TOWN OF ALTA

REQUEST FOR BIDS
FOR CONSTRUCTION SERVICES

2025 Crosstow Waterline Completion Project

TABLE OF CONTENTS

NOTICE: REQUEST FOR SEALED BIDS

PROJECT NAME: Town of Alta – 2025 Crosstow Waterline Completion Project

BIDDING AVAILABLE: March 10, 2025

PROJECT LOCATION: Alta, UT

PROJECT DESCRIPTION: Labor and materials to install an approximately 4000 linear-foot water transmission pipeline on the Town of Alta Culinary Water System.

BIDS ACCEPTED UNTIL: March 24, 2025 at 4:30 PMMDT

OWNER:	TOWN OF ALTA
CONTACT:	*Chris Cawley* *ccawley@townofalta.utah.gov* All questions shall be submitted in writing no later than: March 20, 2025 at 5:00 PM

Town of Alta reserves the right to reject any or all proposals received. Furthermore, the Town shall have the right to waive any informality or technicality in proposals received when in the best interest of the Town.

I. Purpose

The Town of Alta (The Town) is seeking a qualified construction company, hereinafter referred to as "Contractor", to provide construction services and materials for the completion of the Town of Alta 2025 Crosstow Waterline Project.

II. Introduction

The Town of Alta ("the Town") sits at the top of Little Cottonwood Canyon at approximately 8,560 feet within Salt Lake County. This small historic town was settled as a mining town in 1865, incorporated as a municipality in 1970, and is now a popular resort community centered around Alta Ski Area.

The Town operates a culinary water system that serves roughly 90 commercial and residential connections. The Town contracts with Salt Lake County Service Area #3 (SA #3) to operate the system. The system consists of a water source deep inside an old mine tunnel, where water is pumped through an antimony treatment facility and then into two storage tanks in separate locations. There are approximately 2.5 miles of 6", 8", and 10" transmission pipelines in the system, along with two pressure reducing valves and 25 hydrants. The Town recently conducted a capital improvement plan with the goal of improving fire flows and redundancy, and the Project is an outcome of that planning work.

III. Project Summary

The Project includes approximately 4050 feet of 10" HDPE pipe, a pressure reducing value, and an air-vac station. The materials will be installed in a trench being excavated by ASA to install ASA utilities. The Project will take place on National Forest System Land under special use authorization by the US Forest Service to ASA and the Town.

ASA will provide various components of Project labor where the Project will take place in the ASA trench. Please refer to the Project Documents below for more information.

IV. Scope of Services

Given the description provided above in section II, the scope of work to be covered under this bid is limited to the following:

- For the pipeline segment that is *not* included in the ASA trench (as indicated in "Exhibit A")
    - Excavation
    - Bedding/gravel
    - Laying pipe
    - Fusing pipe
    - Setting vaults
    - Repaving and revegetation
- Providing all materials and supplies and arranging timely delivery to the Project site by May 12, 2025. Refer to bid schedule for complete list of materials. (
- Connection of new waterline to the TOA mainline
- Installation of PRV valve
- Disinfection of pipeline

Contractor is expected to coordinate and work concurrently with ASA to complete the Project by roughly September 15th, 2025. Notice to Proceed is anticipated concurrently with contracting by roughly April 1st. *Bidders are encouraged to contact ASA to discuss*

ASA's Project and how to coordinate the Town's Project. ASA Project manager Tom Giardina can be reached at tomg@alta.com.

V. Minimum Requirements

Bidders must have these minimum qualifications; otherwise, the proposal will be rejected and will not be evaluated.

Bidders must:

- Have a valid contractor's license with the State of Utah
- Meet the mandatory insurance and bond requirements
- Demonstrate experience with municipal culinary water pipeline construction
- List at least three (3) references

VI. Insurance Requirements

Contractor shall procure, and maintain for the duration of the Agreement, insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by Contractor, their agents, representatives, employees, or subcontractors. Contractor shall provide a Certificate of Insurance evidencing:

1. General Liability insurance written on an occurrence basis with limits no less than One Million Dollars ($1,000,000) combined single limit per occurrence and Two Million Dollars ($2,000,000) aggregate for personal injury, bodily injury and property damage.

2. Automobile Liability insurance with limits no less than Two Million Dollars ($2,000,000) combined single limit per accident for bodily injury and property damage.

3. Professional Liability (Errors and Omissions) insurance with annual limits no less than One Million Dollars ($1,000,000) per occurrence. If written on a claims-made basis, Contractor warrants that the retroactive date applicable to coverage precedes the effective date of this agreement; and that continuous coverage will be maintained for an extended reporting period and tail coverage will be purchased for

a period of at least three (3) years beginning from the time that work under this agreement is complete.

4. Workers Compensation insurance limits written as follows:
    a. Bodily Injury by Accident Five Hundred Thousand Dollars ($500,000) each accident; Bodily Injury by Disease Five Hundred Thousand Dollars ($500,000) each employee, Five Hundred Thousand Dollar ($500,000) policy limit.

5. Alta shall be named as an additional insured on general liability and auto liability insurance policies, with respect to work performed by or on behalf of Contractor and a copy of the endorsement naming Alta as an additional insured shall be attached to the Certificate of Insurance. Should any of the above-described policies be cancelled before the expiration date thereof, Contractor shall deliver notice to Alta within thirty (30) days of cancellation. Alta reserves the right to request certified copies of any required policies.

6. Contractor's insurance shall contain a clause stating that coverage shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

VII. Proposal Requirements

Failure to provide all proposal components listed below may result in disqualification.

1. Proposals
    a. Statement of Qualifications (SOQ)
        i. Introduction of Contractor and/or Company including years in business.
        ii. Discussion of contractor qualifications, experience, and team availability.
        iii. Contractor should demonstrate knowledge of Town, State, and APWA regulations and standards related to the construction of drinking water appurtenances.
        iv. Contractors shall indicate whether the Contractor (or individual firm) will perform all the work outlines in the scope of services in this RFP and/or if a third party will be contracted by them (include information of sub-contractors).
        v. Additional supporting documents, resumes, copies of certifications. These documents do not count towards the 10-page limit.
    b. Bidders shall include a preliminary schedule showing important tasks and milestones to be performed. The tentative completion date for the Project is expected to be September 15, 2025.
    c. Contractor should demonstrate ability to complete the Project on schedule

d. Copy of Business License(s)
e. A valid Contractor's license and certifications to perform all the work associated with the required services
f. Copy of the Insurance Certificates (General, Worker's Compensation, etc.)
g. Any other information that is of importance and assistance in the selection process
h. Proposals should not exceed 20 pages in length (not including Project related pictures) and in PDF format, preferably in one file, that is formatted for printing on standard 8.5"x11" paper, and not to exceed 20 MB. Paper copies will also be accepted.
i. Bid security in the amount of five (5) percent of the Bid must be included with this proposal
j. The following bid forms (forms found in the attached documentation "Bidding Documents") shall be submitted:
    i. Bid Form
    ii. Bid Schedule
    iii. Bid Measurement and Payment

k. Documentation showing ability to obtain a performance bond in an amount sufficient to complete the 2025 Crosstow Waterline Completion Project.

VIII. Disclosures

1. Once the RFP is released, communication of any kind regarding this Proposal with any Town employee or committee member other than the contact person listed on this RFP is prohibited. Any such contact could disqualify a Contractor from being awarded this RFP.
2. Award of the Proposal does not guarantee any purchase will take place. The Town does not guarantee that any or all of the planned purchases will take place.
3. It is the sole responsibility of the bidder to submit the proposal before the scheduled deadline.
4. The Town is responsible to post any addenda and updates to the Town website. It is the responsibility of the bidder to check the Town website for updates.
5. Any proposal may be withdrawn prior to the date and time the proposals are due. Any proposal not withdrawn will constitute an irrevocable offer, for a period of ninety (90) days, to provide the Town with the services/products specified in the proposal.
6. The Town of Alta reserves the right to reject any or all bids or any part thereof; to waive informalities; to negotiate and agree to contract terms with the successful selected Contractor; to disregard non-conforming, non-responsive, unbalanced or conditional proposals, and to re-advertise if it is in the best interests of the Town to do so.

7. Failure to submit required documents or follow any of the listed conditions of this RFP may result in disqualification at the sole discretion of the selection committee in accordance with the Town's purchasing policy.
8. Any product or services omitted from this specification, but clearly necessary for completing the work shall be considered a requirement although not directly specified or called for in this RFP.

IX. Information to be Submitted

To be considered, all proposals must comply with the following:

- All proposals will be received via email submitted to Chris Cawley, ccawley@townofalta.utah.gov.
    - Email subject line: "SEALED BID – 2025 Crosstow Waterline Completion Project"
- Total file size smaller than 20 MB and fewer than 20 pages
- Formatted for printing on 8.5"x11" paper

X. Review Procedure

A Review Committee comprising at least three (3) members will be established to review all submitted Proposals.

The Review Committee will convene at the time/place designated in the invitations for bids.

XI. Award of Contract

The lowest responsive and responsible bidder shall be determined through use of the following procedures:

The Contract shall be awarded to the lowest responsible bidder whose bid meets the requirements and criteria set forth in the invitation for bids. In determining "lowest responsible bidder", in addition to price, the town council shall consider:

a. The quality and availability of supplies or services offered;
b. The ability, capacity and skill of the bidder to perform the contract or provide the supplies, personnel or service required;
c. Whether the bidder can perform the contract or provide the supplies promptly, or within the time specified, without delay or interference;
d. The sufficiency of the bidder's financial resources and the effect thereof on his ability to perform the contract or provide the supplies or services;

e. The character, integrity, reputation, judgment, experience and efficiency of the bidder;
f. The quality of the bidder's performance or breach of contractual obligations with public and private agencies on previous orders or contracts for the town or others;
g. Litigation by or against the bidder, either pending or threatened, where claim is made that the bidder provided or furnished materially defective workmanship or materials to the town, or failed to substantially comply with bid specifications or contract terms and conditions;
h. The previous and existing compliance by the bidder with laws and ordinances relating to the contract or service;
i. The ability of the bidder to provide future maintenance and service, where such maintenance and service is essential;
j. Possession or ability to obtain all necessary town and state licenses either at the time of bid or before doing business with the town.

XII. Protected Information

1. All proposals are subject to the Government Records Access Management Act (GRAMA) Utah Code Ann., Subsection § 63G-2-101 et seq.
2. If Contractor believes any information should be held confidential for business reasons, Contractor must submit a written claim of business confidentiality for that particular information and include a specific statement of the reasons supporting the claim pursuant to Utah Code Ann. § 63G 2 305(2)(c).

TOWN OF ALTA

REQUEST FOR BIDS
FOR CONSTRUCTION SERVICES

2025 Crosstow Waterline Completion Project

PROJECT DOCMENTS

Bid Proposal

1. After having personally and carefully examined all conditions surrounding the Work and Contract documents, the undersigned proposes to furnish all labor, equipment, tools, and machinery and to furnish and deliver all materials not specifically mentioned as being furnished by the Town of Alta, which is required in and about the construction of the Construction Contract knows as:

   TOWN OF ALTA
   2025 CROSSTOW WATERLINE
   COMPLETION PROJECT

2. The undersigned proposed to complete the work for the price or prices listed in the Bid Schedule and understands that quantities for Unit Price work are not guaranteed.
3. The undersigned proposed to furnish bonds with the Contract, signed by a surety company satisfactory to the Town of Alta, in an amount equal to the Contract amount conditioned to ensure compliance with all requirements of the Contract Documents.
4. The undersigned proposed to execute the attached contract within ten (10) days after the Notice of Intention to Award, and to begin immediately in order to complete the Project by September 15, 2025.
5. If Town of Alta finds it necessary to further define the Work, Contract Price, Contract Time, or some other portion of the Construction Contract, after Bid opening, the PROPOSING CONTRACTOR promises to execute an Agreement Supplement prior to or concurrent with the execution of the Agreement, if the Agreement Supplement is acceptable to the PARTIES.
6. It is understood that the Town of Alta has the right to reject this bid or to accept it, or any portion therein, at the prices listed in the Bid Schedule.

Bid Form

Part 1: Bidder

Name: _____

Address: _____
_____
_____

Telephone Number: _____

Tax ID Number: _____

Bidder holds license number _____ , issued on the _____ Day of _____, _____, by the Utah State Department of Commerce, Division of Occupational and Professional licensing. Bidder is licensed to practice as a _____ Contractor. License renewal date is the _____ day of _____, _____.

Part 2: Bidder's Subscription

Date: _____

Bidder's Signature: _____

Bidder's Name (Printed): _____

Title: _____

BID SCHEDULE

SECTION 00 43 00

BID SCHEDULE

1.01 PROJECT IDENTIFICATION

A. Name: _____

B. Submitted to: _____

_____

_____

1.02 RELATED REQUIREMENTS

A. Section 01 22 00: Measurement and Payment

1.03 BID SCHEDULE

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL AMOUNT
1	Mobilization/Demobilization (Includes SWPPP)	1	L.S.	$	$
2	Quality Control & Testing	1	L.S.	$	$
3	Construction Surveying	1	L.S.	$	$
4	Traffic Control	1	L.S.	$	$
5	10-inch dia. DR 11 HDPE Pipe (materials only – installed by others) Sta 0+70.91 to Sta 5+28.42, Sta 5 +52.27 to Sta 37+21.16*	3,626	L.F	$	$
6	10-inch dia. DR 11 HDPE Pipe furnish materials, install and disinfected/tested (Sta 37+21.16 to Sta 41+58.84)	438	L.F.	$	$
7	Pressure Testing and Disinfection of 10-inch Dia HDPE Pipeline (installed by others)	3,626	L.F.	$	$
8	Connection to Existing System at Sta 0+70.91 installed and disinfected/tested	1	L.S.	$	$

*Materials delivered by May 12, 2025

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL AMOUNT
9	Connection to Existing System at Sta 41+58.84 installed and disinfected/tested	1	L.S.	$	$
10	6-inch PRV Vault (Pre-cast Concrete Vault only – installed by others)	1	L.S.	$	$
11	6-inch PRV Vault equipped and disinfected/tested	1	L.S.	$	$
12	Air-Vac Station (Concrete Manhole only – installed by others)	1	L.S.	$	$
13	Air-Vac Station equipped and disinfected/tested	1	L.S.	$	$
14	Unimproved Access Road Restoration (Sta 37+21 to Sta 40+00)	2,916	S.F.	$	$
15	Untreated Base Course (8” Thick) (Sta 40+00 to Sta 41+59)	1,022	S.F.	$	$
16	Asphalt Trench Patch (6” Thick) (Based on 149 lbs/CF) (Sta 40+00 to Sta 41+59)	64	TON	$	$
				TOTAL	

L.S. = Lump Sum, L.F. = Linear Foot, S.F. - Square Foot

1.04 ACKNOWLEDGEMENT

A. THE FOLLOWING INFORMATION IS ACKNOWLEDGED BY THE BIDDER:

1. The BIDDER also acknowledges to the OWNER that the BID provided herein includes total cost required to build a fully functioning reservoir and valve vault and related items as outlined within these specifications and shown in the drawings.

COMPANY: _____

Signed: _____

Title: _____

1.05 CONTRACTORS PROPOSED COMMENCEMENT AND COMPLETION DATES:

Commence _____

MEASUREMENT and PAYMENT

SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

A. All work completed under this contract shall be in accordance with the Contract Drawings and Specifications and will be measured by ENGINEER/OWNER. The quantities appearing on the Bid Schedule are approximate only, and are prepared for the comparison of bids. Payment to CONTRACTOR on bid items with unit prices other than "Lump Sum" will be made for actual quantities of work performed and accepted, or material furnished in accordance with the Contract. The scheduled quantities of work to be done and materials to be furnished may be increased or decreased in accordance with the General Conditions.

B. The term "Lump Sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure, portion of work, or unit is specified "Lump Sum" as the unit of measurement, the unit will include fittings, accessories, and all work necessary to complete the work as shown on the Drawings and as specified.

C. When the accepted quantities of work vary from the quantities in the Bid Schedule, CONTRACTOR shall accept as payment in full, so far as contract items are concerned, payment at the original contract unit prices for the work done. OWNER reserves the right to add to or delete from quantities listed in the bid schedule in order to match the total bid with the budgeted money available.

1.2 BASE BID SCHEDULE

A. **BID ITEM NO. 1 - "MOBILIZATION/DEMOBILIZATION (INCLUDES SWPPP)**"

1. **GENERAL** This bid item is provided to cover CONTRACTOR's cost for general and miscellaneous responsibilities and operations not normally attributed to any other single bid item within this schedule. This shall include, but is not limited to, development and implementation of SWPPP (submittal and record keeping is to be done in an electronic format) which must be approved before construction may begin, as well as obtaining required permits.

2. **METHOD OF MEASUREMENT** Mobilization shall not be measured, but shall be paid for on a lump sum basis for the completion of the Bid Schedule item.

3. **BASIS OF PAYMENT** Payment will be made at the contract lump sum bid price. Payments will be made in accordance with the following schedule:
   a. When 10% of the original contract amount is earned, 25% of the amount bid for mobilization will be paid.
   b. When 25% of the original contract amount is earned, an additional 25% for a total of 50% of the amount bid for mobilization will be paid.
   c. When 50% of the original contract amount is earned, an additional 25% for a total of 75% of the amount bid for mobilization will be paid.

d. When 75% of the original contract amount is earned, an additional 25% for a total of 100% of the amount bid for mobilization will be paid.

B. **BID ITEM NO. 2 – "QUALITY CONTROL & TESTING"**

1. **GENERAL** This item is provided to cover the Contractor's cost for general and miscellaneous responsibilities and operations associated with Quality Control and Testing. This item shall include, but not limited to: work described or enumerated in Section 01 45 23; Testing Agency Services and Section 01 45 00; Quality Control and Materials Testing.

2. **METHOD OF MEASUREMENT** The Quality Control and Testing shall be measured based on the percentage of work completed for the project according to the amount defined in the Bid Schedule.

