting and roosting substrate, and foraging habitat also exists within and adjacent to the Project Area. In 2017 three Covered Species nests were mapped within the Project Area, and three additional Covered Species nests were identified within 0.5 mile of the Project Area; in addition, territories of two additional pairs were observed in 2017 for whom nests were not located (see Figure 4). Most Covered Activities will be of higher intensity than the baseline activities of farming and road traffic that the Covered Species may be habituated to, and could occur within 0.5 mile of active Covered Species nests. No nest trees will be removed as a result of Project activities.

Covered Activities may result in incidental take of individuals in the form of mortality ("kill") as a result of vehicle strikes due to increased Project-related traffic and Covered Activities and disturbance-related nest failure resulting in the loss of young, fledglings, or eggs due to nest abandonment. Incidental take of individuals of the Covered Species may also occur through capture when eggs or individuals of the Covered Species are salvaged after parental nest abandonment has occurred. The chance of viability of eggs and/or survival for the Covered Species in this circumstance is greatly reduced. Direct impacts to foraging habitat could also affect migrating individuals, and the fitness of Covered Species young raised in close proximity to the Project due to reduced or disrupted foraging opportunities that reduce the ability of parents to acquire food for their dependent young.

Potential indirect impacts to Covered Species and their habitat include effects of ground-disturbing activities associated with implementation of Covered Activities. These include construction-related noise, ground vibration, fugitive dust, visual disturbance, habitat loss and modification, introduction or spread of invasive species, and increased human activity which could result in a reduction in prey abundance and/or availability. Noise and vibration could cause physiological and/or behavioral disruptions that may interfere with breeding, result in nest abandonment, and a loss of fitness in dependent young resulting from interruptions to brooding and/or feeding schedules, due to impaired or interrupted foraging opportunities and because forage acquired further away from the nest is more energetically expensive for parents acquiring food for their dependent young. Additional impacts of Covered Activities conducted at night could include nest predation from nocturnal predators such as great horned owl (*Bubo virginianus*), additional potential for failure of eggs and young

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nestlings if adults are flushed from the nest, and greater potential for premature fledging of young if they are flushed during night work.

Incidental Take Authorization of Covered Species:

This ITP authorizes incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, CDFW authorizes Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Covered Activities, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Covered Activities, take of Covered Species outside of the Project Area, take of Covered Species resulting from violation of this ITP, or intentional take of Covered Species except as authorized by this ITP.

Conditions of Approval:

Unless specified otherwise, the following measures apply to all Covered Activities within the Project Area, including areas used for vehicular ingress and egress, staging and parking, and noise and vibration generating activities that may cause take. CDFW's issuance of this ITP and Permittee's authorization to take the Covered Species are subject to Permittee's compliance with and implementation of the following Conditions of Approval:

1. **Legal Compliance:** Permittee shall comply with all applicable federal, state, and local laws in existence on the effective date of this ITP or adopted thereafter.
2. **California Environmental Quality Act (CEQA) Compliance:** Permittee shall implement and adhere to the mitigation measures related to the Covered Species in the Biological Resources section of the Environmental Impact Report (SCH No.: 2014042068) certified by the City of Modesto on August 7, 2015, as lead agency for the Project pursuant to the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.).
3. **LSA Agreement Compliance:** Permittee shall implement and adhere to the mitigation measures and conditions related to the Covered Species in the Streambed Alteration Agreement (SAA) (Notification No. 1600-2016-0247-R4) for the Project executed by CDFW pursuant to Fish and Game Code section 1600 et seq.
4. **ITP Time Frame Compliance:** Permittee shall fully implement and adhere to the conditions of this ITP within the time frames set forth below and as set forth in the Mitigation Monitoring and Reporting Program (MMRP), which is included as Attachment 1 to this ITP.

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5. General Provisions:

- 5.1. Designated Representative. Before starting Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with this ITP. Permittee shall notify CDFW in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of this ITP.
- 5.2. Designated Biologist. Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist in writing before starting Covered Activities, and shall also obtain approval in advance and in writing if the Designated Biologist must be changed. The Designated Biologist(s) may be assisted by approved biologists identified as Biological Monitors that do not meet the qualifications to be a Designated Biologist. Biological Monitors and their activities shall be approved in advance and in writing by CDFW. At least one Designate Biologist shall be present within the Project Area for Project Activities occurring during the Covered Species nesting season of February 15 through September 15. The Designated Biologist shall supervise any Biological Monitors.
- 5.3. Designated Biologist and Biological Monitor Authority. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist(s) and Biological Monitor(s) shall have authority to immediately stop any activity and shall stop any activity that does not comply with this ITP, and/or to order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species.
- 5.4. Education Program. Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before performing any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status pursuant to CESA including legal protection, recovery efforts, penalties for

violations and Project-specific protective measures described in this ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided to any new workers before they are authorized to perform work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. This training shall be repeated at least once annually for long-term and/or permanent employees that will be conducting work in the Project Area.

- 5.5. Construction Monitoring Notebook. The Designated Biologist shall maintain a construction-monitoring notebook on-site throughout the construction period, which shall include a copy of this ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review at the Project site upon request by CDFW.
- 5.6. Trash Abatement. Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in animal-proof containers and removed at least once a week to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.
- 5.7. Dust Control. Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring for the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles.
- 5.8. Delineation of the Project Area. Before initiating Covered Activities along each part of the pipeline alignment in active construction, Permittee shall clearly delineate the boundaries of the Project Area with stakes and/or flags. Permittee shall maintain all stakes and flags until the completion of Covered Activities.
- 5.9. Project Access. Project-related personnel shall access the Project Area using existing routes, or routes identified in the Project Description, and shall not cross Covered Species' habitat outside of or en-route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact CDFW for written approval before carrying out such an activity. CDFW

may require an amendment to this ITP, among other reasons, if additional take of Covered Species will occur as a result of the Project modification.

- 5.10. Staging Areas. Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area unless provided for as described in Condition of Approval 5.9 of this ITP.
- 5.11. Hazardous Waste. Permittee shall immediately stop and, pursuant to pertinent state and federal statutes and regulations, arrange for repair and clean up by qualified individuals of any fuel or hazardous material leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.
- 5.12. CDFW Access. Permittee shall provide CDFW staff with reasonable access to the Project, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in this ITP.
- 5.13. Refuse Removal. Upon completion of Covered Activities, Permittee shall remove from the Project Area and properly dispose of all temporary fill and construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.

6. Monitoring, Notification and Reporting Provisions:

- 6.1. Notification Before Commencement. The Designated Representative shall notify CDFW at least 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.
- 6.2. Notification of Non-compliance. The Designated Representative shall immediately notify CDFW in writing if it determines that Permittee is not in compliance with any Condition of Approval of this ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in this ITP and/or the MMRP. The Designated Representative shall report any non-compliance with this ITP to CDFW in writing (email shall suffice) within 24 hours of discovery.

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- 6.3. Compliance Monitoring. The Designated Biologist(s) shall be on-site daily when Covered Activities occur during the Covered Species nesting season of February 15 through September 15. The Designated Biologist(s) shall conduct compliance inspections to: (1) minimize incidental take of the Covered Species; (2) prevent unlawful take of species; (3) check for compliance with all measures of this ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist(s) shall prepare daily written observation and inspection records summarizing: oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by this ITP. The Designated Biologist(s) shall conduct compliance inspections a minimum of monthly during periods of inactivity and after clearing, grubbing, or grading are completed.
- 6.4. Monthly Compliance Report. The Designated Representative or Designated Biologist(s) shall compile the observation and inspection records identified in Condition of Approval 6.3 into a Monthly Compliance Report and submit it to CDFW along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted no later than the 15th day of the month, for the previous calendar month, to the CDFW offices listed in the Notices section of this ITP and via e-mail to CDFW's Regional Representative, Regional Office, and Headquarters CESA Program. At the time of this ITP's approval, the CDFW Regional Representative is Annette Tenneboe (Annette.Tenneboe@wildlife.ca.gov), the Regional Office email is R4CESA@wildlife.ca.gov, and Headquarters CESA Program email is CESA@wildlife.ca.gov. CDFW may at any time increase or decrease the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If CDFW determines the reporting schedule must be changed, CDFW will notify Permittee in writing of the new reporting schedule.
- 6.5. Annual Status Report. Permittee shall provide CDFW with an Annual Status Report (ASR) no later than January 31st of each year beginning with issuance of this ITP and continuing until CDFW accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: 1) a summary of all Monthly Compliance Reports for that year identified in Condition of Approval 6.4; 2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; 3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; 4) an assessment of the effectiveness of each completed or

partially completed mitigation measure in avoiding, minimizing and mitigating Project impacts; 5) all available information about Project-related incidental take of the Covered Species; and 6) information about other Project impacts on the Covered Species.

- 6.6. CNDDDB Observations. The Designated Biologist shall submit all observations of Covered Species to CDFW's California Natural Diversity Database (CNDDDB) within 60 calendar days of the observation and the Designated Biologist shall include copies of the submitted forms with the next Monthly Compliance Report or ASR, whichever is submitted first relative to the observation.
- 6.7. Final Mitigation Report. No later than 45 days after completion of all mitigation measures, Permittee shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related incidental take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of this ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.

7. Take Minimization Measures:

The following requirements are intended to ensure the minimization of incidental take of Covered Species in the Project Area during Covered Activities. Permittee shall implement and adhere to the following conditions to minimize take of Covered Species:

- 7.1. Swainson's Hawk (SWHA) Surveys. Within 30 days prior to Covered Activities starting during the nesting season (February 15 through September 15) at and within 0.5 mile of the Project Area each year of Covered Activities, the Designated Biologist shall conduct surveys for Covered Species nests. The Designated Biologist shall provide survey results to CDFW in a written report no more than one (1) week prior to beginning Covered Activities during the nesting season. If more than 30 days elapse before any Covered Activities begin within 0.5 mile of the surveyed area, the Designated Biologist shall complete an additional survey and submit survey results to CDFW no more than one (1) week prior to the start of those Covered Activities. The Designated Biologist or

Designated Representative shall notify CDFW within 24 hours of the location of each new nest detected at and within 0.5 mile of the Project Area.

- 7.2. SWHA Nest Identification and Mapping. As the Designated Biologist identifies active Covered Species nests at and within 0.5 mile of the Project Area, the Designated Biologist shall: 1) map the nests and make them known to all employees and contractors with access to the Project Area, 2) flag or otherwise identify the nests in the field until the young have fledged or the adults are no longer nesting, and 3) provide initial mapping of the nests in the SWHA Survey Report (see Condition of Approval 7.1 above) to CDFW (i.e., by email) no more than one week prior to initiating Covered Activities and within 24 hours of each new nest detection following the start of Covered Activities.
- 7.3. SWHA Nest Buffer. Permittee and Designated Biologist shall ensure that no Covered Activities occur within 100 feet of a Covered Species nest during the nesting season (February 15 through September 15). The 100-foot no-disturbance buffer shall not be reduced or otherwise modified without first consulting with and receiving written approval from CDFW. An electronic mail will suffice for CDFW written approval. Worker foot traffic, water or restroom facilities, employee break areas, and worker vehicle parking is prohibited within 1,000 feet of any Covered Species nest without prior written CDFW approval.
- 7.4. SWHA Nest Monitoring. If a nesting Covered Species is found in the Project Area or the 0.5-mile Project Area buffer, the Designated Biologist(s) shall be present for the entire duration of any Covered Activities within the Project Area that is within the 0.5-mile buffer, to monitor the behavior of the potentially affected Covered Species. The Designated Biologist(s) shall have the authority to order the cessation of all Covered Activities if any bird(s) exhibit distress and/or abnormal nesting behavior (i.e., swooping/stooping, excessive vocalization [distress calls], agitation, failure to remain on nest, failure to deliver prey items for an extended time period, failure to maintain nest, etc.) that may cause reproductive failure (i.e., nest abandonment and loss of eggs and/or young). Permittee shall not resume Covered Activities until CDFW has been consulted by the Designated Biologist(s), and both the Designated Biologist(s) and CDFW confirm that the bird's behavior has normalized or the nest has failed.
- 7.5. SWHA Observations. At any time while engaged in Covered Activities, all workers shall inform the Designated Biologist if a Covered Species is seen within or near the Project Area. All Covered Activities in the vicinity of the Covered Species that could injure or kill the animal shall cease until the Covered Species is moved by

the Designated Biologist (according to Condition of Approval 7.6) or it moves from the Project Area of its own accord.