3. **BASIS OF PAYMENT** Payment for Quality Control and Testing will be made at the contract lump sum bid price as shown and accepted by the Owner and Engineer in the Bid Schedule. Payments will be made in accordance with the following schedule:
   a. When 10% of the original contract amount is earned, 25% of the amount bid for quality control & testing will be paid.
   b. When 25% of the original contract amount is earned, an additional 25% for a total of 50% of the amount bid for quality control & testing will be paid.
   c. When 50% of the original contract amount is earned, an additional 25% for a total of 75% of the amount bid for quality control & testing will be paid.
   d. When 75% of the original contract amount is earned, an additional 25% for a total of 100% of the amount bid for quality control & testing will be paid.

C. **BID ITEM NO. 3 - "CONSTUCTION SURVEY",**

1. **GENERAL** This item is provided to cover the Contractor's cost for general and miscellaneous responsibilities and operations associated with Construction Survey, which shall be performed by a registered professional land surveyor in the State of Utah.
2. **METHOD OF MEASUREMENT** The Construction Survey shall be measured based on the percentage of work completed for the project according to the amount defined in the Bid Schedule.

3. **BASIS OF PAYMENT** Payment for Construction Survey will be made at the contract lump sum bid price as shown and accepted by the Owner and Engineer in the Bid Schedule. Payments will be made in accordance with the following schedule:
   a. When 10% of the original contract amount is earned, 25% of the amount bid for construction survey will be paid.
   b. When 25% of the original contract amount is earned, an additional 25% for a total of 50% of the amount bid for construction survey will be paid.
   c. When 50% of the original contract amount is earned, an additional 25% for a total of 75% of the amount bid for construction survey will be paid.
   d. When 75% of the original contract amount is earned, an additional 25% for a total of 100% of the amount bid for construction survey will be paid.

D. **BID ITEM NO. 4 - "TRAFFIC CONTROL"**

1. **METHOD OF MEASUREMENT** This item shall not be measured but shall be paid for on a lump sum unit price basis to direct traffic and pedestrians safely around the construction activities .

2. **BASIS OF PAYMENT** Payment for this item will be made at the contract lump sum bid price and shall be considered complete compensation for all labor, equipment, and materials to develop a traffic control plan, submit the plan to Town of Alta and Alta Ski Resort for review, and implement the traffic control plan throughout construction of the project. Payments will be made in accordance with the following schedule.
   a. When 10% of the original contract amount is earned, 25% of the amount bid for traffic control will be paid.
   b. When 25% of the original contract amount is earned, an additional 25% for a total of 50% of the amount bid for traffic control will be paid.
   c. When 50% of the original contract amount is earned, an additional 25% for a total of 75% of the amount bid for traffic control will be paid.
   d. When 75% of the original contract amount is earned, an additional 25% for a total of 100% of the amount bid for traffic control will be paid

E. **BID ITEM NO. 5 - "10-INCH DIA DR 11 HDPE PIPE (MATERIALS ONLY – INSTALLED BY OTHERS) STA 0+70.91 TO STA 5+28.42, STA 5+52.27 TO STA 37+21.16"**

1. **METHOD OF MEASUREMENT** Measurement shall be according to the lineal foot of pipe furnished and delivered. Measurement shall be along the horizontal centerline of the pipe. Pipe in vertically or vertically diagonal directions will only be measured in the horizontal plane. Contractor shall include associated cost for any such pipe as the horizontal cost per foot.

2. **BASIS OF PAYMENT** Work completed under this bid item shall be paid for at the contract unit bid price per lineal foot listed in the bidder's proposal and shall be considered complete compensation for furnishing the pipe materials, including but not limited to: furnishing and delivering the HDPE (DR-11) pipe, appurtenances, fitting, safety tape, and tracer wire; and all other operations and materials required to furnish the item in accordance with the plans, technical specifications, and Town of Alta standards.

3. This bid item does not include installation of pipe, which is paid for in other bid items.

F. **BID ITEM NO. 6 - "10-INCH DIA DR 11 HDPE PIPE, FURNISH MATERIALS, INSTALL AND DISINFECTED/TESTED (STA 37+21.16 TO STA 41+58.84)"**

1. **METHOD OF MEASUREMENT** Measurement shall be according to the lineal foot of pipe acceptably installed as shown on the drawings and specified in the specifications. Measurement shall be along the horizontal centerline of the pipe. Pipe in vertically or vertically diagonal directions will only be measured in the horizontal plane. Contractor shall include associated cost for any such pipe as the horizontal cost per foot.

2. **BASIS OF PAYMENT** Work completed under this bid item shall be paid for at the contract unit bid price per lineal foot listed in the bidder's proposal and shall be considered complete compensation for all labor, equipment, and materials necessary, including but not limited to: saw cutting; excavation; dewatering; shoring; removal and disposal of excavated material and asphalt; furnishing and installing the HDPE (DR-11) pipe, appurtenances, fitting, safety tape, and tracer wire; commissioning of pipeline (including cleaning and flushing, disinfection and pressure testing); furnishing, installing, and removing temporary blow-off valves and fittings required for pipeline commissioning; protection of buried utilities; additional potholing as needed; looping and/or re-routing of any affected utilities (either temporarily or permanently); backfilling with import pipe zone material and import trench backfill material; compaction; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

3. This bid item does not include surface restoration, which is paid for in other bid items.

G. **BID ITEM NO. 7 - "PRESSURE TESTING AND DISINFECTION OF 10-INCH DIA HDPE PIPELINE (INSTALLED BY OTHERS)"**

1. **METHOD OF MEASUREMENT** Measurement shall be according to the lineal foot of existing pipe acceptably tested and disinfected as shown on the drawings and specified in the specifications. Measurement shall be along the horizontal centerline of the pipe. Pipe in vertically or vertically diagonal directions will only be measured in the horizontal plane.

2. **BASIS OF PAYMENT** Work completed under this bid item shall be paid for at the contract unit bid price per lineal foot listed in the bidder's proposal and shall be considered complete compensation for all labor, equipment, and materials necessary, including but not limited to: commissioning of pipeline (including cleaning and flushing, disinfection and pressure testing); furnishing, installing, and removing temporary blow-off valves and fittings required for pipeline commissioning; protection of buried utilities; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

3. This bid item does not include furnishing or installing the 10" dia HDPE pipe (including all surface restoration). This work will be done by others.

H. **BID ITEM NO. 8 - "CONNECTION TO EXISTING SYSTEM AT STA 0+70.91 INSTALLED AND DISINFECTED/TESTED"**

1. **METHOD OF MEASUREMENT** This item shall not be measured but shall be paid for on a lump sum unit price basis for the construction and installation of connection, including all components required in the drawings and specifications.

2. **BASIS OF PAYMENT** Payment for the connection shall be made at the contract unit lump sum bid price for completion of the work as shown on the drawings and

specified herein. Payment shall be considered complete compensation for all labor, equipment, and materials, including but not limited to: saw cutting; excavation; dewatering; shoring; removal and disposal of excavated material and asphalt; furnishing and installing the 8” tee, gate valve, coupling, 10”x8” reducer, HDPE flange adapter, safety tape, tracer wire, thrust blocks and restraints; connection to existing waterline; polywrapping associated ductile iron fitting; commissioning of pipeline (including cleaning and flushing, disinfection and pressure testing); furnishing, installing, and removing temporary blow-off valves and fittings required for pipeline commissioning; protection of buried utilities; additional potholing as needed; looping and/or re-routing of any affected utilities (either temporarily or permanently); backfilling with import pipe zone material and import trench backfill material; compaction; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

3. This bid item does not include surface restoration, which is paid for in other bid items.

I. BID ITEM NO. 9 - "CONNECTION TO EXISTING SYSTEM AT STA 41+58.84 INSTALLED AND DISINFECTED/TESTED”

1. **METHOD OF MEASUREMENT** This item shall not be measured but shall be paid for on a lump sum unit price basis for the construction and installation of connection, including all components required in the drawings and specifications.

2. **BASIS OF PAYMENT** Payment for the connection shall be made at the contract unit lump sum bid price for completion of the work as shown on the drawings and specified herein. Payment shall be considered complete compensation for all labor, equipment, and materials, including but not limited to: saw cutting; excavation; dewatering; shoring; removal and disposal of excavated material and asphalt; furnishing and installing the 6” tee, gate valve, long sleeve, 6” dia PVC pipe, 10”x6” reducer, HDPE flange adapter, safety tape, tracer wire, thrust blocks and restraints; connection to existing waterline; polywrapping associated ductile iron fitting; commissioning of pipeline (including cleaning and flushing, disinfection and pressure testing); furnishing, installing, and removing temporary blow-off valves and fittings required for pipeline commissioning; protection of buried utilities; additional potholing as needed; looping and/or re-routing of any affected utilities (either temporarily or permanently); backfilling with import pipe zone material and import trench backfill material; compaction; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

3. This bid item does not include surface restoration, which is paid for in other bid items.

J. **BID ITEM NO. 10 - "6-INCH PRV VAULT (PRE-CAST CONCRETE VAULT ONLY – INSTALLED BY OTHERS)"**

1. **METHOD OF MEASUREMENT** This bid item shall not be measured but shall be paid for on a lump sum price for furnishing and delivering the PRV vault as shown on the Contract Drawings and specified herein.

2. **BASIS OF PAYMENT** Payment for this bid item shall be made at the contract unit lump sum bid price for the completion of work shown on the drawing and specified herein. Payment shall be considered complete compensation for all materials including but not limited to: furnishing and delivering the pre-cast concrete vault, manhole ring and cover, polypropylene steps and floor drain; and all other incidentals and materials herein described required to complete this item in accordance with the plans and technical specifications.

3. This bid item does not include installing the precast vault, ring and cover, steps, surface restoration, gravel base, and piping outside the vault. This work will be done by others.

K. **BID ITEM NO. 11 - "6-INCH PRV VAULT EQUIPPED AND DISINFECTED/TESTED"**

1. **METHOD OF MEASUREMENT** This bid item shall not be measured but shall be paid for on a lump sum price for the equipping, disinfecting and testing the PRV vault as shown on the Contract Drawings and specified herein.

2. **BASIS OF PAYMENT** Payment for this bid item shall be made at the contract unit lump sum bid price for the completion of work shown on the drawing and specified herein. Payment shall be considered complete compensation for all labor, equipment and materials including but not limited to: furnishing and installation of pipe, gate valves, ball valves and pressure reducing valves; furnishing and installing all fittings including reducers, tees, spool pieces, elbows, nipples, adaptors, pressure gauges, hose bibs with vacuum breaker, companion flanges, pipe supports, and joint restraints; furnishing and installing all other materials included in the schedule on Sheet C-2 of the drawings; painting and finishing of piping, valves, fittings, and steel plates inside the vault as shown on Contract Drawings and Specifications; flushing, disinfection and testing; and all other incidentals and materials herein described required to complete this item in accordance with the plans and technical specifications.

3. This bid item does not include furnishing the precast vault, steps, and ring and cover, which is paid for in other bid items.

4. This bid item does not include installing the precast vault, ring and cover, steps, surface restoration, gravel base, and piping outside the vault. This work will be done by others.

L. **BID ITEM NO. 12 - "AIR-VAC STATION (CONCRETE MANHOLE ONLY – INSTALLED BY OTHERS)"**

1. **METHOD OF MEASUREMENT** This bid item shall not be measured but shall be paid for on a lump sum price for furnishing and delivering the Air-Vac Station as shown on the Contract Drawings and specified herein.

2. **BASIS OF PAYMENT** Payment for this bid item shall be made at the contract unit lump sum bid price for the completion of work shown on the drawing and specified herein. Payment shall be considered complete compensation for all materials, including but not limited to: furnishing and delivering the pre-cast manhole, manhole ring and cover, and polypropylene steps; and all other incidentals and materials herein described required to complete this item in accordance with the plans and technical specifications.

3. This bid item does not include installing the precast manhole, ring and cover, steps, surface restoration, gravel base, and piping through manhole. This work will be done by others

M. **BID ITEM NO. 13 - "AIR-VAC STATION EQUIPPED AND DISINFECTED/TESTED"**

1. **METHOD OF MEASUREMENT** This bid item shall not be measured but shall be paid for on a lump sum price for the equipping, disinfecting and testing the Air-Vac Station as shown on the Contract Drawings and specified herein.

2. **BASIS OF PAYMENT** Payment for this bid item shall be made at the contract unit lump sum bid price for the completion of work shown on the drawing and specified herein. Payment shall be considered complete compensation for all labor, equipment, and materials, including but not limited to: furnishing and installing the combination air valve, ball valve, fittings and piping, and service saddle; furnishing and installing all other materials included in the detail on Sheet C-3 of the drawings; and all other incidentals and materials herein described required to complete this item in accordance with the plans and technical specifications.

3. This bid item does not include furnishing the precast manhole, steps and ring and cover, which is paid for in other bid items

4. This bid item does not include installing the precast manhole, ring and cover, steps, surface restoration, gravel base, and 10" HDPE pipe through the manhole. This work will be done by others.

N. **BID ITEM NO. 14 - "UNIMPROVED ACCESS ROAD RESTORATION (STA 37+21 TO STA 40+00)"**

1. **METHOD OF MEASUREMENT** This bid item shall be measured by the square foot of restored and accepted in place unimproved access road as shown on the plans and in accordance with the specifications.

2. **BASIS OF PAYMENT** This item shall be paid for at the contract unit price per square foot of restored and accepted in place unimproved access road. Payment shall be considered complete compensation for all labor, equipment, and required materials

including but not limited to: video/photos of road prior to beginning work; stockpiling, placing, compacting and grading the existing access road material; restoring the road to existing or better conditions; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

O. **BID ITEM NO. 15 - "UNTREATED BASE COURSE (8" THICK) (STA 40+00 TO STA 41+59)"**

1. **METHOD OF MEASUREMENT** This bid item shall be measured by the square foot of installed and accepted in place untreated base course as shown on the plans and in accordance with the specifications.

2. **BASIS OF PAYMENT** This item shall be paid for at the contract unit price per square foot of installed and accepted in place untreated base course (8" thick). Payment shall be considered complete compensation for all labor, equipment, and required materials including but not limited to: supplying, placing, compacting and grading the UBC; testing coordination; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

P. **BID ITEM NO. 16 - " ASPHALT TRENCH PATCH (6" THICK) (STA 40+00 TO STA 41+59)"**

1. **METHOD OF MEASUREMENT** This bid item shall be measured per ton (based on 149 lb/CF) of restored asphalt as shown on the plans and in accordance with the specifications. Measurement shall be based on weight tickets for asphalt installed accepted in place, provided to the Owner.

2. **BASIS OF PAYMENT** This item shall be paid for at the contract unit price per ton of installed and accepted in place asphalt (6" thick min or to match existing thickness) and shall be considered complete compensation for all labor, equipment, and required materials including but not limited to: supplying, placing, compacting and grading the asphalt (approved by the OWNER prior to placement); testing coordination; and all other operations and materials required to complete the item in accordance with the plans, technical specifications, and Town of Alta standards.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

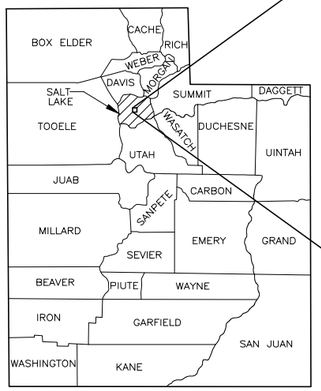
- END OF SECTION -

PROJECT ADDENDA

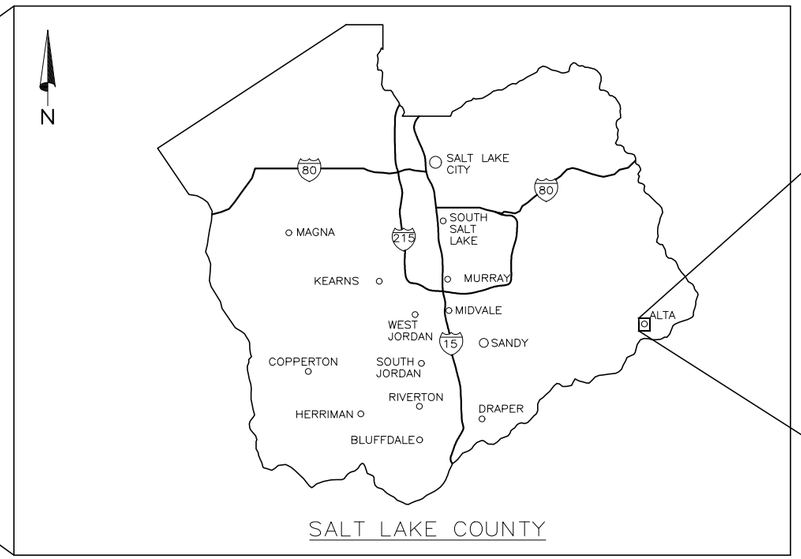
"Exhibit A"
FINAL DESIGN DRAWINGS

TOWN OF ALTA

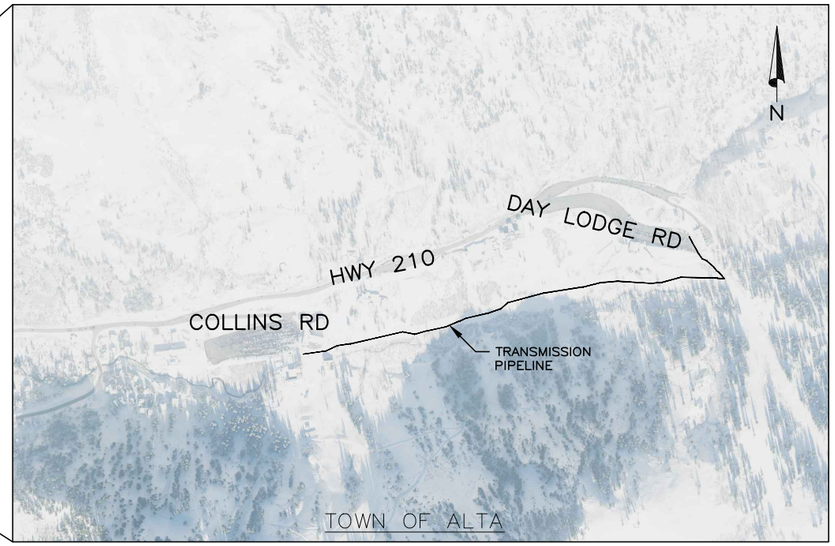
CROSSTOW TRANSMISSION PIPELINE
FEBRUARY 2025
FINAL DESIGN DRAWINGS



STATE OF UTAH



VICINITY MAP



PROJECT LOCATION

TOWN OF ALTA CONTACTS

TOWN MANAGER: CHRIS CAWLEY (801) 742-6010

PROFESSIONAL ENGINEER
No. 12390282-2202
GARRICK D. STEPHENSON
2/24/2025
STATE OF UTAH

HANSEN, ALLEN & LUCE DESIGN TEAM

BENJAMIN D. MINER, P.E. – PRINCIPAL IN CHARGE
DELMAS JOHNSON, P.E. – PROJECT MANAGER
GARRICK STEPHENSON, P.E. – PROJECT ENGINEER
DANISA DOLDER – DESIGNER

HANSEN ALLEN & LUCE inc
ENGINEERS

859 W. SOUTH JORDAN PKWY STE. 200
SOUTH JORDAN UTAH, 84095
(801) 566-5599

FILE NAME: PROJECTS\528 – TOWN OF ALTA\02.100 – CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\G-1 COVER.DWG
FILE DATE: 2.24.2025 13:34:54 (GDS)

SECTION & DETAIL IDENTIFICATION

SECTION IDENTIFICATION

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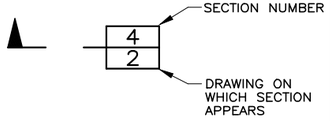

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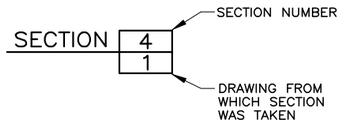

DETAIL IDENTIFICATION

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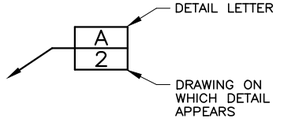
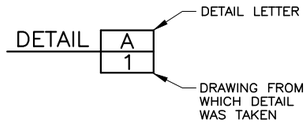


ON DRAWING NO. 2, THIS DETAIL IS IDENTIFIED AS:



NOTES:

1. IF SECTION CUT AND SECTION OR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON SAME DRAWING, DRAWING NUMBER IS REPLACED BY A LINE.

LEGEND

EOC — EOC	EDGE OF CONCRETE SUB-BASE
UDOT — UDOT	EXISTING BURIED UDOT CABLE
T-UG	EXISTING TELEPHONE LINE
P-UG	EXISTING ELECTRIC LINE
— — —	PROPERTY LINES
2-G	EXISTING GAS LINE W/ DIAMETER
8-W	EXISTING WATER LINE W/ DIAMETER
8-SS	EXISTING SEWER LINE W/ DIAMETER
8-SD	EXISTING STORM DRAIN LINE W/ DIAMETER
FO	EXISTING FIBER OPTICS LINE
WS	EXISTING WATER SERVICE
GS	EXISTING GAS SERVICE
	NEW STORM DRAIN OUTFALL
	FENCE LINE

	MANHOLE	WM	WATER METER
	POWER POLE		WATER VALVE
	LIGHT POLE		SURVEY MONUMENT
	FIRE HYDRANT		TREE

ABBREVIATIONS

CLR	=	CLEARANCE	OHP	=	OVERHEAD POWER LINE
DIA	=	DIAMETER	PE	=	PLAIN END
DIP	=	DUCTILE IRON PIPE	PSI	=	POUNDS PER SQUARE INCH
EL	=	ELEVATION	PVC	=	POLYVINYL CHLORIDE
FL	=	FLOW LINE	ROW	=	RIGHT OF WAY
FLG	=	FLANGE	HP	=	HIGH PRESSURE
ID	=	INSIDE DIAMETER	SQ	=	SQUARE
MAX	=	MAXIMUM	STA	=	STATION
MIN	=	MINIMUM	THD	=	THREAD
MJ	=	MECHANICAL JOINT	TYP	=	TYPICAL
NTS	=	NOT TO SCALE	UBC	=	UNTREATED BASE COURSE

PROFESSIONAL ENGINEER — No. 12390282-2202 — GARRICK D. STEPHENSON — 2/24/2025 — STATE OF UTAH

PROJECT ENGINEER

INDEX OF DRAWINGS

SURVEY CONTROL

THE PROJECT CONTROL WAS COMPILED USING G.P.S. (RTK) REAL TIME KINEMATIC METHODS AVERAGED AT A MINIMUM OF 180 TIMES.

CONTROL WAS ESTABLISHED BASED ON A SINGLE LOCAL SITE MONUMENTS WITH THE BASE PROJECT COORDINATE ESTABLISHED ON POINT NUMBER 101 BEING A SALT LAKE COUNTY MOUMENT, 3S3E058A ALTA. DISTANCES ARE STATE PLANE GRID (UTAH CENTRAL – 4302, NAD 83, GEOID 18, US SURVEY FEET) COORDINATES ARE AS FOLLOWS:

BASE PROJECT COORDINATE: N = 7383929.340 E = 1602908.405
BASE PROJECT ELEVATION: 8665.664 (NAVD 88)

GENERAL NOTES

1. THE CONTRACTOR SHALL MEET ALL UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY AND U.S. EPA REQUIREMENTS, INCLUDING REQUIREMENTS FOR PUBLIC DRINKING WATER SYSTEMS.
2. TRAFFIC CONTROL SHALL BE PROVIDED DURING CONSTRUCTION. TRAFFIC CONTROL SHALL COMPLY WITH APPLICABLE STATE AND LOCAL REQUIREMENTS.
3. UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES, INCLUDING WATER LINES, IRRIGATION LINES, GAS LINES, TELECOMMUNICATIONS CABLES, ETC. AND ANY OTHER OBSTRUCTION DURING THE COURSE OF CONSTRUCTION AND INSTALLATION OF THE PIPELINES. CONTRACTOR SHALL CALL BLUE STAKES (811) BEFORE BEGINNING CONSTRUCTION. UTILITIES DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO A CONDITION AT LEAST EQUAL TO THEIR ORIGINAL CONDITION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN RIGHT OF INGRESS AND EGRESS SHOULD HE VENTURE ONTO PRIVATE PROPERTY WHICH IS NOT INCLUDED IN APPROVED RIGHTS-OF-WAY AND EASEMENTS.
5. UNLESS DETAILED, SPECIFIED OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS OR IN SPECIFIC DRAWINGS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT ALL EXISTING IMPROVEMENTS DURING CONSTRUCTION AND SHALL REPLACE OR RESTORE ANY IMPROVEMENTS DAMAGED AS A RESULT OF THE CONSTRUCTION ACTIVITY, AS DIRECTED BY THE ENGINEER.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
8. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
9. CONTRACTOR SHALL POT HOLE UTILITIES AT ALL CROSSINGS SUFFICIENTLY IN ADVANCE OF LAYING PIPE TO ALLOW FOR ADJUSTMENTS OF NEW PIPELINE GRADE TO AVOID CONFLICT.
10. CONTRACTOR SHALL REPLACE SURVEY MONUMENTS DAMAGED DURING CONSTRUCTION. SURVEY MONUMENTS TO BE REPLACED BY A LICENSED LAND SURVEYOR.
11. DIMENSIONS SHOWN ARE TO THE CENTER OF THE PIPELINE UNLESS OTHERWISE NOTED.
12. DISTANCES SHOWN ALONG PIPELINES ARE HORIZONTAL DISTANCES AND NOT ACTUAL PIPE LENGTHS. MORE PIPE MAY BE REQUIRED TO COMPLETE CONSTRUCTION THAN IS DIMENSIONED IN THE PLANS.
13. CONTRACTOR IS REQUIRED TO HAVE A SET OF APPROVED PLANS ON THE SITE AT ALL TIMES.
14. CONTRACTOR IS RESPONSIBLE FOR PROVIDING WATER NECESSARY FOR DUST ABATEMENT, COMPACTION, ETC.

GENERAL NOTES (CONTINUED)

15. ANY WORK DONE WITHIN A PUBLIC RIGHT-OF-WAY SHALL BE COORDINATED WITH THE APPROPRIATE TRANSPORTATION AGENCY AND SHALL MEET THE REQUIREMENTS OF THAT AGENCY AND THE REQUIREMENTS OF ANY RIGHT-OF-WAY OR SPECIAL USE PERMITS.
16. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONS NECESSARY TO INSURE THAT NO STORM WATER/SEDIMENT AND/OR CONSTRUCTION DEBRIS ARE RELEASED FROM THE SITE. ANY RELEASES SHALL BE CLEANED AND MITIGATED AT THE CONTRACTOR'S EXPENSE.
17. CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACCESS AND RELATED TRAFFIC CONTROL WITH THE OWNER. CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO THE OWNER.
18. CONTRACTOR SHALL PROVIDE A STORM WATER POLLUTION PREVENTION PLAN. IF REQUIRED BY LOCAL OR STATE AUTHORITIES.

WATER PIPELINE NOTES

1. CONTACT TOWN OF ALTA AT LEAST 72 HOURS IN ADVANCE OF ALL WATER SHUTDOWNS.
2. MINIMUM COVER OVER TOP OF PIPE SHALL BE 5-FEET, UNLESS A DEPTH INDICATED WITH A SPECIFIC SLOPE IS SHOWN OTHERWISE.
3. CONTRACTOR TO PROVIDE ADDITIONAL TEMPORARY BLOW OFF VALVES & FITTINGS IF NEEDED TO FLUSH & DISINFECT NEW WATERLINES. PROVIDE PLAN TO TOWN OF ALTA FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. TEMPORARY BLOWOFF & FITTINGS SHALL BE REMOVED PRIOR TO PUTTING NEW LINE INTO SERVICE.
4. THE MINIMUM SLOPE OF THE WATER LINE SHALL BE 0.3%, UNLESS INDICATED OTHERWISE, WITH NO LOCAL HIGH POINTS EXCEPT AS INDICATED ON THE DRAWINGS.
5. DEFLECTIONS IN PIPE JOINTS SHALL NOT EXCEED 1 DEGREES FOR PVC/DIP PIPE, OR MANUFACTURER'S PUBLISHED DEFLECTIONS.
6. USE MEGALUG PACK JOINT RESTRAINT (OR OTHER APPROVED EQUAL JOINT RESTRAINT) AT ALL BENDS, FITTINGS, VALVES, ETC.
7. ALL DUCTILE OR CAST IRON PIPE AND ALL COMPRESSION COUPLINGS, MECHANICAL JOINTS, FLANGED JOINTS, VALVES, HYDRANTS AND FITTINGS INCLUDING TEES, WYES, ELBOWS, PLUGS, ETC. EXPOSED TO SOIL SHALL BE WRAPPED WITH 8 MIL THICK POLYETHYLENE FILM TUBE. ALL FITTINGS, VALVES AND EXPOSED NUTS & BOLTS SHALL BE LIBERALLY COATED WITH FM GREASE PRIOR TO WRAPPING. THE FILM SHALL BE HELD IN PLACE BY 2-INCH WIDE PLASTIC BACKED ADHESIVE TAPE EQUAL TO POLYKEN NO. 900 OR SCOTCHRAP NO. 50. THE TAPE SHALL BE INSTALLED TO TIGHTLY SECURE THE FILM TO THE PIPE. ENOUGH FILM SHALL BE USED TO OVERLAP ADJOINING SECTIONS OF FILM A MINIMUM OF ONE (1) FOOT.
8. VALVES SHALL BE WRAPPED BY BRINGING THE WRAP ON THE ADJACENT PIPE OVER THE BELLS OR FLANGES OF THE VALVE AND SEALING WITH THE ADHESIVE TAPE. THE VALVE BODIES ARE THEN WRAPPED WITH A FLAT SHEET OF THE FILM PASSED UNDER THE VALVE BOTTOM AND BROUGHT UP AROUND THE BODY TO THE STEM AND FASTENED IN PLACE WITH THE ADHESIVE TAPE.
9. ANY FITTINGS THAT REQUIRE CONCRETE BLOCKING SHOULD BE COMPLETELY WRAPPED PRIOR TO THE POURING OF THE CONCRETE THRUSTING BLOCK.
10. POLYETHYLENE WRAP SHALL BE PROTECTED FROM THE SUN AND WEATHERING PRIOR TO USE. CARE SHALL BE EXERCISED DURING BACK FILLING OF THE PROTECTED AREAS TO PREVENT PUNCTURING OF THE FILM.
11. CONTRACTOR SHALL COVER AND SEAL ALL OPEN ENDS OF PIPELINE AT THE END OF EACH DAY'S WORK.
12. ALL TRANSMISSION LINE COMPONENTS SHALL HAVE NSF/ANSI 61 CERTIFICATION.
13. ALL TRANSMISSION LINE COMPONENTS SHALL BE LEAD FREE AS DEFINED BY THE SAFE DRINKING WATER ACT..
14. PIPE SHALL NOT BE DROPPED INTO THE TRENCH DURING CONSTRUCTION.
15. THE BENDING RADIUS IN THE HDPE PIPE SHALL NOT EXCEED 100 FEET, OR MANUFACTURER'S PUBLISHED RECOMMENDATIONS.

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\G-2 INDEX.DWG
FILE DATE: 2.24.2025 13:36:30 (GDS)

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DRAFTED	DD	2					
CHECKED	DWJ	1					
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS		BY	APVD.

SCALE: NOT TO SCALE

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
GENERAL
GENERAL NOTES, LEGEND & INDEX OF DRAWINGS

SHEET G-2

528.02.100

7/04

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\G-3 SHEET LOCATOR.DWG
FILE DATE: 2.24.2025 13:37:58 (GDS)

HANSEN ALLEN & LUCE Inc. ENGINEERS

PROFESSIONAL ENGINEER No. 12390282-2202 GARRICK D. STEPHENSON 2/24/2025 STATE OF UTAH

DESIGNED	GDS	3				
DRAFTED	DD	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
GENERAL
SHEET LOCATOR

SHEET G-3
528.02.100

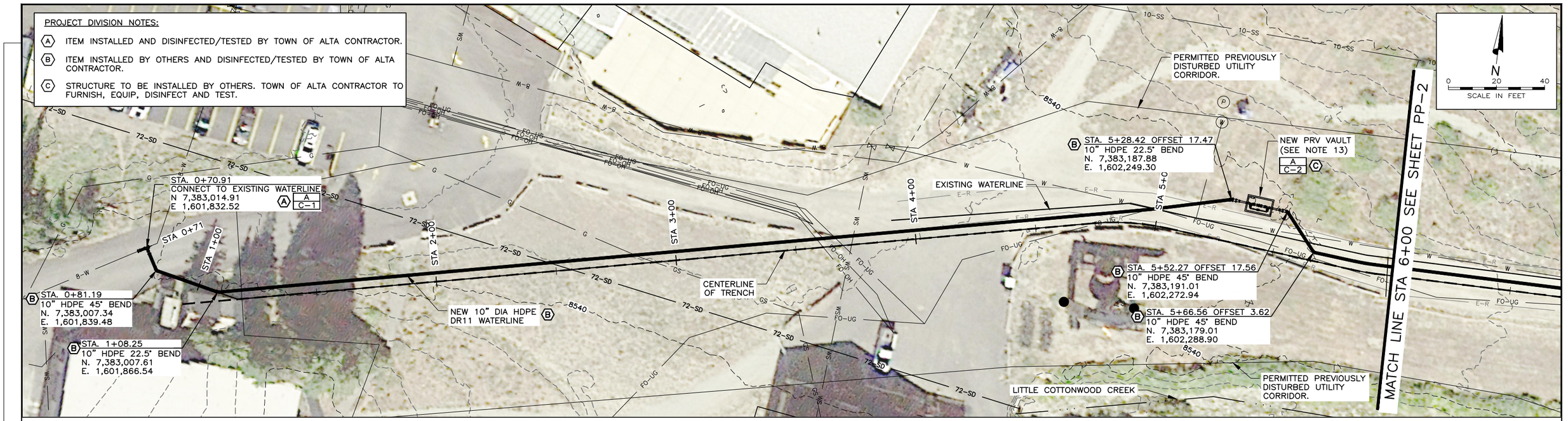
7/04

PROJECT DIVISION NOTES:

(A) ITEM INSTALLED AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.

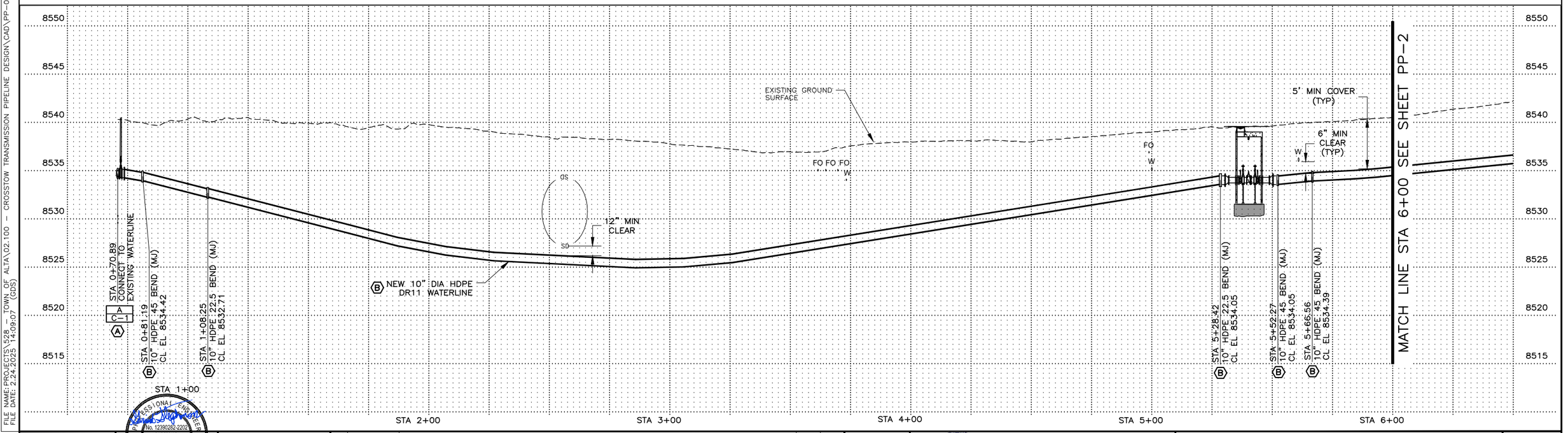
(B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.