- 7.6. SWHA Injury. If a Covered Species is injured as a result of Project-related activities, the Designated Biologist shall immediately take it to a CDFW-approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility and shall bear any costs associated with the care or treatment of such injured Covered Species. The Permittee shall notify CDFW of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report as described in Condition of Approval 6.7. Notification shall include the name of the facility where the animal was taken.
- 7.7. SWHA Nest Abandonment. The Designated Biologist shall prepare a Nest Abandonment Contingency Plan (Plan) and submit it to CDFW for written approval no more than seven (7) business days after execution of this ITP. The Plan shall include, but not be limited to, identification of capture methods, handling methods, methods to return Covered Species individuals back into the wild, and the identification of a wildlife rehabilitation center or veterinary facility. Only the Designated Biologist shall handle and relocate eggs, hatchlings, or injured Covered Species. Notification to CDFW shall be via telephone or email, followed by a written incident report within five (5) days. Each notification shall include the date, time, location and circumstances of the incident, and the name of the facility where the animal was taken. These incidents shall also be included in the reports required by Conditions of Approval 6.4, 6.6, and 6.7 of this ITP.
- 7.8. Artificial Lighting at Night. Permittee shall not use permanent or temporary, fixed, exterior lighting, including motion-triggered security lighting that casts light on Covered Species habitat beyond the Project Area of Covered Activities between sunset and sunrise. Nighttime construction lighting shall be shielded and oriented downward to minimize effects on any nearby receptors.
- 7.9. Rodenticide Use. Permittee shall prohibit the use of rodenticides in the Project Area during Covered Activities.

8. Compensatory Mitigation:

CDFW has determined that permanent protection and perpetual management of compensatory habitat is necessary and required pursuant to CESA to fully mitigate Project-related impacts of the taking on the Covered Species that will result from the Covered Activities. This determination is based on factors including an assessment of the importance of Covered Species nesting habitat at and in the vicinity of the Project Area, the extent to which the Covered Activities will impact the Covered Species

reproduction within that habitat, and CDFW's estimate of the nesting habitat required to provide for adequate compensation.

To meet this requirement, Permittee shall purchase three (3) Covered Species nest credits prior to the start of Covered Activities from a CDFW-approved mitigation or conservation bank, such as Alkali Sink Conservation Bank (Bank No. 1798-2015-01-R4) or Dutchman Creek Conservation Bank (Bank No. 1798-2013-02-R4), for the planting, monitoring, and long-term maintenance of native tree species to compensate for the take of Covered Species. The CDFW-approved mitigation or conservation bank has a service area that encompasses the Project Area and is known to provide habitat to support suitable nesting substrate and contains high quality foraging habitat for the Covered Species, has been conserved in perpetuity through a conservation easement, and has funds for long-term management of the conserved lands. Endowment costs were included in the sale price of conservation credits.

The three Covered Species nest credits will provide compensatory mitigation for the impacts to no more than three (3) Covered Species nests. Upon the determined detection of a fourth or more additional Covered Species nest(s) within the Project Area and within up to a 0.5-mile radius from the Project Area, the Permittee shall immediately consult with CDFW on the need for an amendment to this ITP and the purchase of additional credits to mitigate the loss of additional Covered Species nest(s).

- 8.1 Covered Species Credits. Permittee shall purchase three (3) Covered Species nest credits from a CDFW-approved mitigation or conservation bank and provide proof of credit purchase to CDFW within 60 days of the effective date of this ITP and prior to initiating Covered Activities.

Amendment:

This ITP may be amended as provided by California Code of Regulations, Title 14, section 783.6, subdivision (c), and other applicable law. This ITP may be amended without the concurrence of the Permittee as required by law, including if CDFW determines that continued implementation of the Project as authorized under this ITP would jeopardize the continued existence of the Covered Species or where Project changes or changed biological conditions necessitate an ITP amendment to ensure that all Project-related impacts of the taking to the Covered Species are minimized and fully mitigated.

Stop-Work Order:

CDFW may issue Permittee a written stop-work order requiring Permittee to suspend any Covered Activity for an initial period of up to 25 days to prevent or remedy a violation of this ITP, including but not limited to the failure to comply with reporting or monitoring obligations, or to prevent the unauthorized take of any CESA endangered, threatened, or candidate species. Permittee shall stop work immediately as directed by CDFW upon receipt of any such stop-work order. Upon written notice to Permittee, CDFW may extend any stop-work

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order issued to Permittee for a period not to exceed 25 additional days. Suspension and revocation of this ITP shall be governed by California Code of Regulations, Title 14, section 783.7, and any other applicable law. Neither the Designated Biologist nor CDFW shall be liable for any costs incurred in complying with stop-work orders.

Compliance with Other Laws:

This ITP sets forth CDFW's requirements for Permittee to implement the Project pursuant to CESA. This ITP does not necessarily create an entitlement to proceed with the Project. Permittee is responsible for complying with all other applicable federal, state, and local law.

Notices:

Permittee shall deliver a fully executed duplicate original ITP by registered first class mail or overnight delivery to the following address:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
Post Office Box 944209
Sacramento, California 94244-2090

Written notices, reports and other communications relating to this ITP shall be delivered to CDFW by registered first class mail at the following address, or at addresses CDFW may subsequently provide Permittee. Notices, reports, and other communications shall reference the Project name, Permittee, and ITP Number 2081-2017-038-04 in a cover letter and on any other associated documents.

Original cover with attachment(s) to:

Julie A. Vance, Regional Manager
California Department of Fish and Wildlife
Central Region – R4
1234 East Shaw Avenue
Fresno, California 93710
Telephone (559) 243-4005
Fax (559) 243-4022

and a copy to:

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Attention: CESA Permitting Program
Post Office Box 944209
Sacramento, California 94244-2090

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Unless Permittee is notified otherwise, CDFW's Regional Representative for purposes of addressing issues that arise during implementation of this ITP is:

Annette Tenneboe
Senior Environmental Scientist (Specialist)
California Department of Fish and Wildlife
Central Region – R4
1234 East Shaw Avenue
Fresno, California 93710
Telephone (559) 243-4014, extension 231
Fax (559) 243-4020
Annette.Tenneboe@wildlife.ca.gov

Compliance with CEQA:

CDFW's issuance of this ITP is subject to CEQA. CDFW is a responsible agency pursuant to CEQA with respect to this ITP because of prior environmental review of the Project by the lead agency, City of Modesto. (See generally Pub. Resources Code, §§ 21067, 21069.) The lead agency's prior environmental review of the Project is set forth in the North Valley Regional Recycled Water Program (Project) Environmental Impact Report (EIR) (State Clearinghouse No. 2014042068) dated January 8, 2015, that the City of Modesto certified for the Project on August 07, 2015. At the time the lead agency certified the EIR and approved the Project it also adopted various mitigation measures for the Covered Species as conditions of Project approval.

This ITP, along with CDFW's related CEQA findings, which are available as a separate document, provide evidence of CDFW's consideration of the lead agency's EIR for the Project and the environmental effects related to issuance of this ITP (CEQA Guidelines, § 15096, subd. (f)). CDFW finds that issuance of this ITP will not result in any previously undisclosed potentially significant effects on the environment or a substantial increase in the severity of any potentially significant environmental effects previously disclosed by the lead agency. Furthermore, to the extent the potential for such effects exists, CDFW finds that adherence to and implementation of the Conditions of Project Approval adopted by the lead agency, and that adherence to and implementation of the Conditions of Approval imposed by CDFW through the issuance of this ITP, will avoid or reduce to below a level of significance any such potential effects. CDFW consequently finds that issuance of this ITP will not result in any significant, adverse impacts on the environment.

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Findings Pursuant to CESA:

These findings are intended to document CDFW's compliance with the specific findings requirements set forth in CESA and related regulations. (Fish & G. Code § 2081, subs. (b)-(c); Cal. Code Regs., tit. 14, §§ 783.4, subds, (a)-(b), 783.5, subd. (c)(2).)

CDFW finds based on substantial evidence in the ITP application, the Project EIR, the results of site visits, consultations with the biological consultant and City of Turlock staff, and information in the administrative record of proceedings, that issuance of this ITP complies and is consistent with the criteria governing the issuance of ITPs pursuant to CESA:

- (1) Take of Covered Species as defined in this ITP will be incidental to the otherwise lawful activities covered under this ITP;
- (2) Impacts of the taking on Covered Species will be minimized and fully mitigated through the implementation of measures required by this ITP and as described in the MMRP. Measures include: (1) permanent nesting habitat expansion and protection; (2) establishment of nesting avoidance zones; (3) employee/worker/contractor education; and (4) Monthly Compliance Reports. CDFW evaluated factors including an assessment of the importance of the Covered Species nesting habitat at and near the Project Area, the extent to which the Covered Activities will impact the habitat, and CDFW's estimate of the new nesting habitat required to provide for adequate compensation. CDFW evaluated factors including an assessment of the importance of the Covered Species nesting habitat at and near the Project Area, the extent to which the Covered Activities will impact that habitat, and CDFW's estimate of the new nesting habitat required to provide for adequate compensation. Based on this evaluation, CDFW determined that the purchase of conservation bank credits in advance of initiating Covered Activities, along with the take minimization, monitoring, and reporting requirements of this ITP minimizes and fully mitigates the impacts of the taking caused by the Project;
- (3) The take avoidance and mitigation measures required pursuant to the conditions of this ITP and its attachments are roughly proportional in extent to the impacts of the taking authorized by this ITP;
- (4) The measures required by this ITP maintain Permittee's objectives to the greatest extent possible;
- (5) All required measures are capable of successful implementation;
- (6) This ITP is consistent with any regulations adopted pursuant to Fish and Game Code sections 2112 and 2114;

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(7) Permittee has ensured adequate funding to implement the measures required by this ITP as well as for monitoring compliance with, and the effectiveness of, those measures for the Project; and

(8) Issuance of this ITP will not jeopardize the continued existence of the Covered Species based on the best scientific and other information reasonably available, and this finding includes consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (1) known population trends; (2) known threats to the species; and (3) reasonably foreseeable impacts on the species from other related projects and activities. Moreover, CDFW's finding is based, in part, on CDFW's express authority to amend the terms and conditions of this ITP without concurrence of the Permittee as necessary to avoid jeopardy and as required by law.

Attachments:

FIGURE 1	Project Location
FIGURE 2	Project Pipeline Alignment
FIGURE 3	Pipeline Crossing Locations
FIGURE 4	Covered Species Nesting Locations in 2017
ATTACHMENT 1	Mitigation Monitoring and Reporting Program