(C) STRUCTURE TO BE INSTALLED BY OTHERS. TOWN OF ALTA CONTRACTOR TO FURNISH, EQUIP, DISINFECT AND TEST.



NOTES:

1. CONTRACTOR SHALL POTHOLE UTILITIES AT ALL CROSSINGS SUFFICIENTLY IN ADVANCE OF LAYING PIPE TO ALLOW FOR ADJUSTMENTS OF NEW PIPELINE GRADE TO AVOID CONFLICTS AND WORK DELAYS.
2. EXISTING UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR MUST FIELD VERIFY ALL EXISTING UTILITIES.
3. BENDING RADIUS OF HDPE PIPE SHALL NOT EXCEED 100 FEET OR MANUFACTURER'S PUBLISHED ALLOWED DEFLECTION, WHICHEVER IS LESS.
4. TEST PRESSURE FOR PIPE SHALL BE 200 PSI.
5. ALL HDPE JOINTS AND FITTINGS SHALL BE FUSED UNLESS SHOWN OTHERWISE.
6. VERTICAL CHANGES WITHIN TRENCH SHALL NOT EXCEED MANUFACTURER'S SPECIFICATIONS.
7. MINIMUM SLOPE OF WATERLINE SHALL BE 0.3%.
8. EXISTING WATERLINE TO BE PROTECTED AND REMAIN IN SERVICE FOR ENTIRE CONSTRUCTION PROCESS.
9. USE NATIVE SEED MIX FOR ALL DISTURBED AREAS IN UNIMPROVED AREAS PER SPECIFICATIONS.
10. RESTORE EXISTING TRAILS+GRAVEL ROADS WITH 6" MIN. THICKNESS OF UTBC. COMPACTION 96% IN ACCORDANCE WITH ASTM D1557.
11. RESTORE ASPHALT MATCHING EXISTING THICKNESS (4" MIN), WITH 8" MIN UTBC. COMPACTION 96% IN ACCORDANCE WITH ASTM D1557.
12. COORDINATES SHOWN ARE THE WATERLINE LOCATION (NOT THE CENTERLINE OF TRENCH).
13. FINAL LOCATION TO BE FIELD DETERMINED BASED UPON PERMIT CONCERNS INCLUDING DISTURBED AREA, EXISTING VEGETATION, AND POTENTIAL SURFACE ACCESS CONFLICTS.



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HANSEN ALLEN & LUCE, INC. ENGINEERS

REGISTERED PROFESSIONAL ENGINEER — No. 12390282-2202 — GARRICK D. STEPHENSON — 2/24/2025 — STATE OF UTAH
PROJECT ENGINEER

DESIGNED	GDS	3			
DRAFTED	DD	2			
CHECKED	DWJ	1			
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY / APVD.

SCALE: AS SHOWN

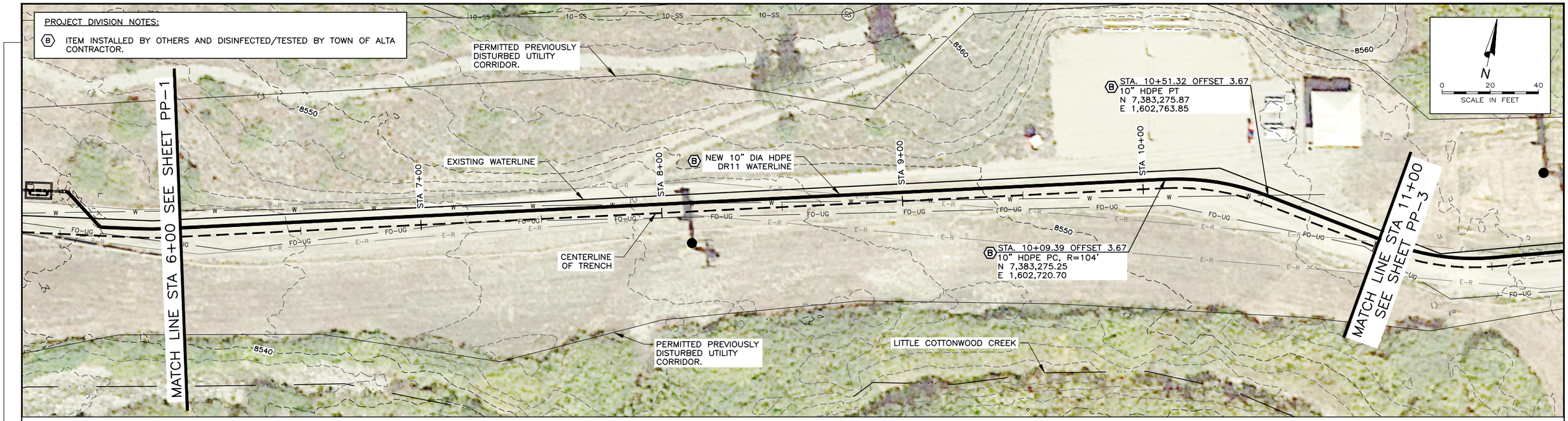
TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 0+70 TO STA 6+00

SHEET PP-1

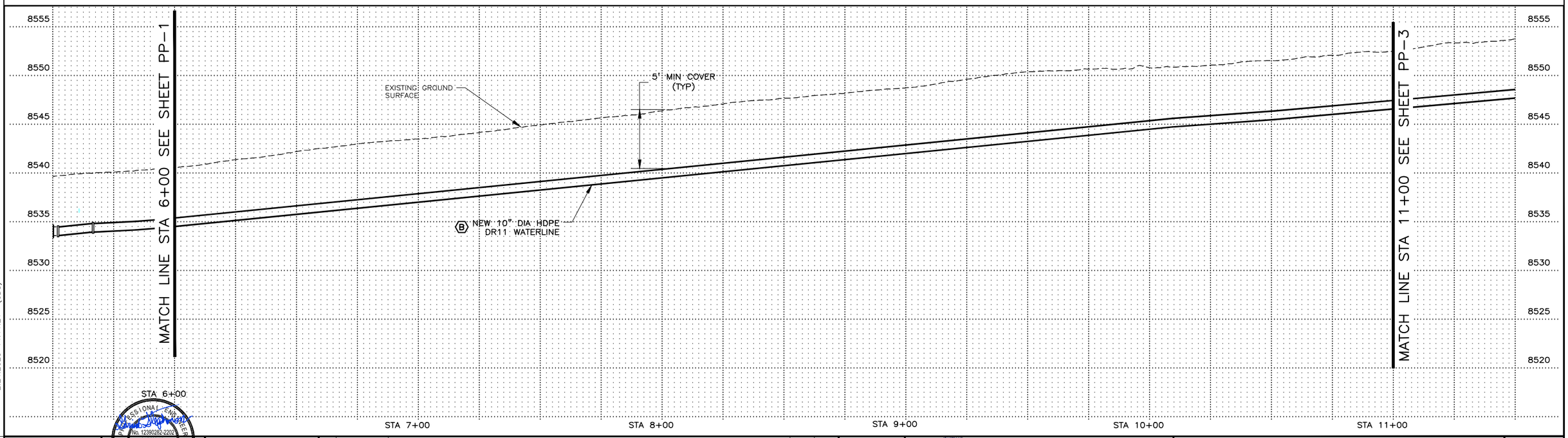
528.02.100

7/04



NOTES:

1. CONTRACTOR SHALL POTHOLE UTILITIES AT ALL CROSSINGS SUFFICIENTLY IN ADVANCE OF LAYING PIPE TO ALLOW FOR ADJUSTMENTS OF NEW PIPELINE GRADE TO AVOID CONFLICTS AND WORK DELAYS.
2. EXISTING UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR MUST FIELD VERIFY ALL EXISTING UTILITIES.
3. BENDING RADIUS OF HDPE PIPE SHALL NOT EXCEED 100 FEET OR MANUFACTURER'S PUBLISHED ALLOWED DEFLECTION, WHICHEVER IS LESS.
4. TEST PRESSURE FOR PIPE SHALL BE 200 PSI.
5. ALL HDPE JOINTS AND FITTINGS SHALL BE FUSED UNLESS SHOWN OTHERWISE.
6. VERTICAL CHANGES WITHIN TRENCH SHALL NOT EXCEED MANUFACTURER'S SPECIFICATIONS.
7. MINIMUM SLOPE OF WATERLINE SHALL BE 0.3%.
8. EXISTING WATERLINE TO BE PROTECTED AND REMAIN IN SERVICE FOR ENTIRE CONSTRUCTION PROCESS.
9. USE NATIVE SEED MIX FOR ALL DISTURBED AREAS IN UNIMPROVED AREAS PER SPECIFICATIONS.
10. RESTORE EXISTING TRAILS+GRAVEL ROADS WITH 6" MIN. THICKNESS OF UTBC. COMPACTION 96% IN ACCORDANCE WITH ASTM D1557.
11. RESTORE ASPHALT MATCHING EXISTING THICKNESS (4" MIN), WITH 8" MIN UTBC. COMPACTION 96% IN ACCORDANCE WITH ASTM D1557.
12. COORDINATES SHOWN ARE THE WATERLINE LOCATION (NOT THE CENTERLINE OF TRENCH).



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FILE DATE: 2.24.2025 14:1:21 (GDS)

HANSEN ALLEN & LUCE ENGINEERS

GARRICK D. STEPHENSON No. 12390282-2202 PROFESSIONAL ENGINEER STATE OF UTAH 2/24/2025

PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	DD	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE: AS SHOWN

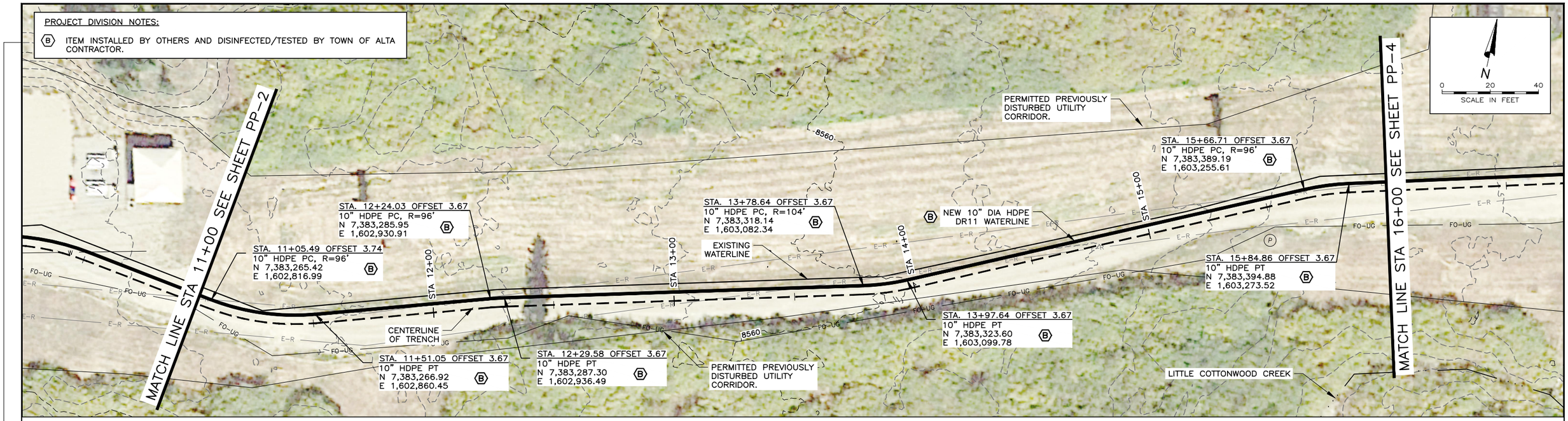
TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 6+00 TO STA 11+00

SHEET PP-2

528.02.100

7/04



NOTES:

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5. ALL HDPE JOINTS AND FITTINGS SHALL BE FUSED UNLESS SHOWN OTHERWISE.
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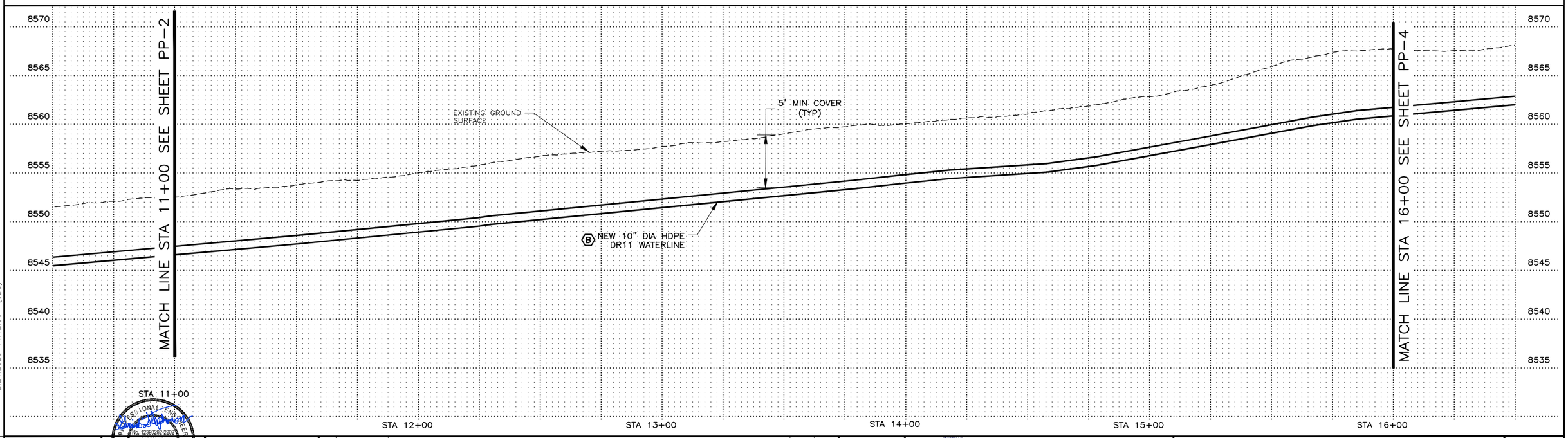


FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-03.DWG
FILE DATE: 2.24.2025 14:12:50 (GDS)

HANSEN ALLEN & LUCE, INC. ENGINEERS

PROFESSIONAL ENGINEER No. 12390282-2202 GARRICK D. STEPHENSON 2/24/2025 STATE OF UTAH
PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	DD	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE: AS SHOWN

TOWN OF ALTA

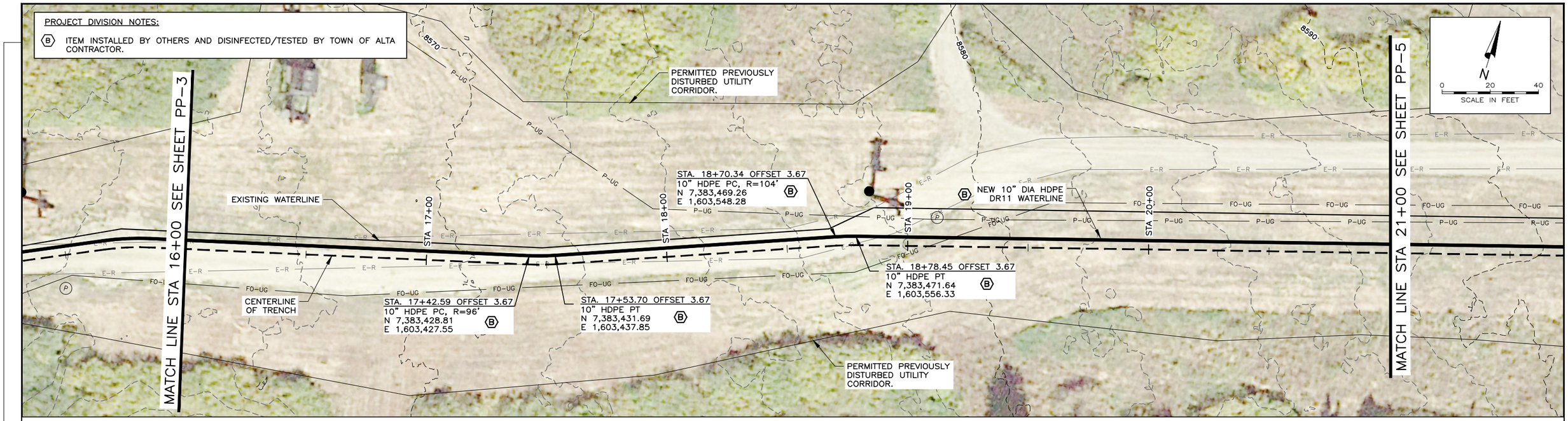
CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 11+00 TO STA 16+00

SHEET: PP-3
528.02.100

7/04

PROJECT DIVISION NOTES:

(B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.