ISSUED BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

on

5/14/18



Julie A. Vance, Regional Manager
CENTRAL REGION – R4

ACKNOWLEDGMENT

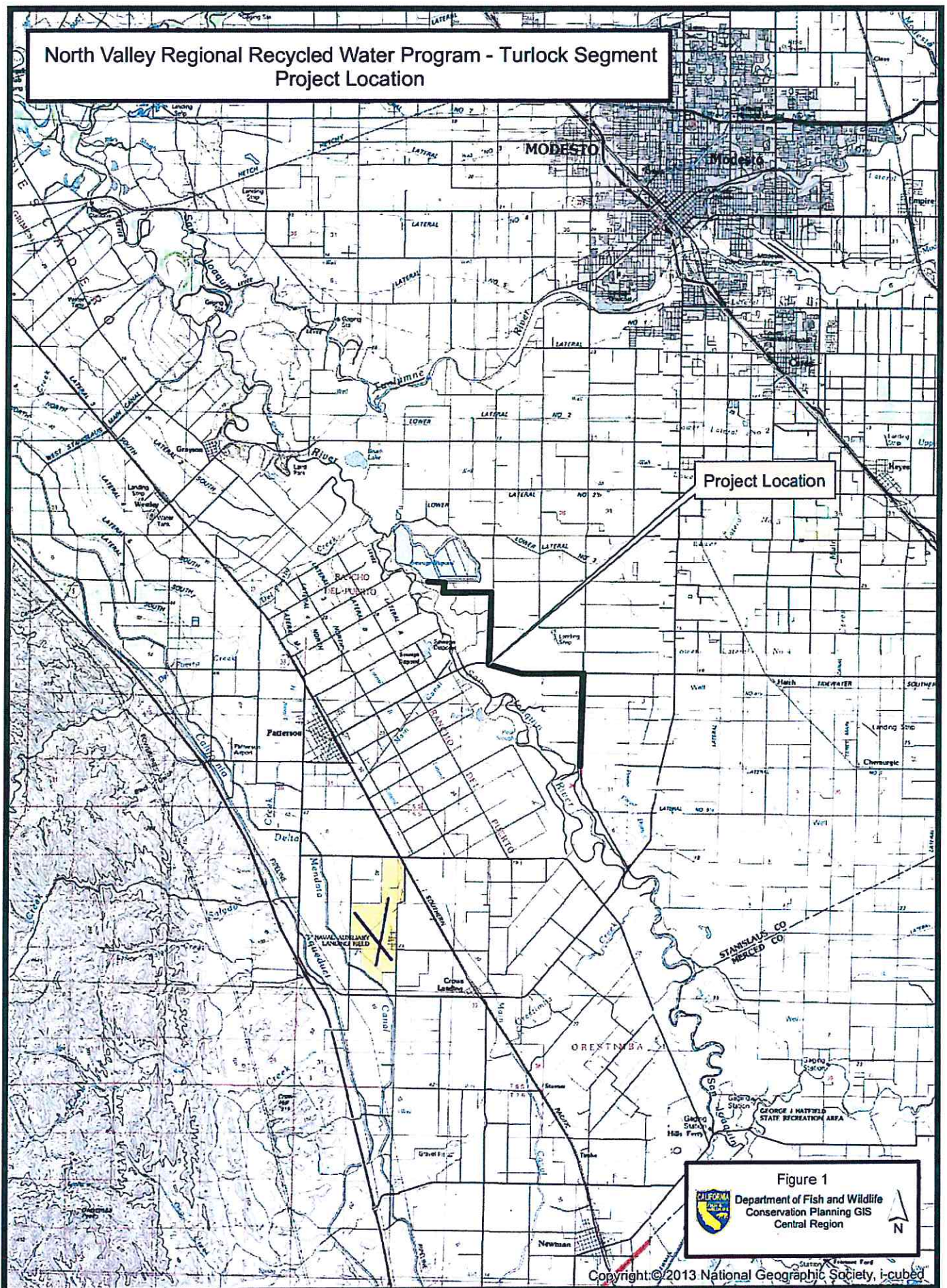
The undersigned: (1) warrants that he or she is acting as a duly authorized representative of the Permittee, (2) acknowledges receipt of this ITP, and (3) agrees on behalf of the Permittee to comply with all terms and conditions

By: _____ Date: _____

Printed Name: _____ Title: _____

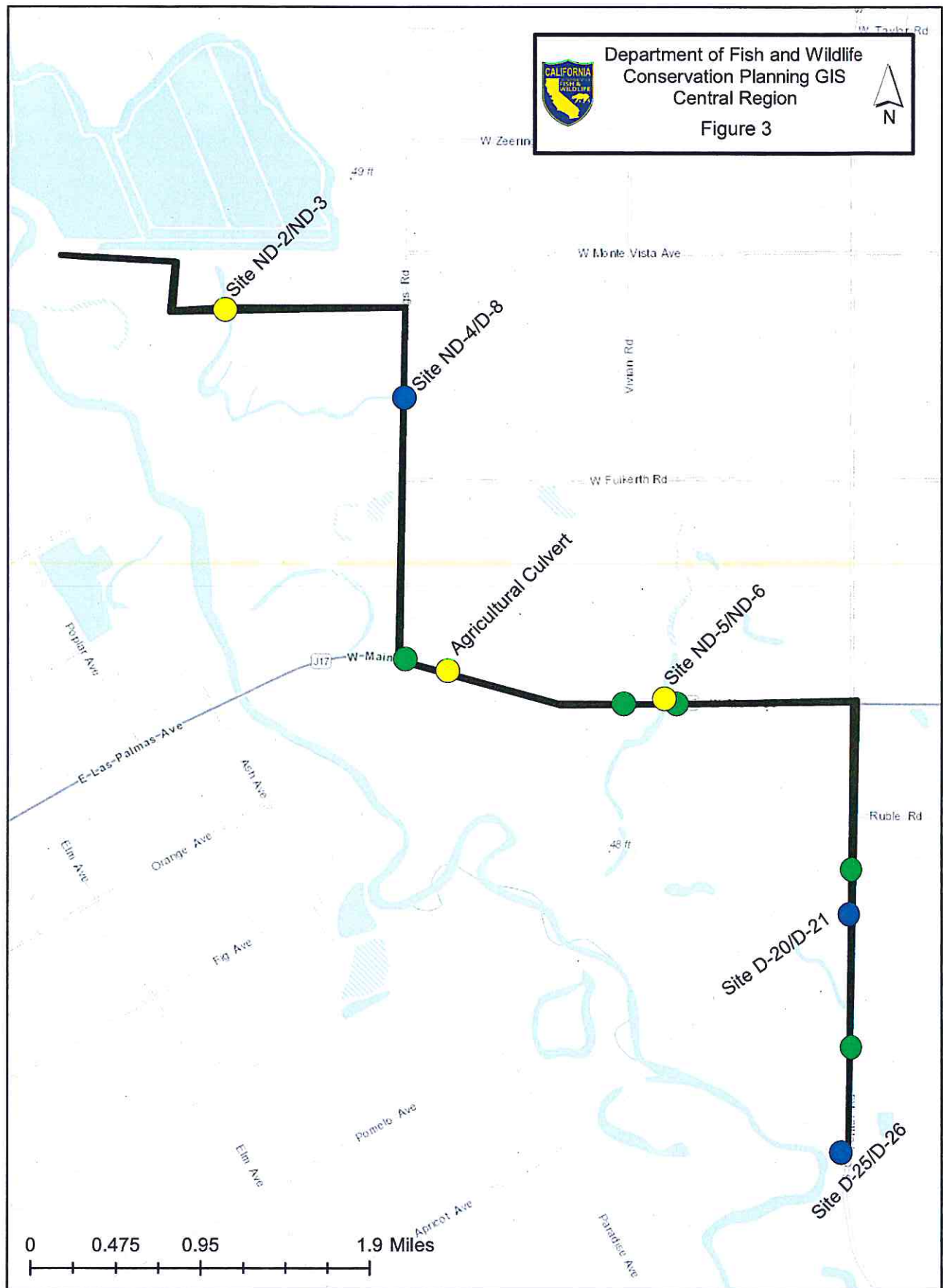
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North Valley Regional Recycled Water Program - Turlock Segment Project Location

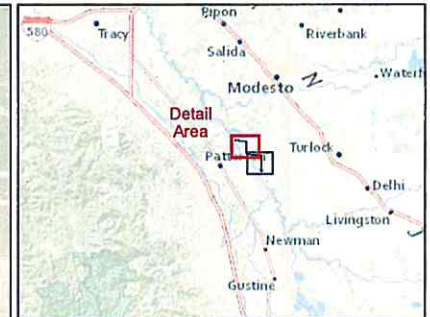
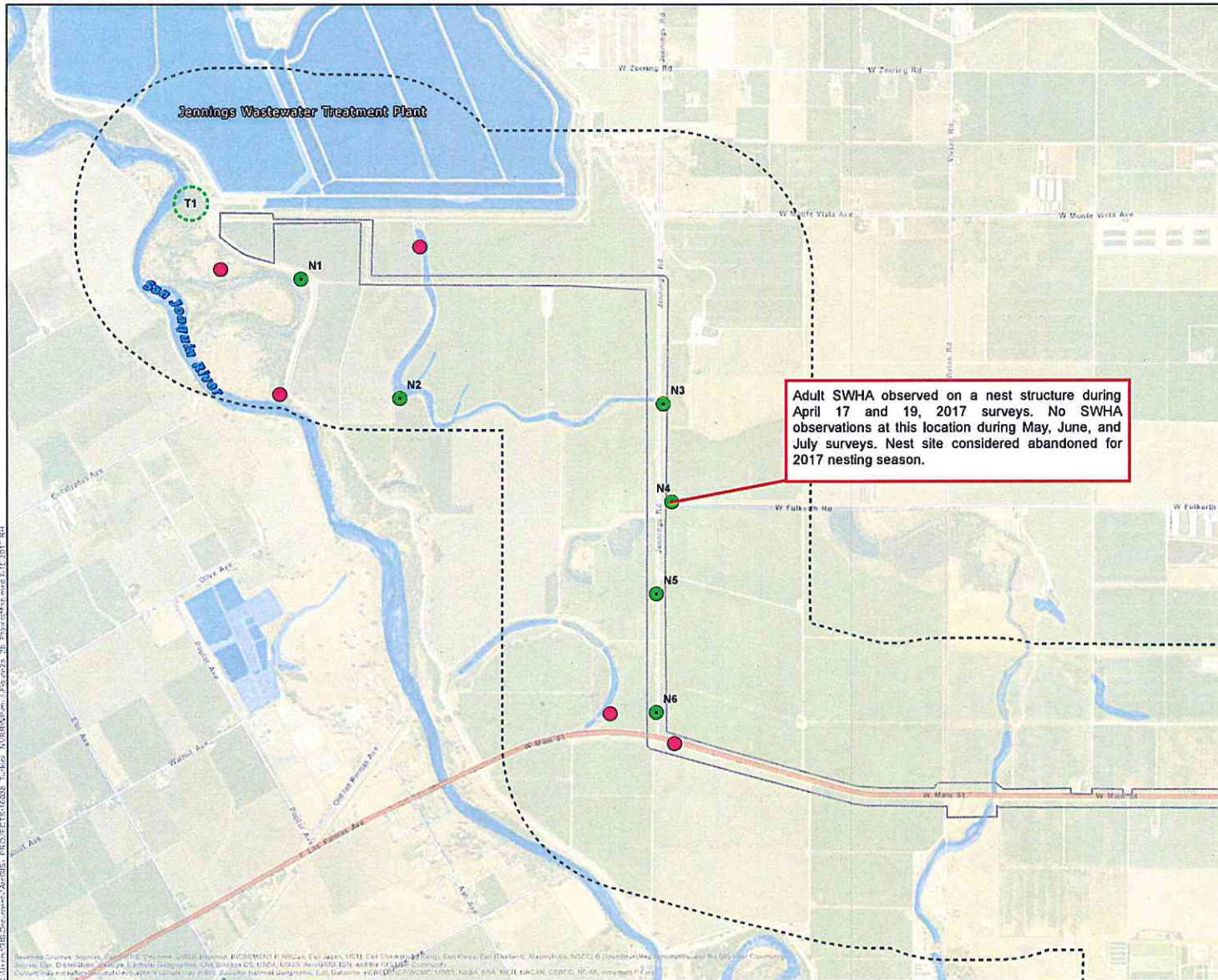


Project Location

Figure 1
Department of Fish and Wildlife
Conservation Planning GIS
Central Region



- Road Crossings (No Site Names)
- Microtunnel Crossings
- Open Trench Stream Crossings



Project Limits

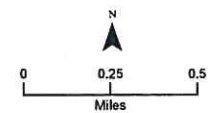
1/2-mile buffer

Hawk observations

Swainson's Hawk Nest (N)

Swainson's Hawk Territory (T)

Red-tailed Hawk Nest



**NVRRWP – Turlock Segment
2017 Swainson's Hawk Survey**

Figure 4, Page 1

Project Area – North

Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE MITIGATION MONITORING AND REPORTING PROGRAM (MMRP) CALIFORNIA ENDANGERED SPECIES ACT

INCIDENTAL TAKE PERMIT NO. 2081-2017-038-04

PERMITTEE: City of Turlock, Utilities Department

**PROJECT: North Valley Regional Recycled Water Program –
Turlock Segment**

PURPOSE OF THE MMRP

The purpose of the MMRP is to ensure that the impact minimization and mitigation measures required by the Department of Fish and Wildlife (CDFW) for the above-referenced Project are properly implemented, and thereby to ensure compliance with section 2081(b) of the Fish and Game Code and section 21081.6 of the Public Resources Code. A table summarizing the mitigation measures required by CDFW is attached. This table is a tool for use in monitoring and reporting on implementation of mitigation measures, but the descriptions in the table do not supersede the mitigation measures set forth in the California Incidental Take Permit (ITP) and in attachments to the ITP, and the omission of a permit requirement from the attached table does not relieve the Permittee of the obligation to ensure the requirement is performed.

OBLIGATIONS OF PERMITTEE

Mitigation measures must be implemented within the time periods indicated in the table that appears below. Permittee has the primary responsibility for monitoring compliance with all mitigation measures and for reporting to CDFW on the progress in implementing those measures. These monitoring and reporting requirements are set forth in the ITP itself and are summarized at the front of the attached table.

VERIFICATION OF COMPLIANCE, EFFECTIVENESS

CDFW may, at its sole discretion, verify compliance with any mitigation measure or independently assess the effectiveness of any mitigation measure.

TABLE OF MITIGATION MEASURES

The following items are identified for each mitigation measure: Mitigation Measure, Source, Implementation Schedule, Responsible Party, and Status/Date/Initials. The Mitigation Measure column summarizes the mitigation requirements of the ITP. The Source column identifies the ITP condition that sets forth the mitigation measure. The Implementation Schedule column shows the date or phase when each mitigation measure will be implemented. The Responsible Party column identifies the person or agency that is primarily responsible for implementing the mitigation measure. The Status/Date/Initials column shall be completed by the Permittee during preparation of each Status Report and the Final Mitigation Report, and must identify the implementation status of each mitigation measure, the date that status was determined, and the initials of the person determining the status.

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
BEFORE DISTURBING SOIL OR VEGETATION					
1	<u>Designated Representative</u> . Before starting Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with CDFW and overseeing compliance with the ITP. Permittee shall notify CDFW in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify CDFW in writing if a substitute Designated Representative is selected or identified at any time during the term of the ITP..	ITP Condition # 5.1	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
2	<u>Designated Biologist</u> . Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain CDFW approval of the Designated Biologist in writing before starting Covered Activities, and shall also obtain approval in advance and in writing if the Designated Biologist must be changed. The Designated Biologist(s) may be assisted by approved biologists identified as Biological Monitors that do not meet the qualifications to be a Designated Biologist. Biological Monitors and their activities shall be approved in advance and in writing by CDFW. At least one Designate Biologist shall be present within the Project Area for Project Activities occurring during the Covered Species nesting season of February 15 through September 15. The Designated Biologist shall supervise any Biological Monitors.	ITP Condition # 5.2	Before commencing ground- or vegetation-disturbing activities	Permittee	
3	<u>Education Program</u> . Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before performing any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status pursuant to CESA including legal protection, recovery efforts, penalties for violations and Project-specific protective measures described in the ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided to any new workers before they are authorized to perform work in the Project Area. Permittee shall prepare and distribute wallet sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. This training shall be repeated at least once annually for long-term and/or permanent employees that will be conducting work in the Project Area.	ITP Condition # 5.4	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
4	<u>Trash Abatement</u> . Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in animal proof containers and removed at least once a week to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	ITP Condition # 5.6	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
5	<u>Dust Control</u> . Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring for the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles.	ITP Condition # 5.7	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
6	<u>Delineation of the Project Area</u> . Before initiating Covered Activities along each part of the pipeline alignment in active construction, Permittee shall clearly delineate the boundaries of the Project Area with stakes and/or flags. Permittee shall maintain all stakes and flags until the completion of Covered Activities.	ITP Condition # 5.8	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
7	<u>Notification Before Commencement</u> . The Designated Representative shall notify CDFW at least 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.	ITP Condition # 6.1	Before commencing ground- or vegetation-disturbing activities/ Entire Project	Permittee	
8	<u>Covered Species Credits</u> . Permittee shall purchase three (3) Covered Species nest credits from a CDFW-approved mitigation or conservation bank and provide proof of credit purchase to CDFW within 60 days of the effective date of this ITP and prior to initiating Covered Activities.	ITP Condition # 8.1	Before commencing ground- or vegetation-disturbing activities	Permittee	
DURING CONSTRUCTION					
9	<u>Designated Biologist and Biological Monitor Authority</u> . To ensure compliance with the Conditions of Approval of the ITP, the Designated Biologist(s) and Biological Monitor(s) shall have authority to immediately stop any activity and shall stop any activity that does not comply with the ITP, and/or to order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species.	ITP Condition # 5.3	Entire Project	Permittee	
10	<u>Construction Monitoring Notebook</u> . The Designated Biologist shall maintain a construction-monitoring notebook on-site throughout the construction period, which shall include a copy of the ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review at the Project site upon request by CDFW.	ITP Condition # 5.5	Entire Project	Permittee	
11	<u>Project Access</u> . Project-related personnel shall access the Project Area using existing routes, or routes identified in the Project Description, and shall not cross Covered Species' habitat outside of or en-route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact CDFW for written approval before carrying out such an activity. CDFW may require an amendment to the ITP, among other reasons, if additional take of Covered Species will occur as a result of the Project modification.	ITP Condition # 5.9	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
12	<u>Staging Areas</u> . Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area unless provided for as described in Condition of Approval 5.9 of the ITP.	ITP Condition # 5.10	Entire Project	Permittee	
13	<u>Hazardous Waste</u> . Permittee shall immediately stop and, pursuant to pertinent state and federal statutes and regulations, arrange for repair and clean up by qualified individuals of any fuel or hazardous material leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.	ITP Condition # 5.11	Entire Project	Permittee	
14	<u>CDFW Access</u> . Permittee shall provide CDFW staff with reasonable access to the Project, and shall otherwise fully cooperate with CDFW efforts to verify compliance with or effectiveness of mitigation measures set forth in the ITP.	ITP Condition # 5.12	Entire Project	Permittee	
15	<u>Notification of Non-compliance</u> . The Designated Representative shall immediately notify CDFW in writing if it determines that Permittee is not in compliance with any Condition of Approval of the ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in the ITP and/or this MMRP. The Designated Representative shall report any non-compliance with the ITP to CDFW in writing (email shall suffice) within 24 hours of discovery.	ITP Condition # 6.2	Entire Project	Permittee	
16	<u>Compliance Monitoring</u> . The Designated Biologist(s) shall be on-site daily when Covered Activities occur during the Covered Species nesting season of February 15 through September 15. The Designated Biologist(s) shall conduct compliance inspections to: (1) minimize incidental take of the Covered Species; (2) prevent unlawful take of species; (3) check for compliance with all measures of the ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologists(s) shall prepare daily written observation and inspection records summarizing: oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by the ITP. The Designated Biologists(s) shall conduct compliance inspections a minimum of monthly during periods of inactivity and after clearing, grubbing, or grading are completed.	ITP Condition # 6.3	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
17	<u>Monthly Compliance Report.</u> The Designated Representative or Designated Biologist(s) shall compile the observation and inspection records identified in Condition of Approval 6.3 into a Monthly Compliance Report and submit it to CDFW along with a copy of this MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted no later than the 15th day of the month, for the previous calendar month, to the CDFW offices listed in the Notices section of the ITP and via e-mail to CDFW's Regional Representative, Regional Office, and Headquarters CESA Program. At the time of the ITP's approval, the CDFW Regional Representative is Annette Tenneboe (Annette.Tenneboe@wildlife.ca.gov), the Regional Office email is R4CESA@wildlife.ca.gov, and Headquarters CESA Program email is CESA@wildlife.ca.gov. CDFW may at any time increase or decrease the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If CDFW determines the reporting schedule must be changed, CDFW will notify Permittee in-writing of the new reporting schedule.	ITP Condition # 6.4	Entire Project	Permittee	
18	<u>Annual Status Report.</u> Permittee shall provide CDFW with an Annual Status Report (ASR) no later than January 31st of each year beginning with issuance of the ITP and continuing until CDFW accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: 1) a summary of all Monthly Compliance Reports for that year identified in Condition of Approval 6.4; 2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; 3) a copy of the table in this MMRP with notes showing the current implementation status of each mitigation measure; 4) an assessment of the effectiveness of each completed or partially completed mitigation measure in avoiding, minimizing and mitigating Project impacts; 5) all available information about Project-related incidental take of the Covered Species; and 6) information about other Project impacts on the Covered Species.	ITP Condition # 6.5	Entire Project	Permittee	
19	<u>CNDDDB Observations.</u> The Designated Biologist shall submit all observations of Covered Species to CDFW's California Natural Diversity Database (CNDDDB) within 60 calendar days of the observation and the Designated Biologist shall include copies of the submitted forms with the next Monthly Compliance Report or ASR, whichever is submitted first relative to the observation.	ITP Condition # 6.6	Entire Project	Permittee	
20	<u>Swainson's Hawk (SWHA) Surveys.</u> Within 30 days prior to Covered Activities starting during the nesting season (February 15 through September 15) at and within 0.5 mile of the Project Area each year of Covered Activities, the Designated Biologist shall conduct surveys for Covered Species nests. The Designated Biologist shall provide survey results to CDFW in a written report no more than one (1) week prior to beginning Covered Activities during the nesting season. If more than 30 days elapse before any Covered Activities begin within 0.5 mile of the surveyed area, the Designated Biologist shall complete an additional survey and submit survey results to CDFW no more than one (1) week prior to the start of those Covered Activities. The Designated Biologist or Designated Representative shall notify CDFW within 24 hours of the location of each new nest detected at and within 0.5 mile of the Project Area.	ITP Condition # 7.1	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
21	<u>SWHA Nest Identification and Mapping.</u> As the Designated Biologist identifies active Covered Species nests at and within 0.5 mile of the Project Area, the Designated Biologist shall: 1) map the nests and make them known to all employees and contractors with access to the Project Area, 2) flag or otherwise identify the nests in the field until the young have fledged or the adults are no longer nesting, and 3) provide initial mapping of the nests in the SWHA Survey Report (see Condition of Approval 7.1 above) to CDFW (i.e., by email) no more than one week prior to initiating Covered Activities and within 24 hours of each new nest detection following the start of Covered Activities.	ITP Condition # 7.2	Entire Project	Permittee	
22	<u>SWHA Nest Buffer.</u> Permittee and Designated Biologist shall ensure that no Covered Activities occur within 100 feet of a Covered Species nest during the nesting season (February 15 through September 15). The 100-foot no-disturbance buffer shall not be reduced or otherwise modified without first consulting with and receiving written approval from CDFW. An electronic mail will suffice for CDFW written approval. Worker foot traffic, water or restroom facilities, employee break areas, and worker vehicle parking is prohibited within 1,000 feet of any Covered Species nest without prior written CDFW approval.	ITP Condition # 7.3	Entire Project	Permittee	
23	<u>SWHA Nest Monitoring.</u> If a nesting Covered Species is found in the Project Area or the 0.5-mile Project Area buffer, the Designated Biologist(s) shall be present for the entire duration of any Covered Activities within the Project Area that is within the 0.5-mile buffer, to monitor the behavior of the potentially affected Covered Species. The Designated Biologist(s) shall have the authority to order the cessation of all Covered Activities if any bird(s) exhibit distress and/or abnormal nesting behavior (i.e., swooping/stooping, excessive vocalization [distress calls], agitation, failure to remain on nest, failure to deliver prey items for an extended time period, failure to maintain nest, etc.) that may cause reproductive failure (i.e., nest abandonment and loss of eggs and/or young). Permittee shall not resume Covered Activities until CDFW has been consulted by the Designated Biologist(s), and both the Designated Biologist(s) and CDFW confirm that the bird's behavior has normalized or the nest has failed.	ITP Condition # 7.4	Entire Project	Permittee	
24	<u>SWHA Observations.</u> At any time while engaged in Covered Activities, all workers shall inform the Designated Biologist if a Covered Species is seen within or near the Project Area. All Covered Activities in the vicinity of the Covered Species that could injure or kill the animal shall cease until the Covered Species is moved by the Designated Biologist (according to Condition of Approval 7.6) or it moves from the Project Area of its own accord.	ITP Condition # 7.5	Entire Project	CDFW	
25	<u>SWHA Injury.</u> If a Covered Species is injured as a result of Project related activities, the Designated Biologist shall immediately take it to a CDFW approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility and shall bear any costs associated with the care or treatment of such injured Covered Species. The Permittee shall notify CDFW of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report as described in Condition of Approval 6.7. Notification shall include the name of the facility where the animal was taken.	ITP Condition # 7.6	Entire Project	CDFW	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
26	<u>SWHA Nest Abandonment</u> . The Designated Biologist shall prepare a Nest Abandonment Contingency Plan (Plan) and submit it to CDFW for written approval no more than seven (7) business days after execution of the ITP. The Plan shall include, but not be limited to, identification of capture methods, handling methods, methods to return Covered Species individuals back into the wild, and the identification of a wildlife rehabilitation center or veterinary facility. Only the Designated Biologist shall handle and relocate eggs, hatchlings, or injured Covered Species. Notification to CDFW shall be via telephone or email, followed by a written incident report within five (5) days. Each notification shall include the date, time, location and circumstances of the incident, and the name of the facility where the animal was taken. These incidents shall also be included in the reports required by Conditions of Approval 6.4, 6.6, and 6.7 of the ITP.	ITP Condition # 7.7	Entire Project	CDFW	
27	<u>Artificial Lighting at Night</u> . Permittee shall not use permanent or temporary, fixed, exterior lighting, including motion-triggered security lighting that casts light on Covered Species habitat beyond the Project Area of Covered Activities between sunset and sunrise. Nighttime construction lighting shall be shielded and oriented downward to minimize effects on any nearby receptors.	ITP Condition # 7.8	Entire Project	CDFW	
28	<u>Rodenticide Use</u> . Permittee shall prohibit the use of rodenticides in the Project Area during Covered Activities.	ITP Condition # 7.10	Entire Project	CDFW	
POST-CONSTRUCTION					
29	<u>Refuse Removal</u> . Upon completion of Covered Activities, Permittee shall remove from the Project Area and properly dispose of all temporary fill and construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	ITP Condition # 5.13	Post-construction	Permittee	
30	<u>Final Mitigation Report</u> . No later than 45 days after completion of all mitigation measures, Permittee shall provide CDFW with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in this MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project related incidental take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.	ITP Condition # 6.7	Post-construction and after completion of mitigation	Permittee	