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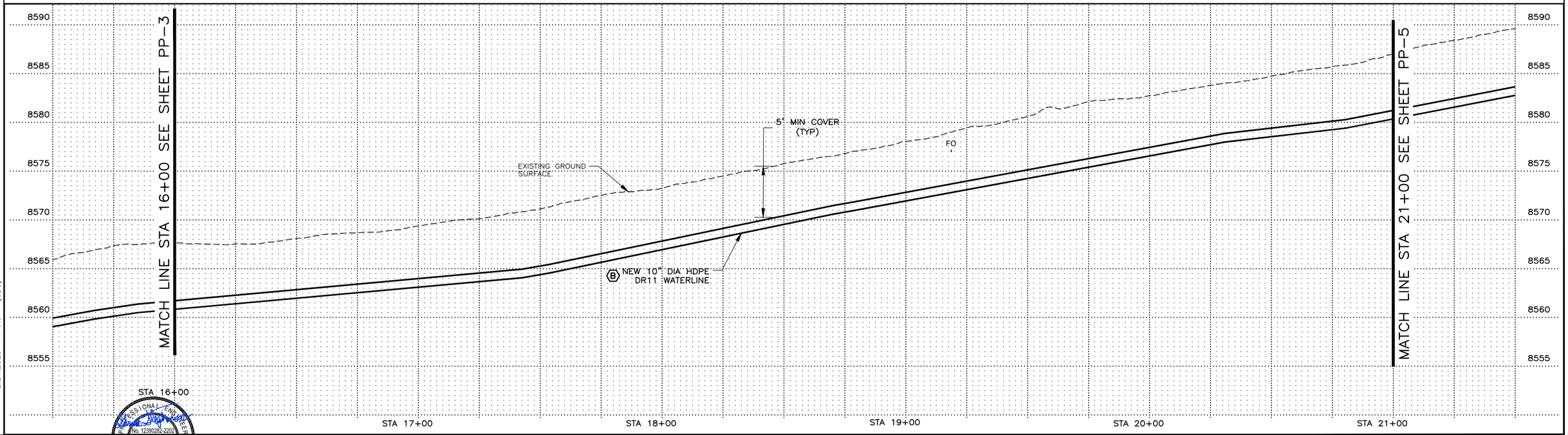


DESIGNED	GDS	3					
DRAFTED	DD	2					
CHECKED	DWJ	1					
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS		BY	APVD.

PROJECT ENGINEER

HANSEN ALLEN & LUCE INC. ENGINEERS

SCALE AS SHOWN

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 16+00 TO STA 21+00

SHEET PP-4

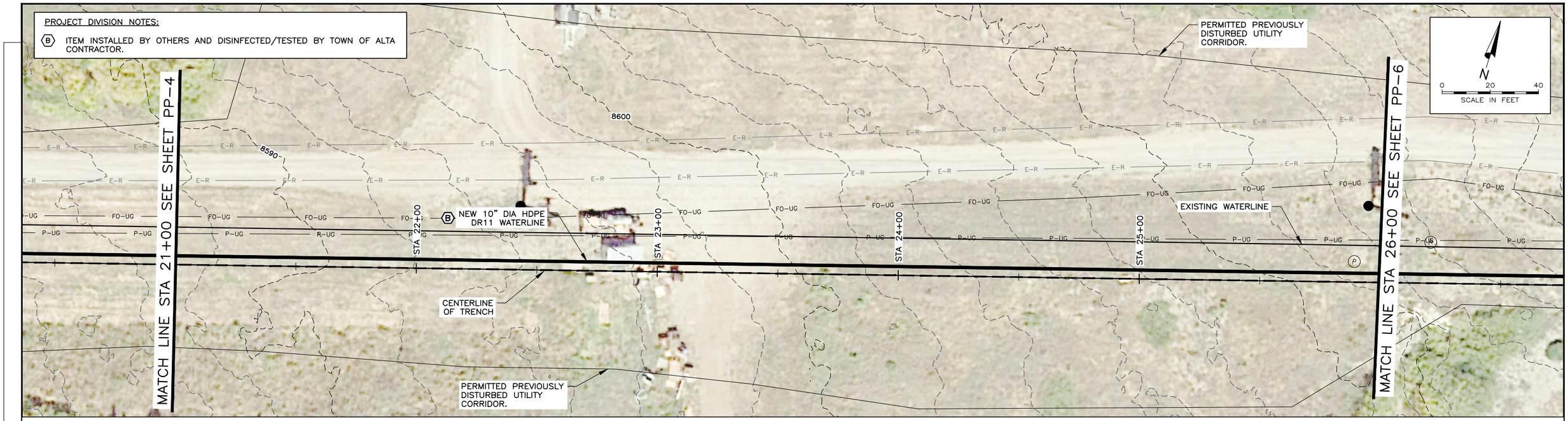
528.02.100

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-04.DWG
FILE DATE: 2.24.2025 14:16:07 (GDS)

7/04

PROJECT DIVISION NOTES:

(B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.



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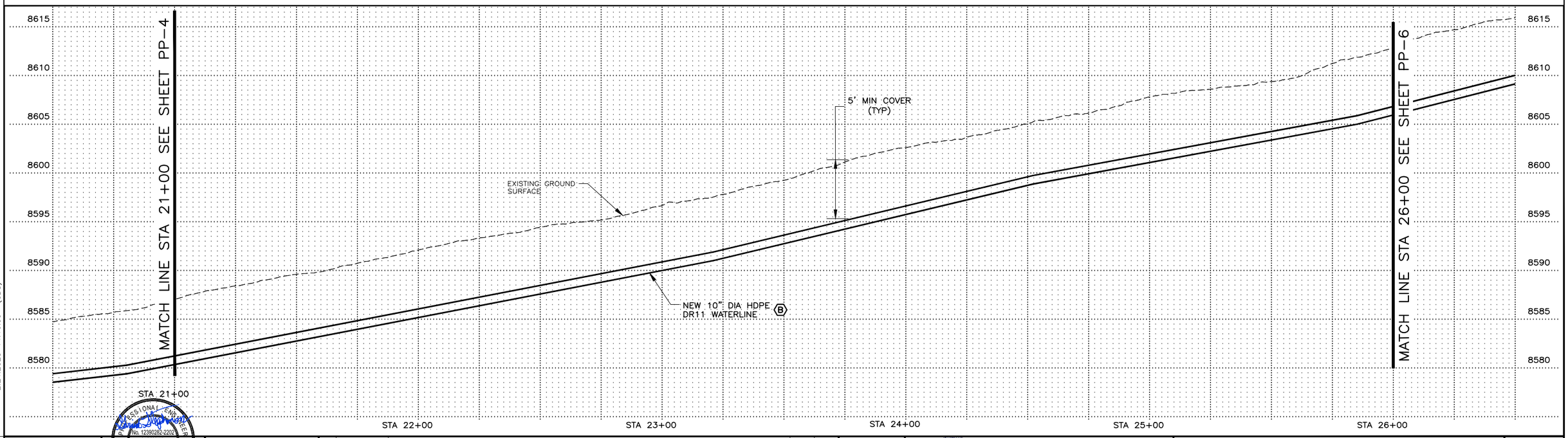


FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-05.DWG
FILE DATE: 2.24.2025 14:16:39 (GDS)

HANSEN ALLEN & LUCE INC. ENGINEERS

PROFESSIONAL ENGINEER No. 12390282-2202 GARRICK D. STEPHENSON 2/24/2025 STATE OF UTAH

PROJECT ENGINEER

DESIGNED	GDS	3			
DRAFTED	DD	2			
CHECKED	DWJ	1			
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY / APVD.

SCALE: AS SHOWN

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 21+00 TO STA 26+00

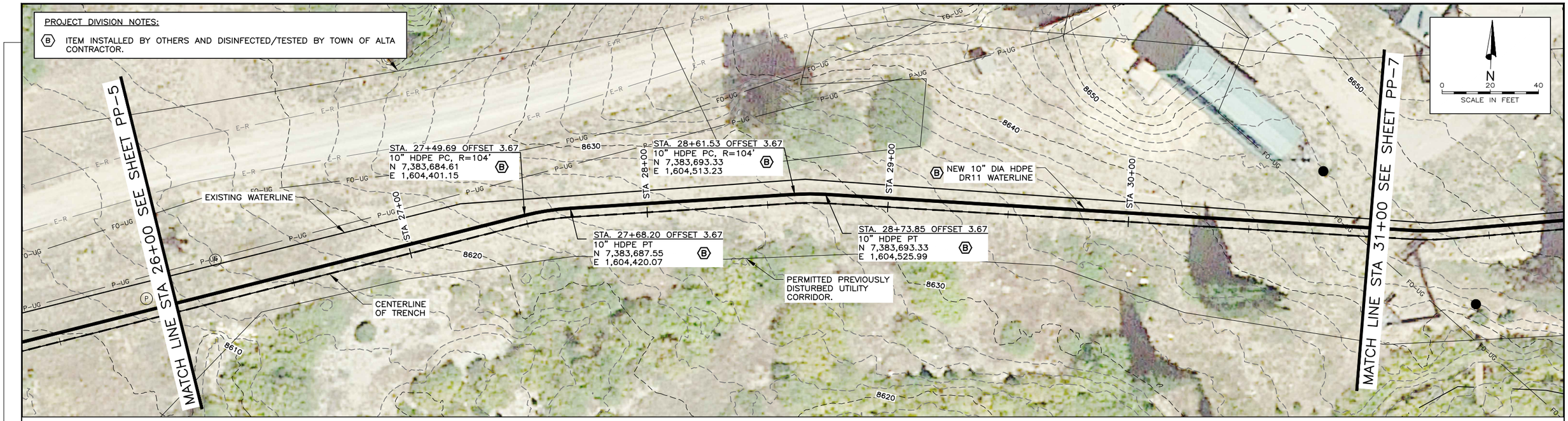
SHEET PP-5

528.02.100

7/04

PROJECT DIVISION NOTES:

(B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.



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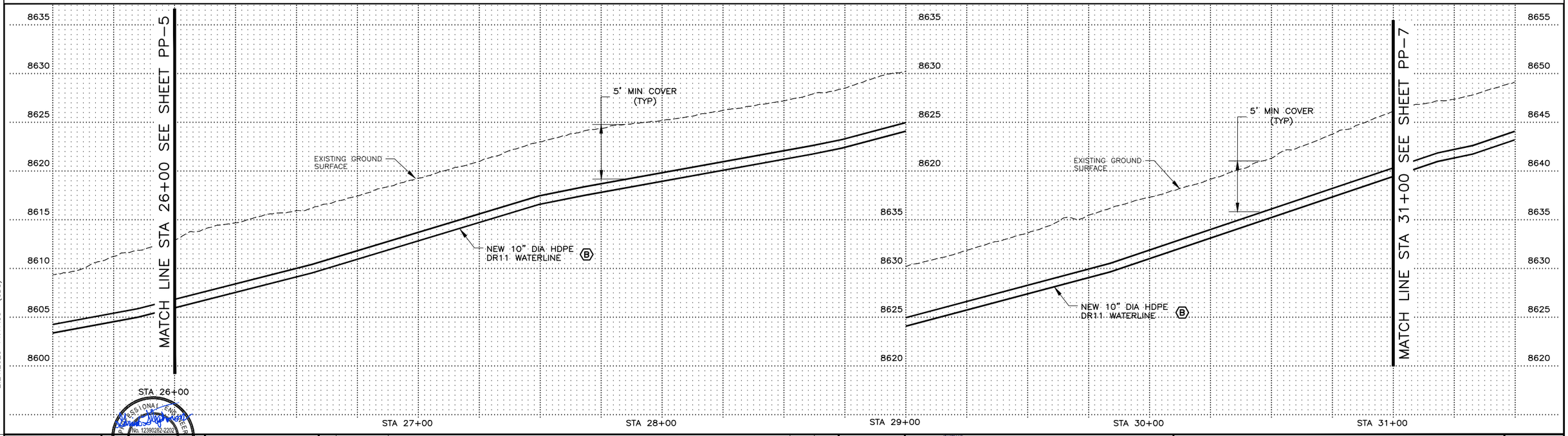


PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	DD	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE: AS SHOWN

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 26+00 TO STA 31+00

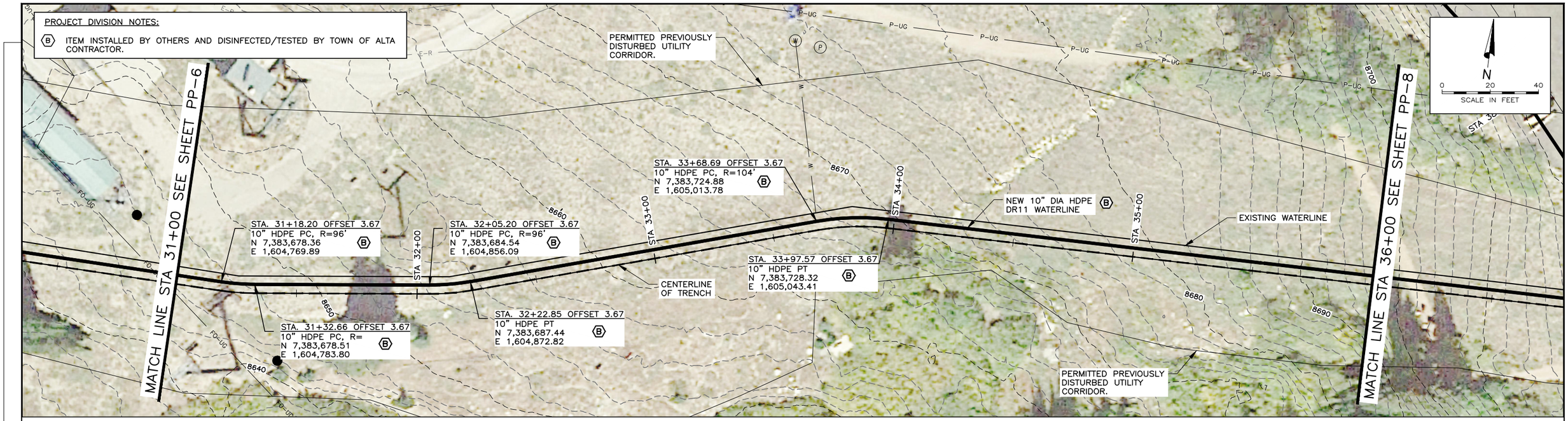
SHEET: PP-6

528.02.100

HANSEN ALLEN & LUCE ENGINEERS

7/04

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-06.DWG
FILE DATE: 2.24.2025 14:17:55 (GDS)



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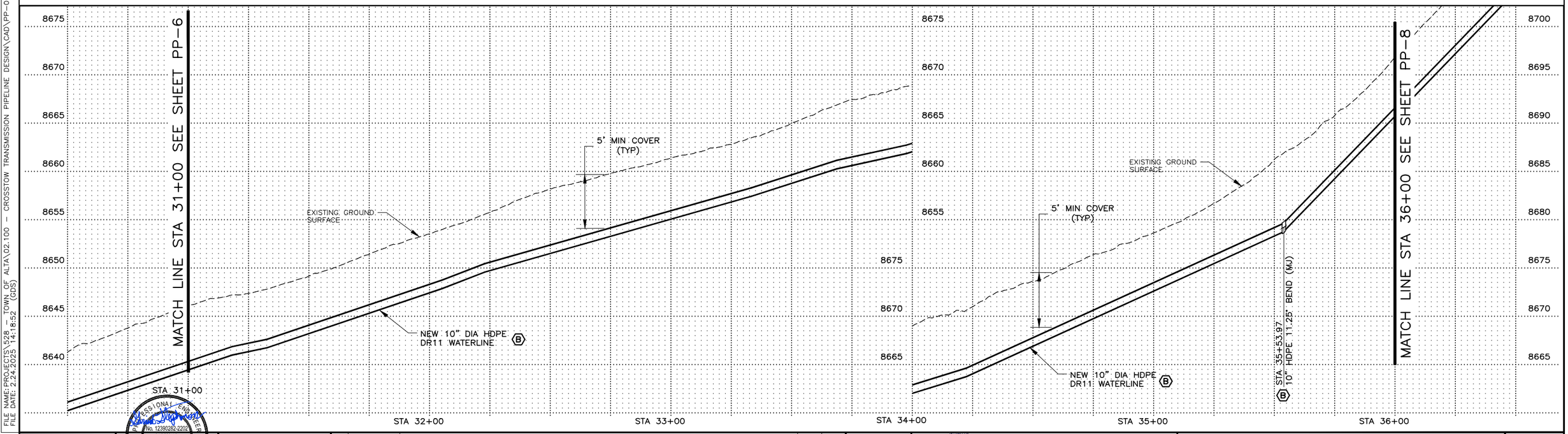


FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-07.DWG
FILE DATE: 2.24.2025 14:18:52 (GDS)

HANSEN ALLEN & LUCE INC. ENGINEERS

GARRICK D. STEPHENSON No. 12390282-2202 PROFESSIONAL ENGINEER STATE OF UTAH 2/24/2025

PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	DD	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE AS SHOWN