APPENDIX R
DEWATERING AGREEMENT - GIOLETTI

**AGREEMENT TO TAKE DELIVERY OF TRENCH DEWATERING WATER
NORTH VALLEY REGIONAL RECYCLED WATER PROGRAM**

THIS AGREEMENT ("**Agreement**") is entered into this ____ day of _____, 2018, and shall become effective as described herein, by and between the City of Turlock, a Municipal Corporation ("**City**"), and Justin Gioletti, dba Robert Gioletti and Sons, Incorporated, a California Corporation ("**Gioletti**"), collectively the "**Parties**."

RECITALS

This **Agreement** is made with respect to the following facts:

A. WHEREAS, **City** will retain the services of a general contractor ("**Contractor**") for purposes of constructing the Turlock Pipeline Segment ("**Pipeline**") of the North Valley Regional Recycled Water Program ("**Project**"). The **Pipeline** will be constructed within the public right-of-way associated with West Main Street and Carpenter Road, and on land owned by the City of Modesto ("**Modesto**").

B. WHEREAS, There is a shallow groundwater table along the pipeline route, and during excavation associated with pipeline construction, **Contractor** will need to perform dewatering. The water generated by this dewatering associated with pipeline construction, within the **Modesto** owned land, will be discharged for agricultural use on that land. **City** is seeking an agreement with an existing irrigator that operates adjacent to the **Pipeline** route along West Main Street and Carpenter Road outside, and east of the **Modesto** owned land for purposes of disposing of groundwater associated with trench dewatering operations.

C. WHEREAS, groundwater in the **Project** area can contain potentially hazardous trace elements including arsenic in concentrations that may exceed 10 ppb, which limits discharge to local surface channels and the San Joaquin River. Another acceptable approach for disposing of groundwater associated with trench dewatering operations is to apply such water to agricultural land where the water can be consumptively used by agricultural crops, evaporate and percolate.

D. WHEREAS, **Gioletti** has a crop to crop verbal lease that includes some sixty-five (65) acres of irrigated agricultural land adjacent to the **Project**, and is willing to accept the water generated by **Project** dewatering operations.

E. WHEREAS, **Gioletti** has made an offer to purchase the irrigated agricultural land and can't commit to taking delivery of the trench dewatering water until such purchase is confirmed.

F. WHEREAS, **City** is in the process of determining the scope and schedule of **Project** dewatering operations, and wants to determine the location to discharge such water prior to selecting a **Contractor** to construct the **Pipeline**.

AGREEMENT

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the **Parties** agree:

1. **PAYMENT TERMS** **Gioletti** is willing to provide one (1) parcel to **City** for water disposal during two time periods. The total payment to **Gioletti** by **City** will be based on the time period of use. The cost/acre for the December 1, 2018 to March 31, 2019 period is Five Hundred Dollars (\$500). The cost/acre for the June 1, 2019 to September 30, 2019 period is

One Thousand Two Hundred Dollars (\$1,200). Both periods are available for **City** use at **City's** option. The options are described herein below. The basis for payment by **City** is set forth in the following table.

Parcel APN(s)	Acreage	Total Cost (\$) by Time of Use	
		12/1/18 - 3/31/19	6/1/19 - 9/31/19
058-002-005	65	32,500	78,000

Gioletti agrees to accept, manage, store, handle, use, and dispose all water generated by dewatering operations by the **Project** under the **Agreement** terms and conditions described herein below. **City** shall identify the time period(s) of use and make payment to **Gioletti** within thirty (30) calendar days of **City's** acceptance of this **Agreement**.

2. **GIOLETTI APPROVAL** **City** shall include this **Agreement** in a bid addendum on or before June 6, 2018. **Gioletti** has accepted the terms and conditions contained herein, but shall not execute this **Agreement** until and unless the purchase of the parcel has been confirmed and **Gioletti** is then capable of complying with the terms and conditions contained herein. **City** shall contact **Gioletti** on or before July 10, 2018 to determine the status of the parcel ownership. Should **Gioletti** have control of the parcel and be in a position to comply with the terms and conditions contained herein, **Gioletti** shall immediately execute this **Agreement**. Should **Gioletti** not have control of the parcel on or before July 10, 2018 and not be in a position to comply with the terms and conditions contained herein, this **Agreement** shall become void

3. **CITY APPROVAL** This **Agreement** is subject to **City** approval and this **Agreement** shall have no force or effect unless and until such approval has been acquired. The effective date of this **Agreement** shall be the first calendar day after **City** approval is acquired. **City** shall identify the time period(s) of use and provide compensation for such to **Gioletti** within thirty (30) calendar days after **City** approval has been acquired. The total payment amount shall be based on the terms of Paragraph 1 herein above.

4. **WATER FLOW AND VOLUME** Water delivery to the parcel shall be confined to trench dewatering water associated with **Project** construction. There are not any anticipated minimum or maximum flow rates, and the actual flow rate will vary depending on groundwater conditions. However, **City** expects the average flow to range from approximately four hundred (400) to six hundred (600) GPM. Periodically, water flow may be less than four hundred (400) gpm and reach or exceed eight hundred (800) gpm. **Gioletti** agrees to accept water produced as a result of **Contractor's** dewatering operations with the following volume limitations and **Contractor** shall cease water delivery when the volume limits are reached.

- A. One (1.0) acre-foot/acre during the December 1, 2018 to March 31, 2019 time period. The total water delivery shall not exceed sixty-five (65) acre-feet.
- B. One and a half (1.5) acre-feet/acre during the June 1, 2019 to September 30, 2019 time period. The total water delivery shall not exceed ninety-seven point five (97.5) acre-feet.

5. **WATER APPLICATION AREA** The parcel included is APN 058-002-005 (sixty-five (65) irrigated acres). **Gioletti** shall confine delivered trench dewatering water to this parcel. Tailwater discharges to the Turlock Irrigation District drain are prohibited.

6. WATER OWNERSHIP Prior to exiting **Contractor's** conveyance pipeline, the water produced by the dewatering operation shall constitute property of the **City**. Immediately upon exiting the **Contractor's** conveyance pipeline, title to the water shall transfer to **Gioletti**. **Gioletti** at his sole cost and risk shall assume full responsibility and liability for the water, including for accepting, managing, storing, using, and disposing the water in a lawful and safe manner. **Gioletti** shall comply with all applicable laws, and additionally shall take all actions required by law, including obtaining approvals or permits and the giving of all notices, which may reasonably be needed in order to take title to, accept, manage, store, use, and dispose the water. **Gioletti** acknowledges that the water may contain hazardous trace elements, including arsenic. In entering into this **Agreement**, **Gioletti** states that he has conducted his own independent investigation concerning all relevant matters, including the presence and concentrations of any hazardous trace elements in the water, and uncertainties regarding such matters, and is not relying on any statements or representations by **City**, or **City's** employees, agents, and contractors.

7. WATER CONVEYANCE **City** shall require **Contractor** to extend a surface water conveyance pipeline to connect to **Gioletti's** existing on-farm water distribution system in accordance with the following. **Contractor** shall make all connections to the **Gioletti** irrigation facilities and maintain and operate the pipeline and connection facilities. The conveyance pipeline shall include a water meter that measures flow and cumulative acre-feet delivered. The **City's** construction manager shall meet with **Gioletti** weekly to provide a summary of water delivery volume. **Contractor** shall review the connection design and coordinate the installation of the conveyance system facilities with **Gioletti** prior to the installation. **Contractor** shall remove the conveyance facilities within fifteen (15) days after ceasing water delivery, and restore the **Gioletti** irrigation system at the connection location to its near original condition. The conveyance pipeline and connection to the existing irrigation system is described as follows:

A. APN 058-002-005: **Contractor** shall extend a conveyance pipeline to the approximate center of the parcel along the southern boundary where the **Gioletti** pipeline is located. The pipeline route shall follow the southern parcel boundary from Carpenter Road to the southern most pipeline riser, a distance of some six hundred (600) feet. The pipeline shall be located along the northern side of the field road that parallels the Harding Drain. The connection to the **Gioletti** irrigation facilities shall be at that southern most riser.

8. WATER DELIVERY **Gioletti** will accept water deliveries during two (2) time periods. The first time period begins December 1, 2018 and ends March 31, 2019. The second time period begins June 1, 2019 and ends September 30, 2019. **Gioletti** acknowledges and agrees that once trench dewatering activities commence that water will be delivered continuously and that the flow of water will not be halted until completion of construction operations for which dewatering is required or the acre-foot delivery limitations described herein above are reached, whichever occurs first.

9. AGREEMENT TERM The **Agreement** term shall commence on the effective date shown above. The **Agreement** shall end within fifteen (15) calendar days after the last day water is delivered to **Gioletti**.

10. WAIVER OF CONSEQUENTIAL AND SPECIAL DAMAGES To the greatest extent permitted by law, **Gioletti** hereby waives any and all consequential or special damages, including without limitation, damages, claims, losses, causes of action, or liabilities for the following: 1) for loss of use, income, profit, financing, business, and reputation; 2) for damage or loss of crops, real property, or arability; 3) for loss of productivity; 4) for loss of services; 5) for loss of financing or return on capital; 6) for financing or interest costs; and 7) for any other consequential or special damages.

11. RIGHT OF ENTRY UPON PREMISES City, its employees, agents, and contractors shall not have the right to enter the **Gioletti** property, other than the area immediately adjacent to the water conveyance pipeline and associated connection facilities as described herein above. Such entry is granted only for the installation and removal, maintenance and operation of the conveyance pipeline and connection facilities.

12. TIME OF ESSENCE, BINDING UPON HEIRS, ETC. Time is of the essence of each, and all the terms and provisions of this **Agreement**, and the terms and provisions of this **Agreement** shall extend to and be binding upon and inure to the benefit of the heirs, executors, administrators, successors, and assigns of the respective parties hereto. **Gioletti** acknowledges that **Contractors** operations at the **Project** depend upon **Gioletti** fully and timely performing his obligations under this **Agreement**, and that **Gioletti's** failure to receive and accept the water could result in **Contractor** having to stop or slow work. Such circumstances could potentially increase **Contractor's** cost and expose **City** to a payment of liquidated damages as well as other damages, liabilities, and costs, including claims by third parties for delay and disruption. **Gioletti** shall be responsible for any damages, liabilities and costs, including but not limited to, claims by third parties for delay or disruption for **Gioletti's** failure to perform his obligation under the agreement.

13. CITY INDEMNIFICATION City agrees to indemnify, defend, and hold harmless **Gioletti**, their officers, agents and employees from and against any and all claims, demands, losses, defense costs, or liability of any kind or nature which **Gioletti**, their officers and employees may sustain or incur, or which may be imposed upon them, or any of them, for injury to or death of persons, or damage to property as a result of, arising out of, or connected with, **City's** sole negligence in the performance of any of **City's** duties under this **Agreement**.

14. NOTIFICATIONS Any and all notices permitted or required to be given hereunder shall be given to each Party at the address respectively indicated below, or to any other address as the respective parties may designate from time to time.

Robert Gioletti and Sons, Inc.
Attn: Justin Gioletti
118 N. Baker Road
Turlock CA 95380
Cellular: 209-602-9110
Email: giodairy@sbcglobal.net

City of Turlock
Attn: Michael I. Cooke, Director
Municipal Services Department
156 South Broadway, Suite 270
Turlock, CA 95380-5454
Telephone: 209-668-5590
Facsimile: 209-668-5695

15. ENTIRE AGREEMENT This agreement represents the entire and integrated agreement between **City** and **Gioletti**, and supersedes all prior negotiations or agreements, whether written or oral.

16. AMENDMENTS This Agreement may not be amended or varied except in writing signed by all **Parties**.

17. GOVERNING LAW AND VENUE the laws of the State of California.

This Agreement shall be governed according to

City of Turlock

Robert Gioletti and Sons, Inc.

By: _____

By: _____

APPROVED AS TO FORM:

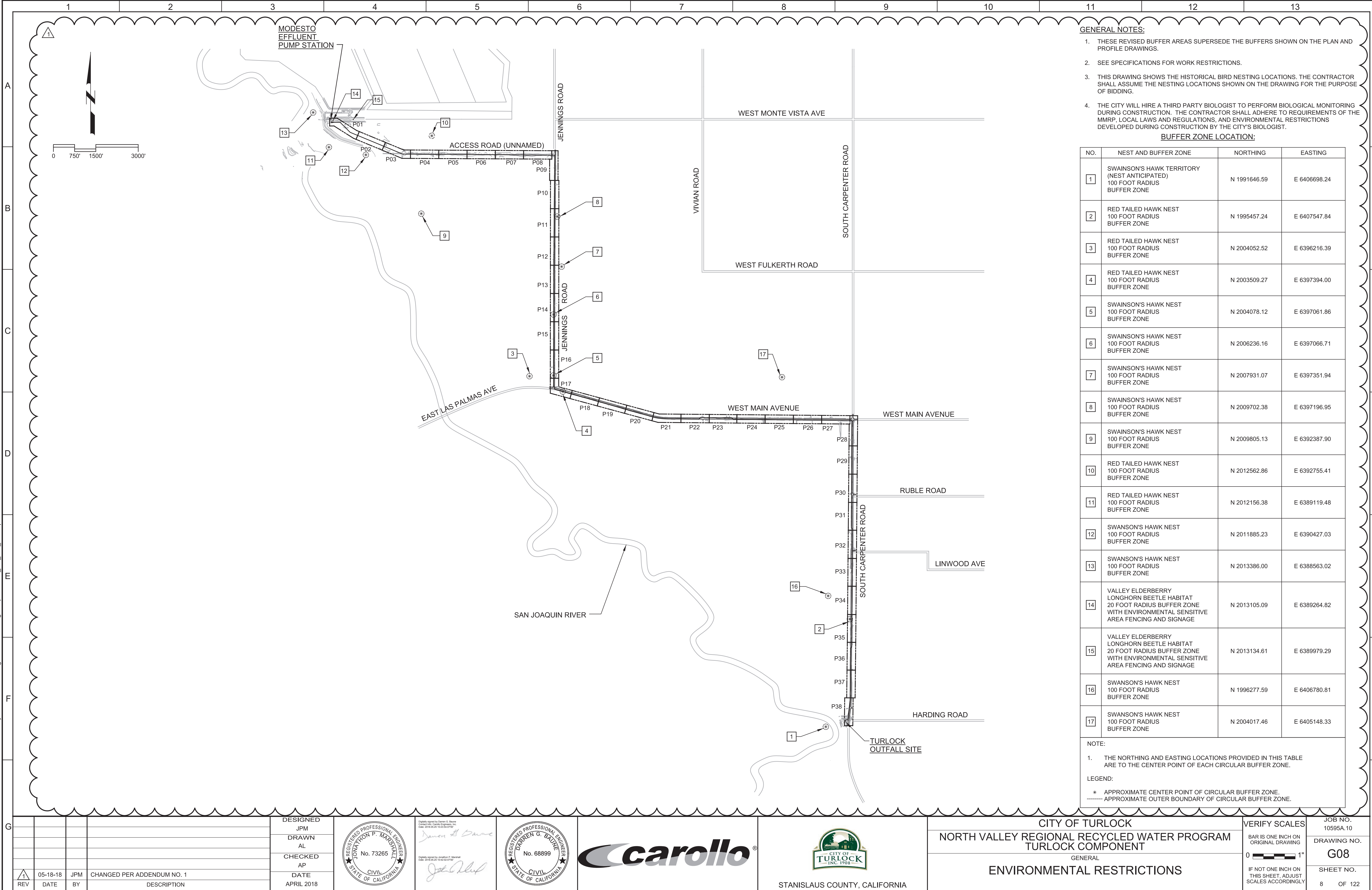
By: _____
Jose M. Sanchez,
Interim City Attorney

ATTEST:

By: _____
Jennifer Land, City Clerk

2942009.1

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User: svcPW

PlotScale: 2:1

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B

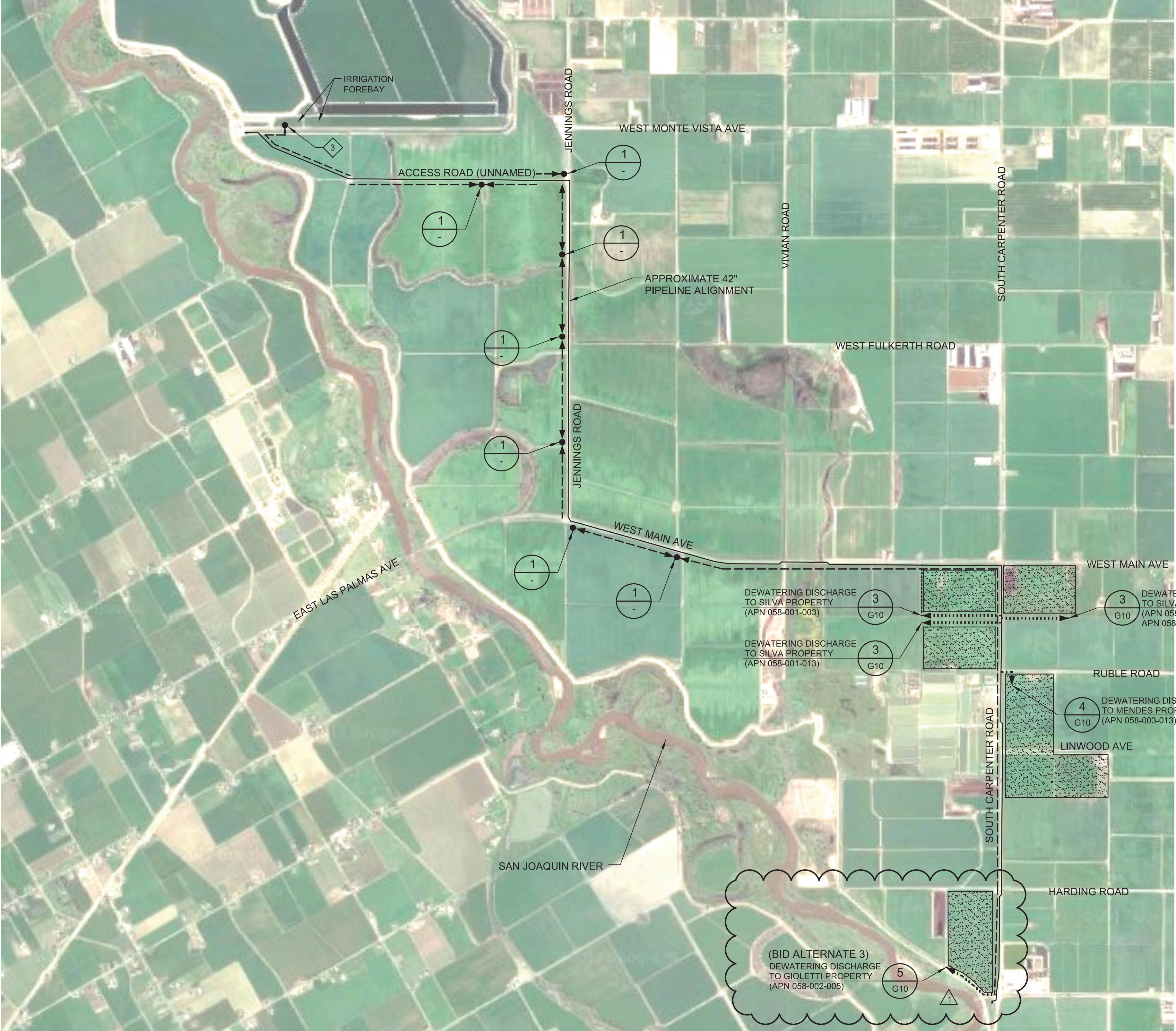
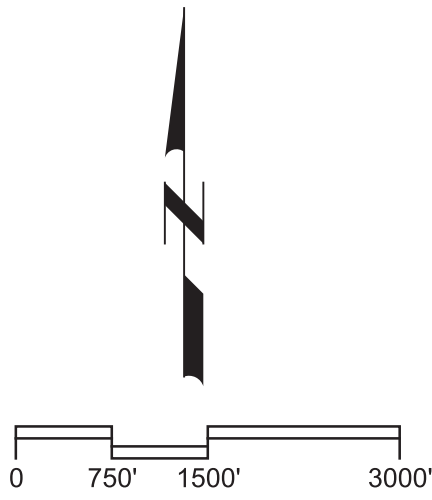
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GENERAL NOTES:

1. SEE DEWATERING SECTION 02240 FOR ADDITIONAL REQUIREMENTS, RESTRICTIONS AND FEES FOR DISCHARGING CONSTRUCTION DEWATERING WATER.
2. THIS CONSTRUCTION DEWATERING DRAWING SHOWS DEWATERING DISCHARGE LOCATIONS AVAILABLE TO THE CONTRACTOR: THE CITY OF MODESTO'S IRRIGATION SYSTEM AND PRIVATE LANDOWNERS. CONTRACTOR SHALL ELECT TO USE SOME OR ALL OF THESE LOCATIONS AT CONTRACTOR'S SOLE DISCRETION AND MEANS AND METHODS FOR CONSTRUCTING THE PROJECT.
3. FIELD VERIFY LOCATION, SIZE, AND CONFIGURATION OF ALL FACILITIES PLANNED TO BE USED FOR DEWATERING OPERATIONS.
4. GROUNDWATER DISCHARGE PIPING SHALL NOT BLOCK ROADS OR DRIVEWAYS. INSTALL PIPING IN A TRENCH, AS NEEDED, TO MAINTAIN ACCESS. WHEN DEWATERING IS COMPLETE, THE PIPING SHALL BE REMOVED AND ROADS AND DRIVEWAYS RESTORED TO PRE-CONSTRUCTION CONDITIONS, UNLESS OTHERWISE INDICATED.
5. DEWATERING FACILITIES SHALL REMAIN WITHIN THE RIGHT-OF-WAY, EASEMENTS, OR OTHER LOCATIONS APPROVED IN WRITING BY THE LANDOWNER.

KEY NOTES:

- 1 BLOW-OFF PIPING IS APPROXIMATELY 8 INCHES DIAMETER. FIELD VERIFY LOCATION, SIZE AND CONFIGURATION OF EACH BLOW-OFF.
- 2 DUCTILE IRON PIPING IS PRESSURIZED UP TO THE ISOLATION VALVE. TIE-IN TO THE DOWNSTREAM FLANGE OF THE ISOLATION VALVE TO CONNECT DEWATERING DISCHARGE PIPING. WHEN DEWATERING IS COMPLETE, THE PIPING SHALL BE REMOVED AND BLOWOFF RESTORED TO PRE-CONSTRUCTION CONDITIONS.
- 3 CONTRACTOR MAY DISCHARGE TO THE MODESTO JENNINGS PLANT IRRIGATION FOREBAY. DISCHARGE PIPING SHALL BE INSTALLED IN A TRENCH THROUGH THE ACCESS ROAD OR IN A PIPE RAMP.