TOWN OF ALTA

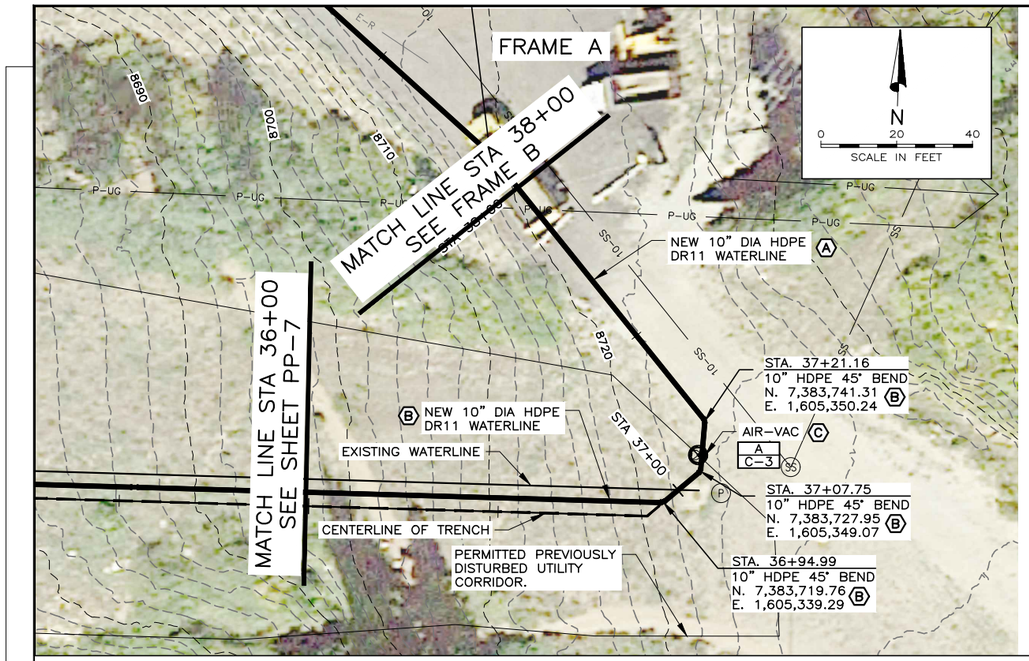
TOWN OF ALTA

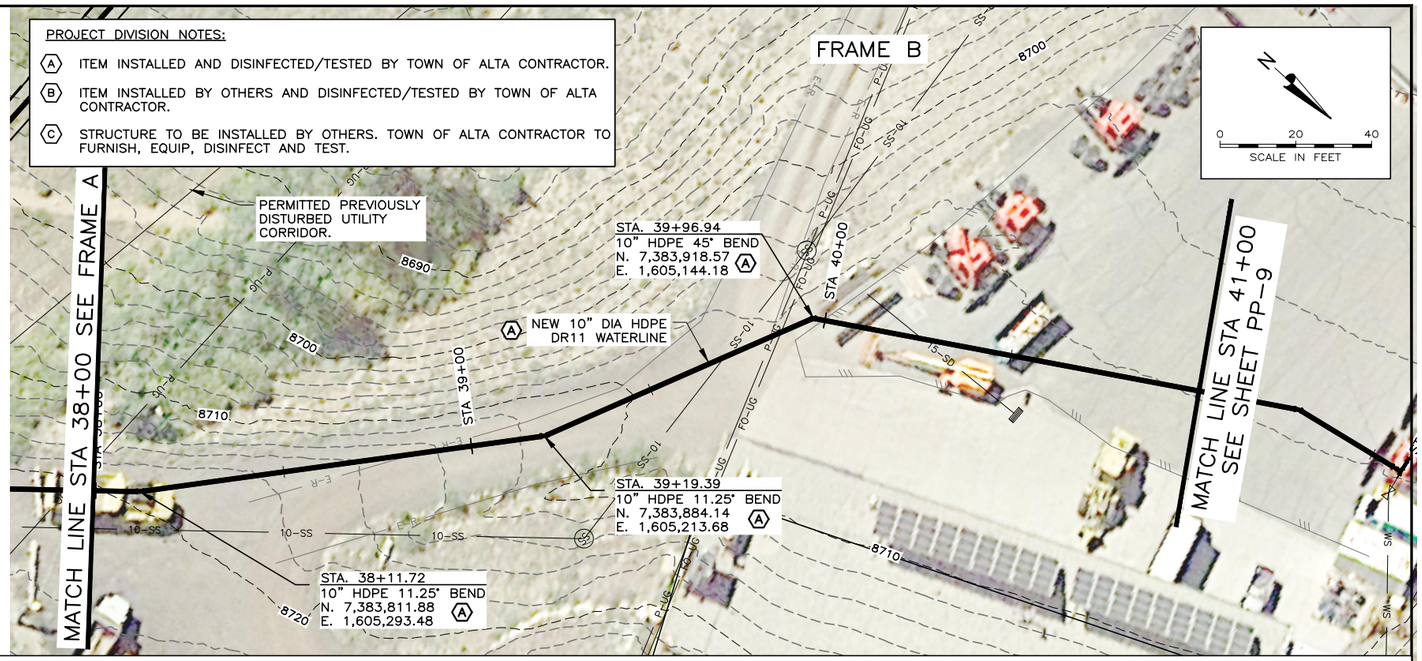
CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 31+00 TO STA 36+00

SHEET PP-7

528.02.100

7/04





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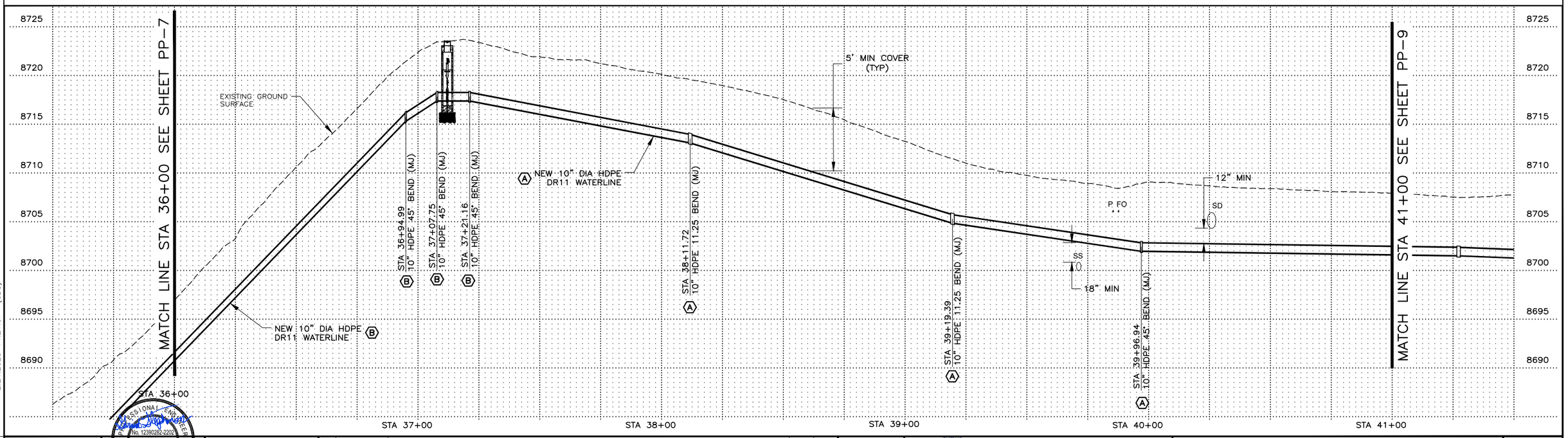

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-08.DWG
FILE DATE: 2.24.2025 14:21:07 (GDS)

HANSEN ALLEN & LUCE INC. ENGINEERS

PROFESSIONAL ENGINEER No. 12390282-2202 GARRICK D. STEPHENSON 2/24/2025 STATE OF UTAH

PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	DD	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE AS SHOWN

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 36+00 TO STA 41+00

SHEET PP-8

528.02.100

7/04

PROJECT DIVISION NOTES:

(A) ITEM INSTALLED AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.

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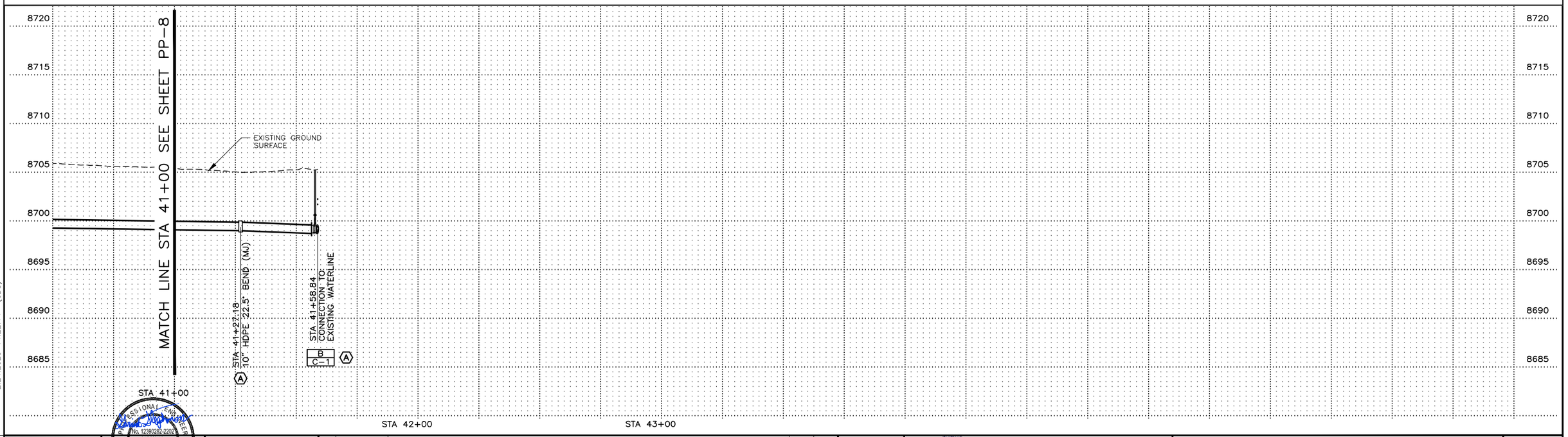


FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\PP-09.DWG
FILE DATE: 2.24.2025 14:22:14 (GDS)

HANSEN ALLEN & LUCE, INC. ENGINEERS

PROFESSIONAL ENGINEER — No. 12390262-2202 — GARRICK D. STEPHENSON — 2/24/2025 — STATE OF UTAH

PROJECT ENGINEER

DESIGNED	GDS	3			
DRAFTED	DD	2			
CHECKED	DWJ	1			
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY / APVD.

SCALE: AS SHOWN

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
PLAN & PROFILE
STA 41+00 TO STA 41+59

SHEET: PP-9

528.02.100

7/04

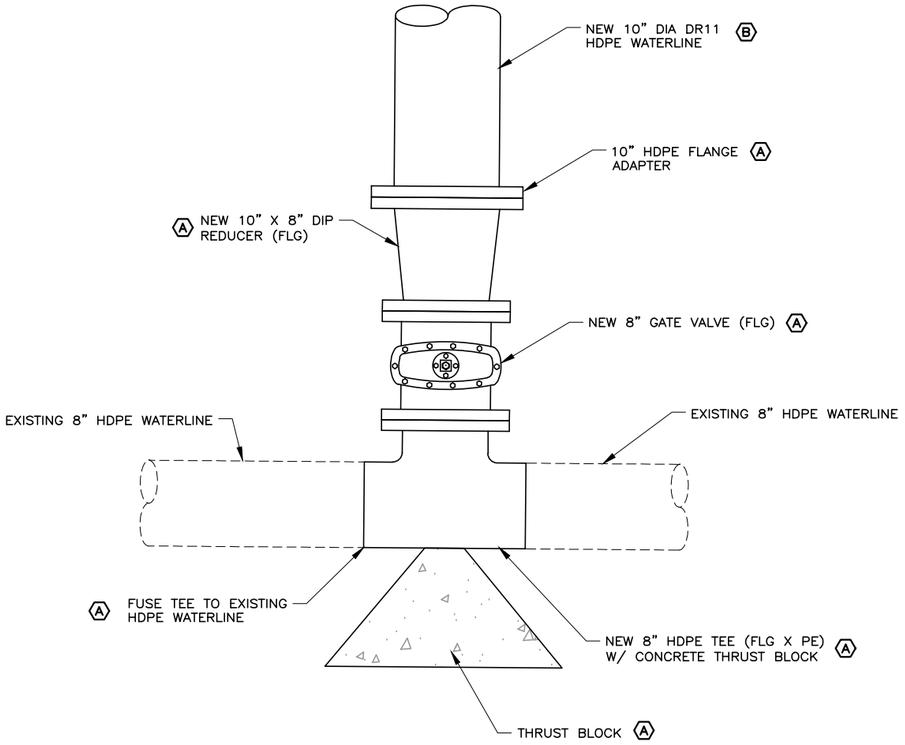
GENERAL SHEET NOTES:

1. INSTALL JOINT RESTRAINTS ON ALL MJ FITTINGS.

PROJECT DIVISION NOTES:

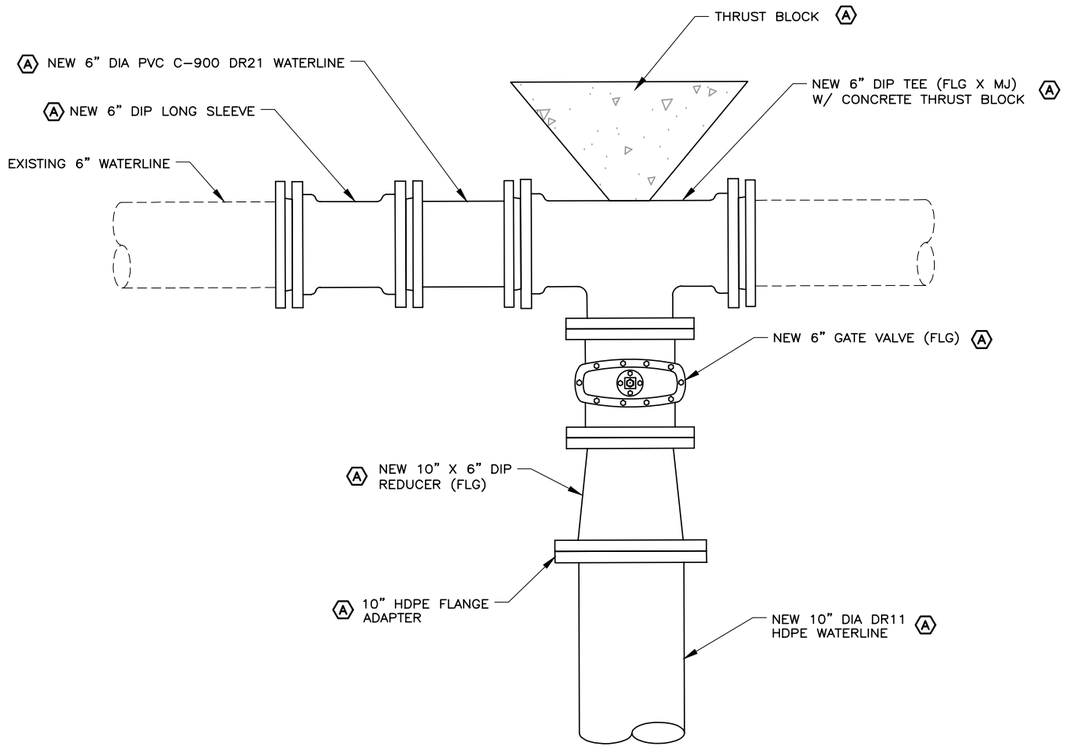
(A) ITEM INSTALLED AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.

(B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.



STA 0+70 CONNECTION — A / PP–1

NTS



STA 41+59 CONNECTION — B / PP–9

NTS

FILE NAME: PROJECTS\528 – TOWN OF ALTA\02.100 – CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\C–1 CONNECTION DETAILS.DWG
FILE DATE: 2.24.2025 13:51:54 (GDS)

HANSEN ALLEN & LUCE, Inc. ENGINEERS

PROFESSIONAL ENGINEER — No. 12390282-2202 — GARRICK D. STEPHENSON — 2/24/2025 — STATE OF UTAH

PROJECT ENGINEER

DESIGNED	GDS	3			
DRAFTED	DD	2			
CHECKED	DWJ	1			
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY / APVD.

SCALE: NOT TO SCALE

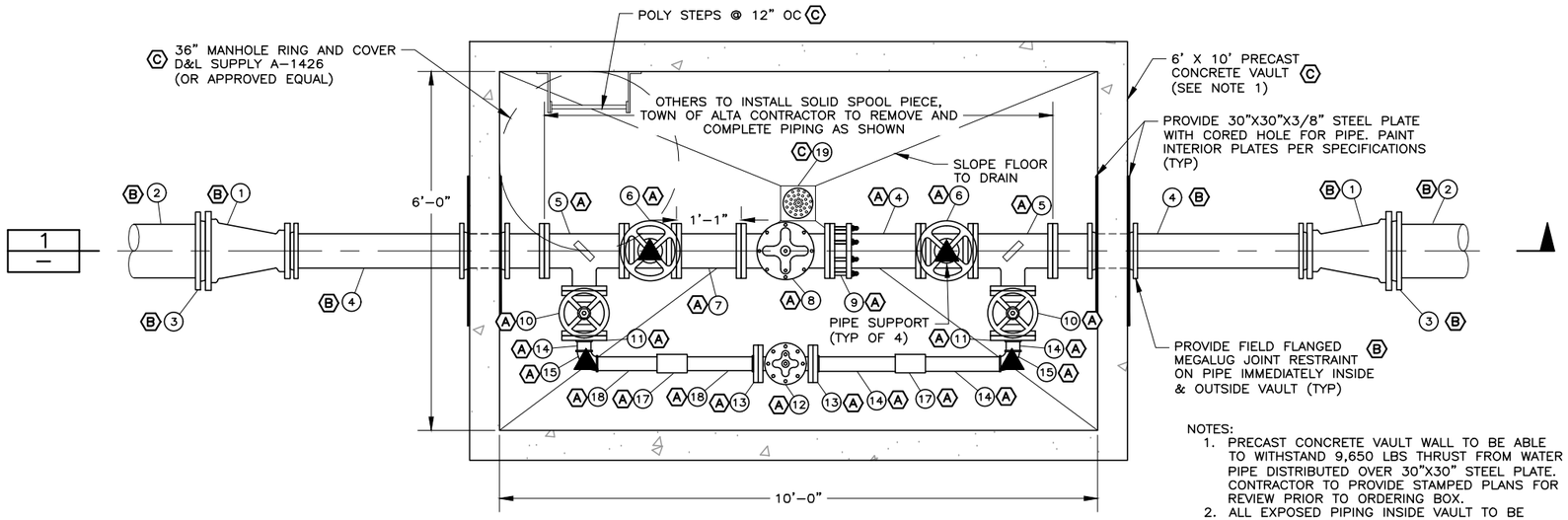
TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
CIVIL
CONNECTION DETAILS