LEGEND:

- > APPROXIMATE LOCATION OF DEWATERING DISCHARGE PIPING TO CITY OF MODESTO IRRIGATION SYSTEM. CONTRACTOR SHALL DESIGN, PROVIDE, INSTALL AND REMOVE ALL DEWATERING FACILITIES.
- - - - -> APPROXIMATE LOCATION OF DEWATERING DISCHARGE PIPING TO PRIVATE PROPERTY OWNERS.
- [Symbol] [Symbol] APPROXIMATE PROPERTY PARCEL BOUNDARY.



A CONSTRUCTION DEWATERING DISPOSAL PLAN
FILE: 10595A10G09C

1 MODESTO IRRIGATION PIPELINE BLOWOFF
SCALE: NO SCALE
FILE: 10595A10G09B

REV	DATE	BY	DESCRIPTION
1	05-24-18	JPM	CHANGED PER ADDENDUM NO. 1

DESIGNED JPM
DRAWN DPF
CHECKED AP
DATE APRIL 2018



Digitally signed by Jonathan P. Marshall
Date: 2018.05.25 10:42:27 -0700

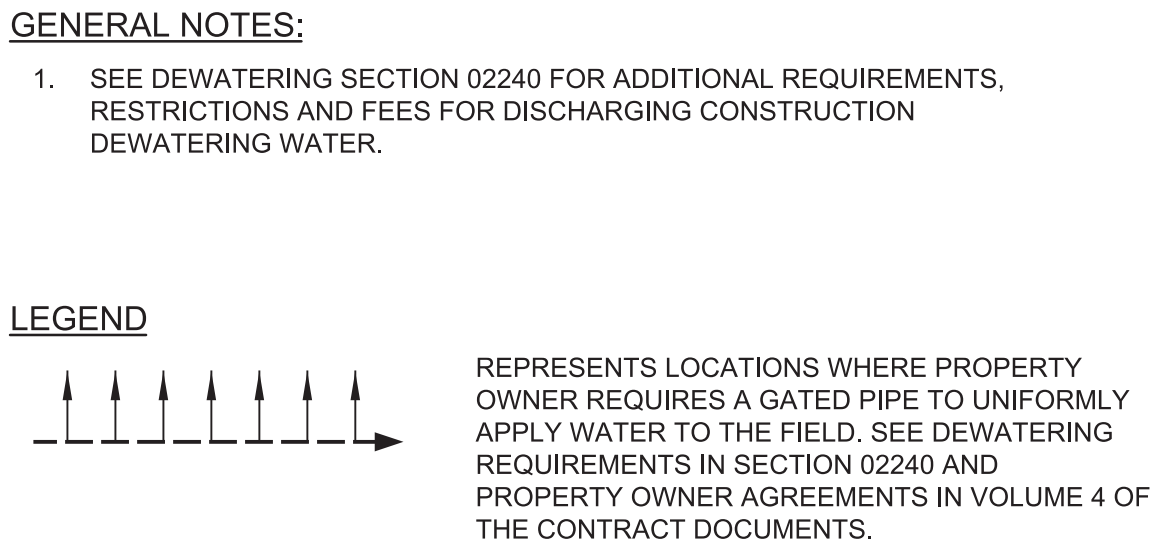


STANISLAUS COUNTY, CALIFORNIA

CITY OF TURLOCK NORTH VALLEY REGIONAL RECYCLED WATER PROGRAM TURLOCK COMPONENT
GENERAL CONSTRUCTION DEWATERING PLAN AND PHOTO

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 10595A.10
DRAWING NO. G09
SHEET NO. 9 OF 122



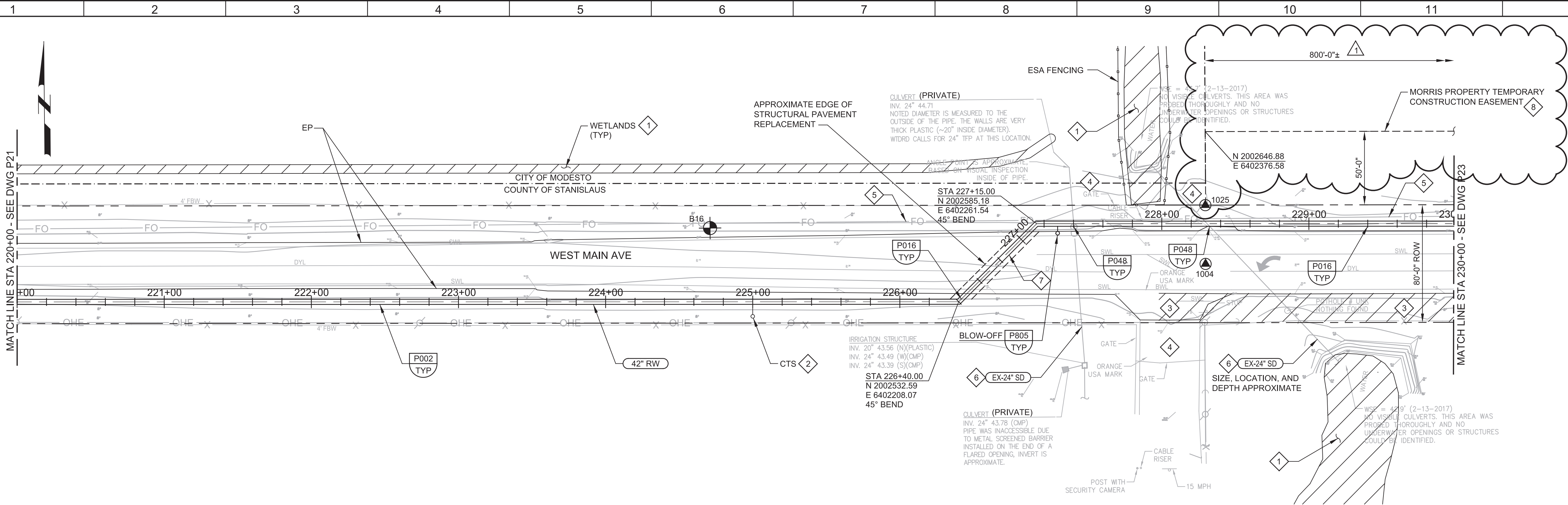
				DESIGNED	 <small>Digitally signed by Jonathan P. Marshall Date: 2019.05.28 10:24:14 AM</small>	 <small>Digitally signed by Jonathan P. Marshall Date: 2019.05.28 10:24:14 AM</small>			CITY OF TURLOCK		VERIFY SCALES	JOB NO. 10595A.10
				DRAWN					NORTH VALLEY REGIONAL RECYCLED WATER PROGRAM TURLOCK COMPONENT		BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO.
				DPF					GENERAL		0  1"	G10
				CHECKED					CONSTRUCTION DEWATERING PHOTOS		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET NO. 10 OF 122
				AP								
				DATE								
				APRIL 2018								

Plot Date: 22-MAY-2018 11:51:46 AM

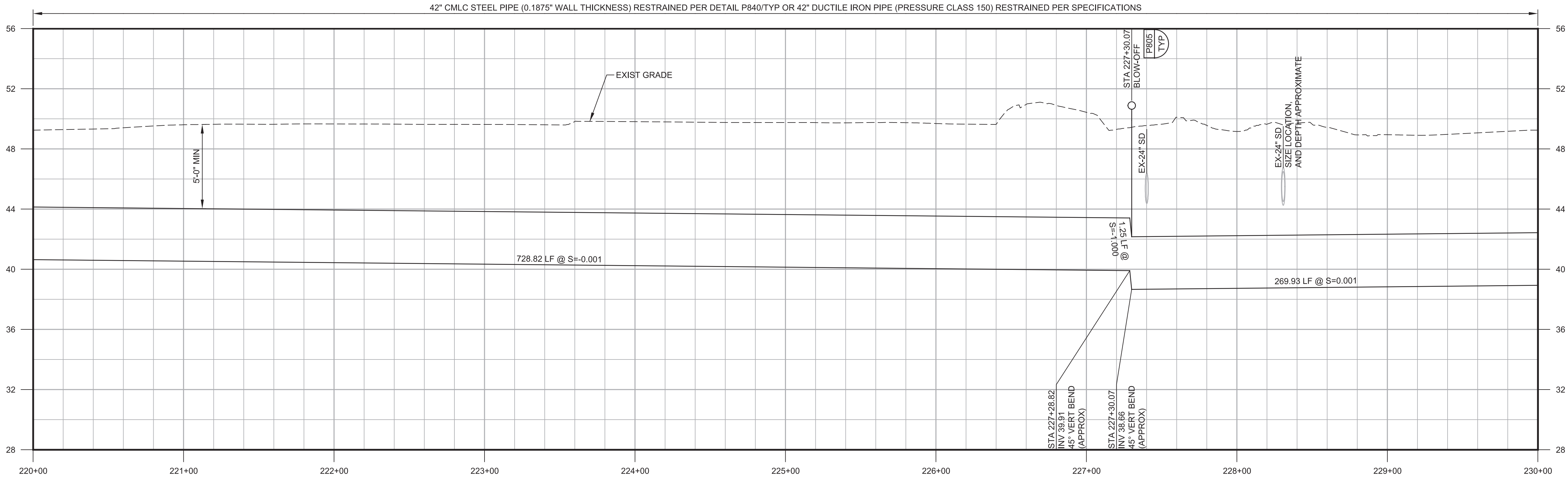
User: svcPW

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo_Std_Pen_v0905.pen PlotScale: 2:1

LAST SAVED BY: Alaloo



PLAN
SCALE: 1"=40'
FILE: 10595A10C101



PROFILE
HORIZ SCALE: 1"=40'
VERT SCALE: 1"=4'
FILE: 10595A10C101

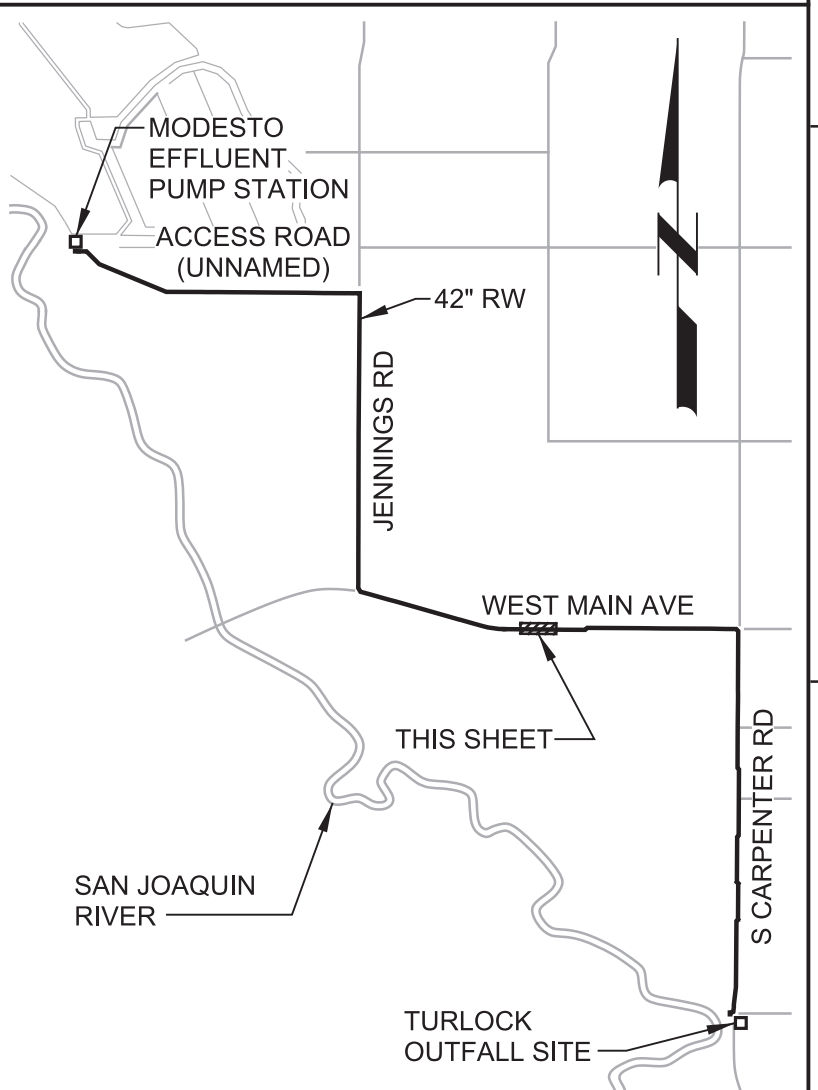
- NOTES
- GENERAL NOTES:**
1. PROTECT TOP SOIL IN PLACE DURING CONSTRUCTION. AFTER CONSTRUCTION, RECOMPACT TOPSOIL AT 85% COMPACTION TO MATCH PRE-CONSTRUCTION ELEVATION. DO NOT HYDROSEED AGRICULTURAL AREAS.
- KEY NOTES:**
1. CONTRACTOR IS PROHIBITED FROM ENTERING WETLAND AREAS (EXCEPT FOR CCTV ROVER) AND SHALL TAKE ALL MEASURES NECESSARY TO PROTECT WETLANDS IN PLACE DURING CONSTRUCTION.
 2. SEE CATHODIC PROTECTION DRAWINGS. FLUSH MOUNTED TYPE.
 3. THE SOUTH ROAD SHOULDER BETWEEN STA 228+00 AND STA 238+00 IS AN ENVIRONMENTALLY SENSITIVE AREA. CONTRACTOR IS PROHIBITED FROM ENTERING THIS AREA.
 4. MAINTAIN PROPERTY OWNER ACCESS.
 5. RELOCATE THE EXISTING AT&T LINE. SEE AT&T RELOCATION DRAWINGS AND SPECIFICATIONS FOR RELOCATION INFORMATION.
 6. CCTV AND ASSESS PER SECTION 01140.
 7. SEE SPECIFICATIONS FOR WORK RESTRICTIONS WHEN CROSSING ROAD.
 8. INSTALL TEMPORARY SNOW FENCE AT THE BOUNDARY OF WORK/STAGING AREA. MAINTAIN FENCE UNTIL WORK AT THE SITE IS COMPLETE. SEE SECTION 01140 FOR ADDITIONAL RESTRICTIONS.

Call before you Dig
Avoid cutting underground utility lines. It's costly.

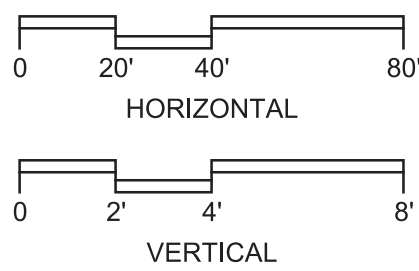


OR
1-800-642-2444

KEY MAP



SCALE



REV	DATE	BY	DESCRIPTION
1	05-18-18	JPM	CHANGED PER ADDENDUM NO. 1

DESIGNED	JPM
DRAWN	AL
CHECKED	AP/DGB
DATE	APRIL 2018



Digitally signed by Jonathan P. Marshall
DN: cn=Jonathan P. Marshall, o=Carollo Engineering, Inc., ou=Carollo Engineering, Inc., email=jmarshall@carollo.com, c=US
Date: 2018.05.22 10:42:47-0700



carollo



STANISLAUS COUNTY, CALIFORNIA

CITY OF TURLOCK
NORTH VALLEY REGIONAL RECYCLED WATER PROGRAM
TURLOCK COMPONENT
CIVIL
PLAN AND PROFILE
STA 220+00 TO 230+00

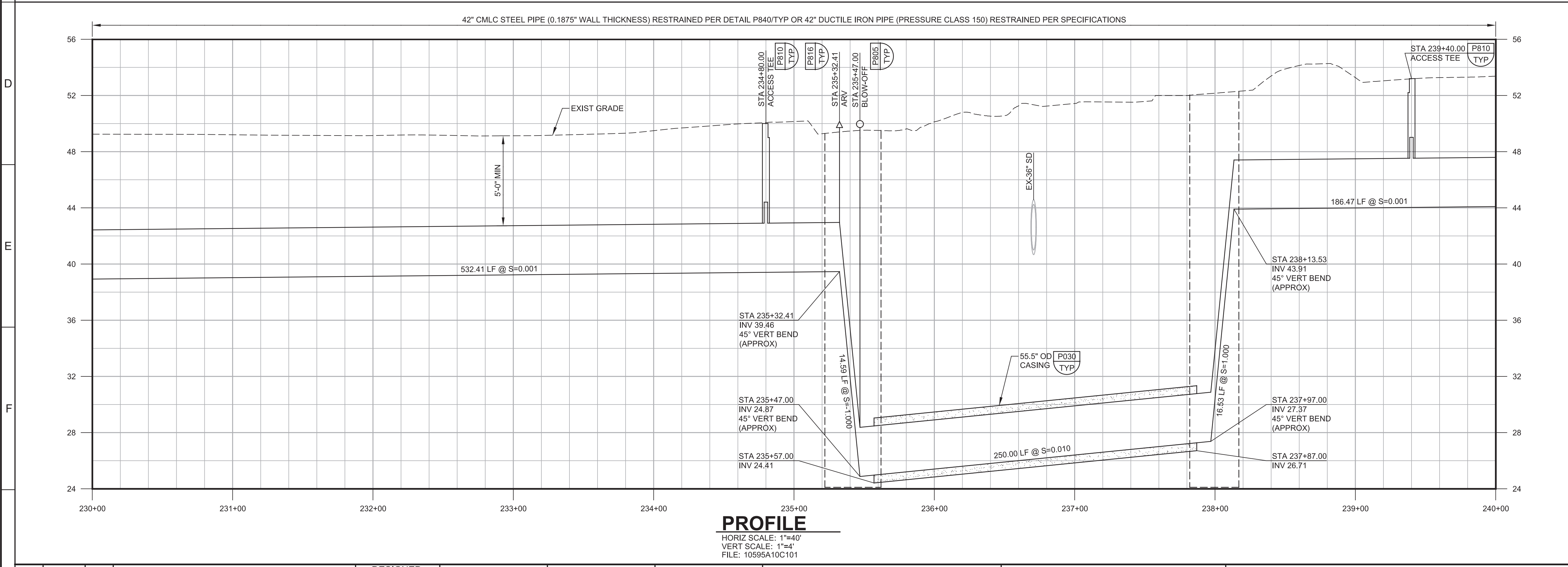
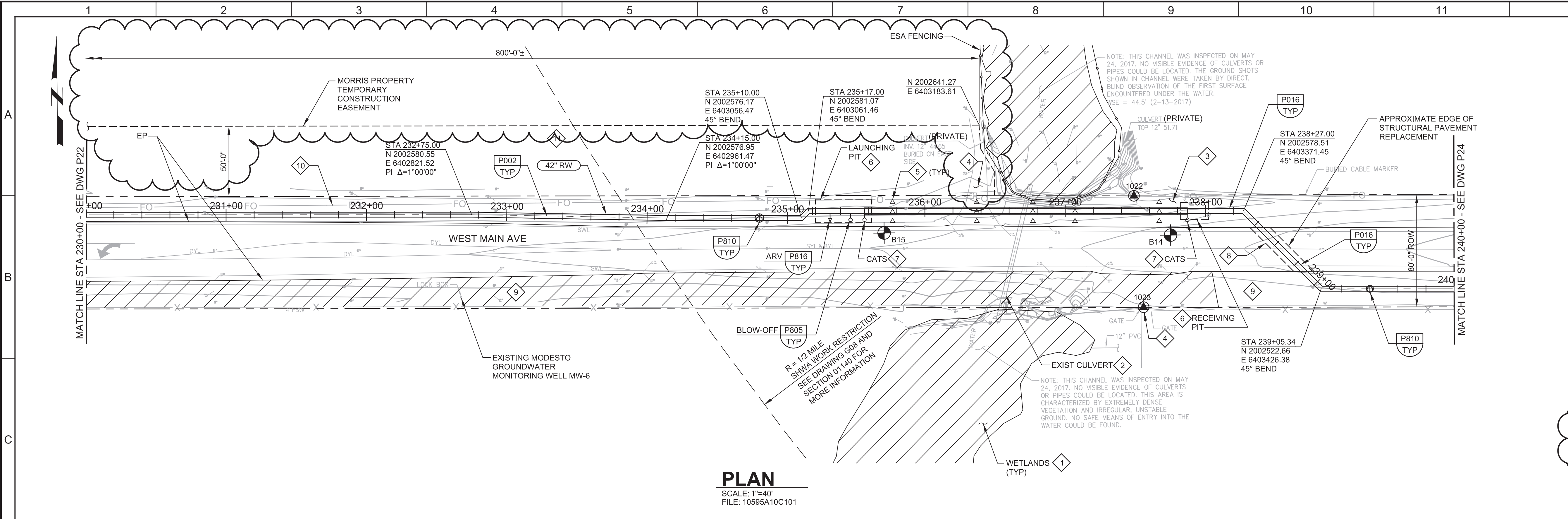
VERIFY SCALES	JOB NO. 10595A.10
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. P22
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET NO. 64 OF 122

Plot Date: 22-MAY-2018 11:51:48 AM

User: svcPW

Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo_Std_Pen_v0905.pen PlotScale: 2:1

LAST SAVED BY: Alalco



NOTES

KEY NOTES:

- CONTRACTOR IS PROHIBITED FROM ENTERING WETLAND AREAS AND SHALL TAKE ALL MEASURES NECESSARY TO PROTECT WETLANDS IN PLACE DURING CONSTRUCTION.
- CULVERT SIZE AND DEPTH UNKNOWN. LOCATION IS APPROXIMATE. UNABLE TO SURVEY. PRIOR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL LOCATE AND PROVIDE ELEVATIONS TO ENGINEER TO DETERMINE IF AN ADJUSTMENT TO THE DESIGN IS NEEDED.
- RUNOFF FROM AGRICULTURAL IRRIGATION OPERATIONS NEAR THE RECEIVING PIT IS PRESENT DURING IRRIGATION SEASON. PROVIDE TEMPORARY MEASURES TO PREVENT IRRIGATION RUNOFF FROM ENTERING THE RECEIVING PIT.
- MAINTAIN PROPERTY OWNER ACCESS TO GATE.
- SETTLEMENT MONITORING LOCATION. SEE SPECIFICATIONS FOR MONITORING REQUIREMENTS.
- INSTALL TEMPORARY TYPE K TRAFFIC GUARDRAIL PER SECTION 01550.
- SEE CATHODIC PROTECTION DRAWINGS. FLUSH MOUNTED TYPE.
- SEE SPECIFICATIONS FOR WORK RESTRICTIONS WHEN CONSTRUCTING ACROSS ROAD.
- THE SOUTH ROAD SHOULDER BETWEEN STA 228+00 AND STA 238+00 IS AN ENVIRONMENTALLY SENSITIVE AREA. CONTRACTOR IS PROHIBITED FROM ENTERING THIS AREA.
- RELOCATE THE EXISTING AT&T LINE. SEE AT&T RELOCATION DRAWINGS AND SPECIFICATIONS FOR RELOCATION INFORMATION.
- INSTALL TEMPORARY SNOW FENCE AT THE BOUNDARY OF WORK/STAGING AREA. MAINTAIN FENCE UNTIL WORK AT THE SITE IS COMPLETE. SEE SECTION 01140 FOR ADDITIONAL RESTRICTIONS. SEE GENERAL NOTE 1 ON DRAWING P22.

Call before you Dig
Avoid cutting underground utility lines. It's costly.

Call 811
OR
1-800-642-2444

KEY MAP

MODESTO EFFLUENT PUMP STATION
ACCESS ROAD (UNNAMED)
JENNINGS RD
WEST MAIN AVE
THIS SHEET
SAN JOAQUIN RIVER
TURLOCK OUTFALL SITE
S CARPENTER RD

SCALE

HORIZONTAL
0 20' 40' 80'

VERTICAL
0 2' 4' 8'

DESIGNED JPM					STANISLAUS COUNTY, CALIFORNIA	CITY OF TURLOCK NORTH VALLEY REGIONAL RECYCLED WATER PROGRAM TURLOCK COMPONENT CIVIL PLAN AND PROFILE STA 230+00 TO 240+00	VERIFY SCALES	JOB NO. 10595A.10
DRAWN AL							BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. P23
CHECKED AP/DBG							0 1"	SHEET NO. 65 OF 122
DATE APRIL 2018							IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	