SHEET: C–1

528.02.100

7/04



1
—

6" PRV VAULT PLAN — A / PP-2

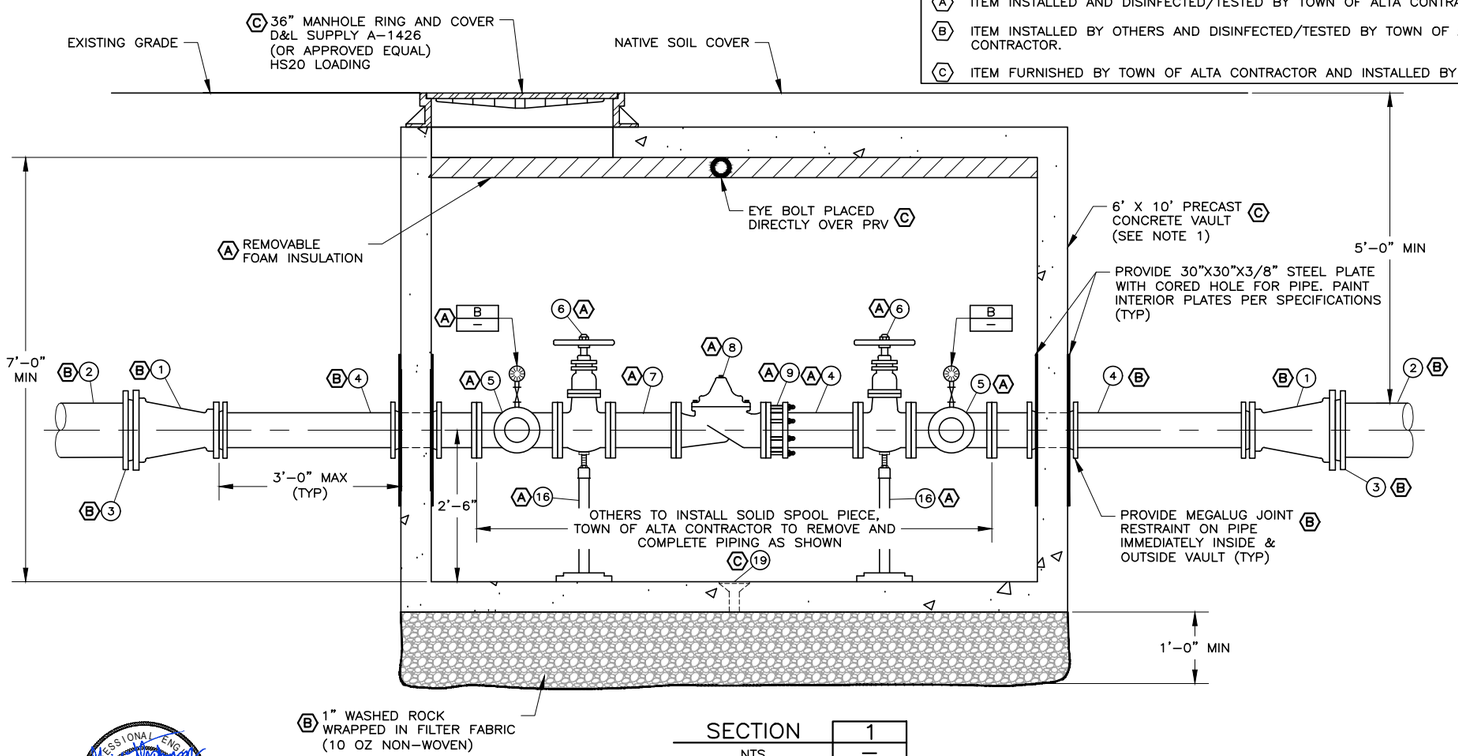
NTS

NOTES:

1. PRECAST CONCRETE VAULT WALL TO BE ABLE TO WITHSTAND 9,650 LBS THRUST FROM WATER PIPE DISTRIBUTED OVER 30"X30" STEEL PLATE. CONTRACTOR TO PROVIDE STAMPED PLANS FOR REVIEW PRIOR TO ORDERING BOX.
2. ALL EXPOSED PIPING INSIDE VAULT TO BE PAINTED PER SPECIFICATIONS.
3. ALL DUCTILE IRON PIPE AND FITTINGS LOCATED OUTSIDE OF THE VAULT SHALL BE POLYWRAPPED PER SPECIFICATIONS.
4. BRING TRACER WIRE INTO VAULT FOR CONTINUED CONNECTIVITY.

PROJECT DIVISION NOTES:

- (A) ITEM INSTALLED AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.
- (B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.
- (C) ITEM FURNISHED BY TOWN OF ALTA CONTRACTOR AND INSTALLED BY OTHERS.



SECTION — 1 / —

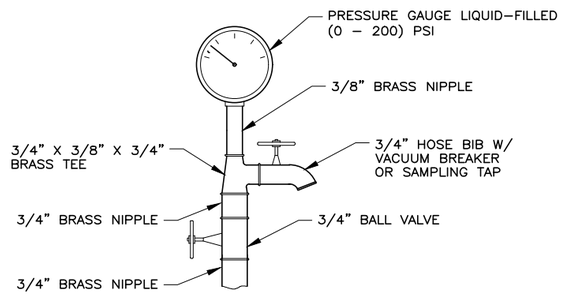
NTS

PIPE, VALVE & FITTING SCHEDULE

#	ITEM NAME	SIZE	JOINT	REMARKS
1	REDUCER WITH RESTRAINT	10" X 6"	MJ	
2	HDPE PIPE	10"	–	
3	HDPE MJ END COUPLING RESTRAINT	10"	MJ	
4	DUCTILE IRON PIPE	6"	FLG X PE	
5	TEE W/ 3/4" TAP	6" X 4"	FLG	PROVIDE BOSS
6	GATE VALVE	6"	FLG	MUELLER RESILIENT SEAT OR APPROVED EQUAL
7	SPOOL PIECE	6"	FLG	LENGTH AS SHOWN
8	PRESSURE REDUCING VALVE	6"	FLG	CLA-VAL 90-01 OR APPROVED EQUAL
9	DISMANTLING JOINT (NON-SLIP)	6"	FLG	ROMAC DJ400 OR EQUAL
10	GATE VALVE	4"	FLG	MUELLER RESILIENT SEAT OR APPROVED EQUAL
11	REDUCING FLANGE	6" X 2 1/2"	FLG X THD	
12	PRESSURE REDUCING VALVE	2 1/2"	FLG	CLA-VAL 90-01 OR APPROVED EQUAL
13	COMPANION FLANGE	2 1/2"	THD	
14	BRASS PIPE	2 1/2"	THD	
15	90° ELBOW (BRASS)	2 1/2"	THD	
16	PIPE SUPPORT	–	–	GRINNELL NO. 264 – 4 REQUIRED OR APPROVED EQUAL
17	UNION (BRASS)	2 1/2"	–	
18	BRASS PIPE	2 1/2"	THD X PE	
19	FLOOR DRAIN	3" X 9"	–	ZURN Z-960 OR APPROVED EQUAL

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL PIPE AND FITTINGS ARE DIP CLASS 53.
2. ALL PIPES AND FITTINGS TO BE ANSI/NSF61 CERTIFIED.



PRESSURE GAUGE DETAIL — B / —

NTS

FILE NAME: PROJECTS\528 – TOWN OF ALTA\02.100 – CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\C-2 6 INCH PRV PLAN & SECTION.DWG
FILE DATE: 2.24.2025 13:50:24 (GDS)

7/04

HANSEN ALLEN & LUCE ENGINEERS

PROFESSIONAL ENGINEER — No. 12390262-2202 — GARRICK D. STEPHENSON — 2/24/2025 — STATE OF UTAH

PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	GDS	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE

TOWN OF ALTA — STATE OF UTAH

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
CIVIL
6 INCH PRV VAULT PLAN & SECTION

SHEET C-2

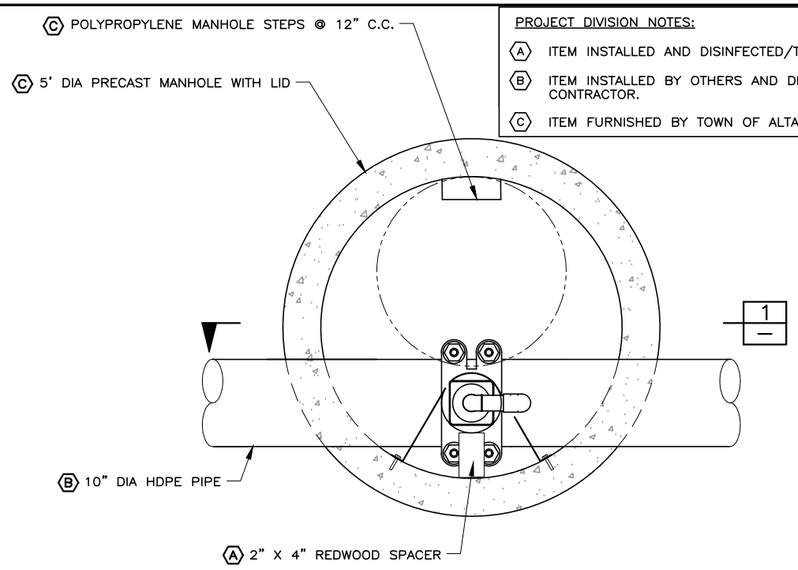
528.02.100

PROJECT DIVISION NOTES:

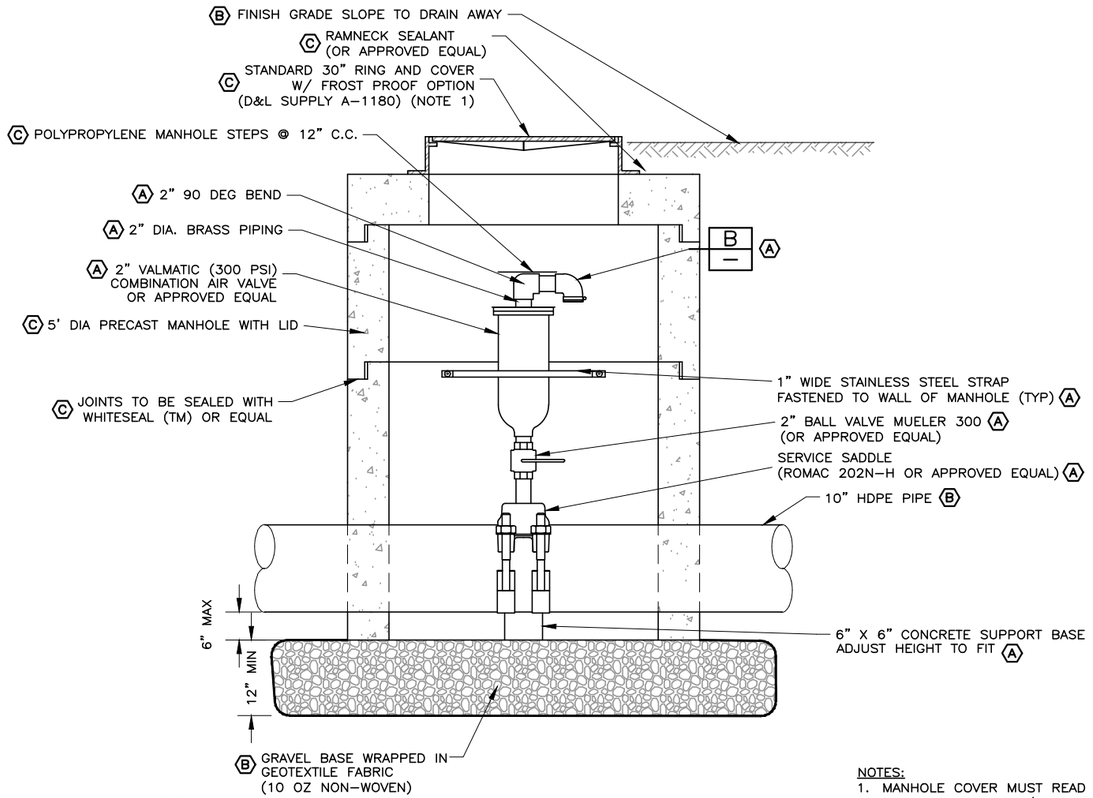
(A) ITEM INSTALLED AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.

(B) ITEM INSTALLED BY OTHERS AND DISINFECTED/TESTED BY TOWN OF ALTA CONTRACTOR.

(C) ITEM FURNISHED BY TOWN OF ALTA CONTRACTOR AND INSTALLED BY OTHERS.

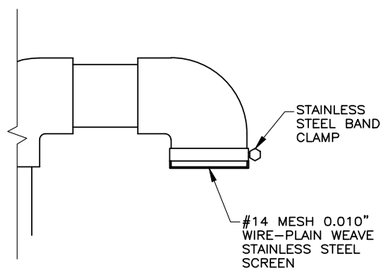


AIR RELEASE ASSEMBLY A PP-2



SECTION 1 — NTS

NOTES:
1. MANHOLE COVER MUST READ "WATER".
2. ALL AIR-VAC PIPING/FITTINGS INSIDE MANHOLE TO BE BRASS, UNLESS NOTED OTHERWISE.



MESH SCREEN DETAIL B — NTS

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\C-3 AIR-VAC MH DETAILS.DWG
FILE DATE: 2.24.2025 13:45:18 (GDS)

HANSEN ALLEN & LUCE, INC. ENGINEERS

PROFESSIONAL ENGINEER — No. 12390262-2202 — GARRICK D. STEPHENSON — 2/24/2025 — STATE OF UTAH

PROJECT ENGINEER

DESIGNED	GDS	3			
DRAFTED	GDS	2			
CHECKED	DWJ	1			
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY / APVD.

SCALE: NOT TO SCALE

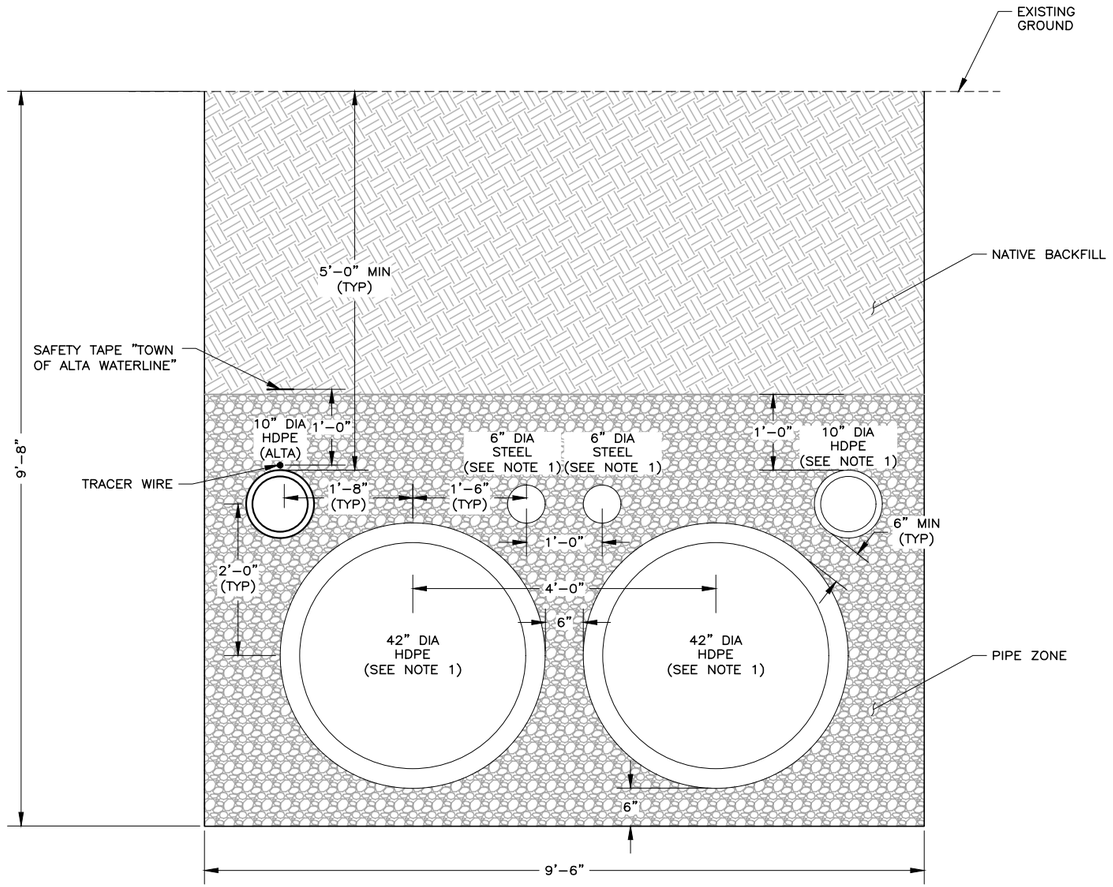
TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
CIVIL
AIR-VAC MANHOLE DETAILS

SHEET C-3

528.02.100

7/04

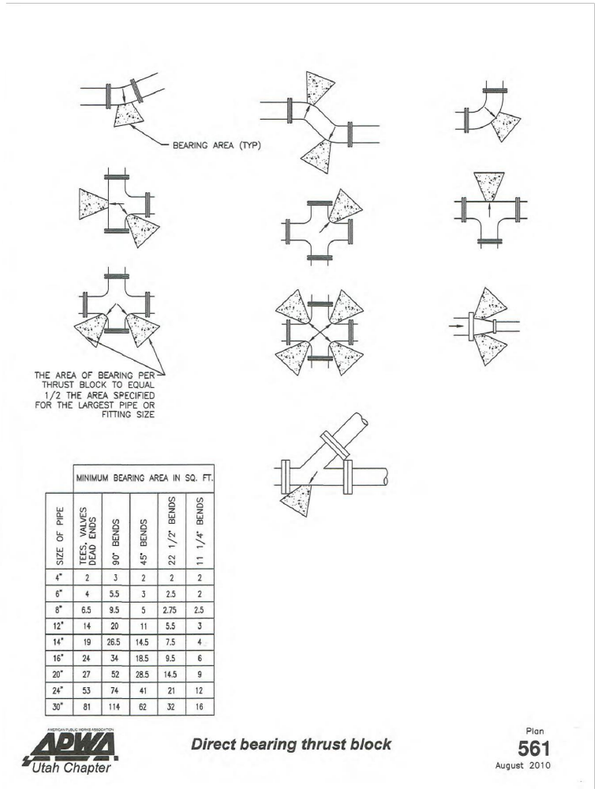


DETAIL NOTES:

1. DESIGN OF THIS UTILITY WAS PERFORMED BY OTHERS. THIS PIPE IS CONVEY SECONDARY WATER.

TYPICAL SHARED TRENCH

NTS



SIZE OF PIPE	MINIMUM BEARING AREA IN SQ. FT.				
	TEES, VALVES DEAD ENDS	90° BENDS	45° BENDS	22 1/2° BENDS	11 1/4° BENDS
4"	2	3	2	2	2
6"	4	5.5	3	2.5	2
8"	6.5	9.5	5	2.75	2.5
12"	14	20	11	5.5	3
14"	19	26.5	14.5	7.5	4
16"	24	34	18.5	9.5	6
20"	27	52	28.5	14.5	9
24"	53	74	41	21	12
30"	81	114	62	32	16

APWA Utah Chapter

Direct bearing thrust block

Plan 561 August 2010

Direct bearing thrust block

1. **GENERAL**
   - A. Thrust design for pipe sizes or configurations not shown require special design.
   - B. Bearing areas, volumes, and special thrust blocking details shown on Drawings take precedence over this plan.
   - C. Restraint sizing is based upon a maximum operating pressure of 150 psi and a test pressure of 200 psi, and a minimum soil bearing strength of 2,000 psf. Operating pressures in excess of 150 psi or soils with less than 2,000 pound bearing strength will require special design.
   - D. Before backfilling around thrust block, secure inspection of installation by ENGINEER.

2. **PRODUCTS**
   - A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
   - B. Backfill: Common fill, APWA Section 31 05 13. Maximum particle size 2-inches.
   - C. Thrust Bocks: Concrete Class 4000, APWA Section 03 30 04.
   - D. Grease: Non-oxide poly-FM.

3. **EXECUTION**
   - A. Pour concrete against undisturbed soil.
   - B. Pipe Joints: Do not cover with concrete. Leave completely accessible.
   - C. Grease: Apply grease to all buried metal surfaces. Wrap with polyethylene sheet and tape wrap.
   - D. Locking restraint devices may be used in conjunction with concrete thrust blocking (at discretion of ENGINEER).
   - E. Base Course and Backfill Placement: Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.

THRUST BLOCK

NTS

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\C-4 TYPICAL DETAILS.DWG
FILE DATE: 2.24.2025 13:40:39 (GDS)

HANSEN ALLEN & LUCE ENGINEERS

PROFESSIONAL ENGINEER No. 12390282-2202 GARRICK D. STEPHENSON 2/24/2025 STATE OF UTAH
PROJECT ENGINEER

DESIGNED	GDS	3				
DRAFTED	GDS	2				
CHECKED	DWJ	1				
DATE	FEBRUARY 2025	NO.	DATE	REVISIONS	BY	APVD.

SCALE

TOWN OF ALTA

TOWN OF ALTA

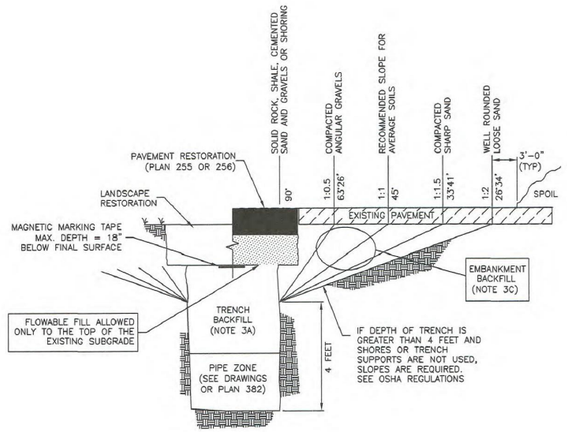
CROSSTOW TRANSMISSION PIPELINE
CIVIL
TYPICAL DETAILS

SHEET C-4

528.02.100

7/04

NARRATIVE: THIS PLAN SHOWS VARIOUS SLOPES RECOMMENDED FOR VARIOUS TYPES OF SLOPE STABILITY PROBLEMS. THE VERTICAL TEXT INDICATES VARIOUS MATERIALS THAT MAY BE ENCOUNTERED. THE SERVICES OF A PROFESSIONAL SOILS ENGINEER SHOULD BE USED TO VERIFY SLOPE STABILITY.



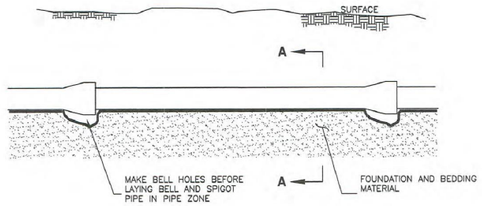
APWA Utah Chapter — **Trench backfill** — Plan 381, July 2016

Trench backfill

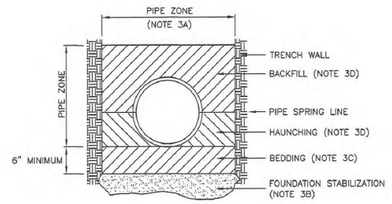
1. **GENERAL**
   A. The drawing applies to backfilling a trench (and embankment) above the pipe zone.

2. **PRODUCTS**
   A. Backfill: Common fill, APWA Section 31 05 13. Maximum particle size 3-inches.
   B. Flowable Fill: APWA Section 31 05 15. Target is 60 psi in 28 days with 90 psi maximum in 28 days, It must flow easily requiring no vibration for consolidation.

3. **EXECUTION**
   A. Trench Backfill Above the Pipe Zone: Follow requirement indicated in APWA Section 33 05 20 and the following provisions. See Standard Plan 382 for backfilling the pipe zone.
      1) DO NOT USE sewer rock, pea gravel, or recycled RAP aggregate as trench backfill.
      2) Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a standard proctor density, APWA Section 31 23 26.
      3) Water jetting is NOT allowed.
   B. Flowable Fill: If controlled low strength material is placed in the trench. Cure the material before placing surface restorations.
   C. Embankment Backfill: When trench sides are sloped proceed as follows.
      1) Maximum lift thickness is 8-inches before compaction.
      2) Compact per APWA Section 31 23 26 to 95 percent or greater relative to a standard proctor density.
      3) Submission of quality control compaction test result data may be requested by ENGINEER at any time. Provide results of tests immediately upon request.
   D. Surface Restoration:
      1) Landscaped Surface: Follow APWA Section 32 92 00 (turf or grass) or APWA Section 32 93 13 (ground cover) requirements. Rake to match existing grade. Replace vegetation to match pre-construction conditions.
      2) Paved Surface: Follow APWA Section 33 05 25 (bituminous pavement surfacing), or APWA Section 33 05 25 (concrete pavement surfacing). Do not install surfacing until compaction density is acceptable to ENGINEER. .



ELEVATION VIEW



SECTION A-A

INSTALLATION

CONCRETE PIPE: FOLLOW ASTM C 1479
"STANDARD PRACTICE FOR INSTALLATION OF PRECAST CONCRETE SEWER, STORM DRAIN, AND CULVERT PIPE USING STANDARD INSTALLATIONS."

PLASTIC PIPE: FOLLOW ASTM D 2321
"STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS"

CORRUGATED METAL PIPE: FOLLOW ASTM A 798
"STANDARD PRACTICE FOR INSTALLING FACOTRY-MADE CORRUGATED STEEL PIPE FOR SEWERS AND OTHER APPLICATIONS.

VITRIFIED CLAY PIPE: FOLLOW ASTM C 12.
"STANDARD RECOMMENDED PRACTICE FOR INSTALLING VITRIFIED CLAY PIPE LINES.

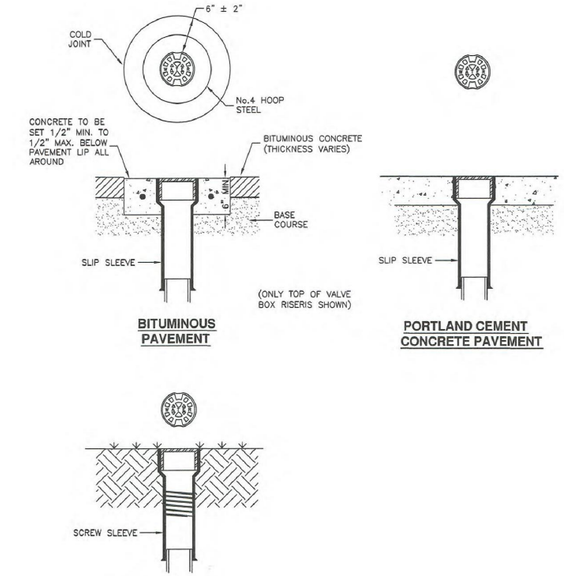
APWA Utah Chapter — **Pipe zone backfill** — Plan 382, January 2011

Pipe zone backfill

1. **GENERAL**
   A. Install the pipe in the center of the trench or no closer than 6-inches from the wall of the pipe to the wall of the trench.

2. **PRODUCTS**
   A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
   B. Backfill: Common fill, APWA Section 31 05 13. Maximum particle size 2-inches.
   C. Concrete: APWA Section 03 30 04.
   D. Flowable Fill: Target is 60 psi in 28 days with 90 psi maximum in 28 days, APWA Section 31 05 15. It must flow easily requiring no vibration for consolidation.
   E. Stabilization-Separation Geotextile: Moderate or high at CONTRACTOR's choice, APWA Section 31 05 19.

3. **EXECUTION**
   A. Excavate the Pipe Zone: Width is measured at the pipe spring line and includes any necessary sheathing. Provide width recommended by pipe manufacturer. Follow manufacturer's recommendations when using trench boxes.
   B. Foundation Stabilization: Get ENGINEER's permission before installing common fill. Vibrate to stabilize. Installation of stabilization-separation geotextile will be required to separate backfill material and native subgrade materials if common fill cannot provide a working surface or prevent soils migration.
   C. Bedding: Follow APWA Section 33 05 20 requirements and the following provisions.
      1) Furnish untreated base course material unless specified otherwise by pipe manufacturer.
      2) Maximum lift thickness is 8-inches.
      3) Bedding immediately under the pipe should not be compacted, but loosely placed.
      4) Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
      5) When using concrete, provide at least Class 2,000, APWA Section 03 30 04.
   D. Pipe Zone: DO NOT USE sewer rock, pea gravel, or recycled RAP aggregate in the pipe zone. Water jetting is NOT allowed.
      1) Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26 unless pipe manufacturer requires more stringent installation.
      2) Submission of quality control compaction test result data developed for the haunch zone may be requested by ENGINEER at any time. CONTRACTOR is to provide results of tests immediately upon request.
   E. Flowable Fill (when required and if allowed by pipe manufacturer):
      1) Place the controlled low strength material, APWA Section 31 05 15.
      2) Prevent pipe flotation by installing in lifts and providing pipe restraints as required by pipe manufacturer.
      3) Reset pipe to line and grade if pipe "floats" out of position.



BITUMINOUS PAVEMENT

PORTLAND CEMENT CONCRETE PAVEMENT

LANDSCAPED AREA

APWA Utah Chapter — **Cover collar for water valve box** — Plan 574, August 2001

Cover collar for water valve box

1. **GENERAL**
   A. In a pavement surface, fill an annular space around a frame and cover casting with concrete. The concrete will support the casting under traffic loadings.

2. **PRODUCTS**
   A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER's permission.
   B. Concrete: Class 4000, APWA Section 03 30 04.
   C. Concrete Curing Agent: Type ID Class A (clear with fugitive dye), membrane forming compound, APWA Section 03 39 00.

3. **EXECUTION**
   A. Base Course: Maximum lift thickness is 8-inches before compaction. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
   B. Pavement Preparation: Provide a neat vertical and concentric joint between concrete collar and existing bituminous concrete surface. Clean edges of all dirt, oil, and loose debris.

FILE NAME: PROJECTS\528 - TOWN OF ALTA\02.100 - CROSSTOW TRANSMISSION PIPELINE DESIGN\CAD\C-5 WATERLINE DETAILS.DWG
FILE DATE: 2.24.2025 13:39:30 (GDS)

HANSEN ALLEN & LUCE ENGINEERS	PROJECT ENGINEER	DESIGNED GDS	3				SCALE
		DRAFTED DD	2				
		CHECKED DWJ	1				
		DATE FEBRUARY 2025	NO.	DATE	REVISIONS	BY APVD.	

TOWN OF ALTA

CROSSTOW TRANSMISSION PIPELINE
CIVIL
WATERLINE DETAILS

SHEET C-5
528.02.100

7/04

"Exhibit B"
COMBINED TECHNICAL SPECIFICATIONS

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 GENERAL

A. This Section outlines the general terms that CONTRACTOR must follow for preparing and providing Submittals to ENGINEER for review.

B. CONTRACTOR shall anticipate resubmitting Submittals for major equipment or complex systems.

C. If CONTRACTOR has questions about submittal requirements, CONTRACTOR is encouraged to communicate with ENGINEER to discuss requirements prior to submitting the Submittal.

D. Substitutions shall be clearly identified on the Submittal transmittal form and shall include all the information required per Section 01 60 00 – Product Requirements.

1.2 DEFINITIONS

A. Shop Drawings: Drawings, diagrams, schedules, and other data specially prepared for the Work by CONTRACTOR to illustrate some portion of the Work.

B. Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by CONTRACTOR to illustrate materials or equipment for some portion of the Work. Product data is typically collected from catalogs, technical data sheets, or other materials supplied by manufacturers and are not specifically prepared for the project. Product data shall be marked up and/or highlighted to show the model, style, or options of a product to be incorporated in the Work.

C. Samples: Physical examples that illustrate materials, equipment, workmanship, or colors, and establish standards by which the Work will be judged.

D. Submittal Dispositions shall be defined as follows:

1. No Exception Taken: ENGINEER and/or OWNER has reviewed the Submittal with skill, care, and judgement consistent with the applicable standard of care and, in accordance with the General Conditions, has determined the submittal appears to be consistent with the contract documents and the design professional's design intent for the completed project.
2. Make Corrections Noted: ENGINEER and/or OWNER has reviewed the Submittal and approval is conditioned on CONTRACTOR, subcontractor, or supplier complying fully with ENGINEER's written comments on the Submittal. Failure of the CONTRACTOR, subcontractor, or supplier to comply fully with the written comments nullifies the approval.
3. Revise and Resubmit: ENGINEER and/or OWNER has reviewed the Submittal and believes the Submittal, as furnished, cannot be approved without revisions and resubmittal. "Revise and Resubmit" does not constitute an approval.

4. Rejected: ENGINEER and/or OWNER has reviewed the Submittal and determined that it cannot be approved because it is incomplete, does not meet the product requirements or specifications, or does not meet the Submittal Procedure requirements as noted below.
5. For Information Only: Submittal is for record only and was not reviewed by ENGINEER and/or OWNER.

1.3 SUBMITTAL PROCEDURES

A. Wherever Submittals are required by the Contract Documents, a single electronic PDF file to ENGINEER with a Submittal transmittal form which is acceptable to ENGINEER.

B. Sequentially number transmittal forms. Mark revised Submittals with original number and sequential alphabetic or numeric suffix, i.e., Submittal 1, Submittal 1.A, Submittal 1.1, etc.

C. Identify Project, Contractor, subcontractor and/or supplier, pertinent drawing and detail number, and Specification section number, appropriate to Submittal.

D. Each Submittal shall contain material pertaining to no more than one equipment or material item.

E. Each Submittal shall have the Specification section and applicable paragraph number clearly identified on the front of the Submittal transmittal form. A copy of the Specification section and applicable paragraph shall be included with the Submittal and items included shall be clearly mark as either in compliance or not in compliance. For items not in compliance a description shall be provided explaining the reason for non-compliance.

F. CONTRACTOR shall review Submittals prior to submission to ENGINEER. Apply Contractor's stamp, signed and dated, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents. Identify any deviations from the Contract Documents on the Submittal transmittal form.

G. Schedule Submittals to expedite Project and deliver to ENGINEER at their business address. Coordinate submission of related items.

H. Submittals shall be submitted sufficiently in advance to allow ENGINEER not less than ten regular working days for examining the drawings. These drawings shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items and unit assemblies in relation to the Contract Drawings and/or specifications.

I. Identify variations from Contract Documents and product or system limitations which may adversely affect successful performance of completed Work.

J. If a Submittal is returned to CONTRACTOR marked “NO EXCEPTIONS TAKEN”, or similar notification, formal revision and resubmission will not be required.

K. If a Submittal is returned marked “MAKE CORRECTIONS NOTED”, or similar notification, CONTRACTOR shall make the corrections on the Submittal, however, formal revision and resubmission will not be required.

L. Resubmittals

1. If a Submittal is returned marked “REVISE AND RESUBMIT”, or similar notification, CONTRACTOR shall revise the Submittal and resubmit the required number of copies.
2. Identify changes made since the previous submission.

M. Rejected Submittals

1. If a Submittal is returned marked “REJECTED”, or similar notification, it shall mean either that the proposed material or product does not satisfy the specification, the Submittal is so incomplete that it cannot be reviewed or is a substitution request not submitted in accordance with Section 01 60 00 – Product Requirements.
2. CONTRACTOR shall prepare a new Submittal or submit a substitution request according to Section 01 60 00 – Product Requirements and shall submit the required number of copies.

N. Distribute copies of reviewed Submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

O. Submittals not requested will not be recognized or processed.

P. Unless noted otherwise, corrections indicated on Submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as changes to the Contract requirements.

Q. Fabrication or purchase of an item may only commence after ENGINEER has reviewed the pertinent Submittals and returned copies to CONTRACTOR marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED”.

R. ENGINEER's review of CONTRACTOR Submittals shall not relieve CONTRACTOR of the entire responsibility for the corrections of details and dimensions. CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in CONTRACTOR Submittals. CONTRACTOR shall be responsible for dimensions and quantities, coordinating with all trades, the design of adequate connections and details, and satisfactory and safe performance of the work.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules within 15 days after date of Owner-Contractor Agreement. After review comments on the initial schedule are received from ENGINEER and OWNER, CONTRACTOR shall resubmit required revised data within ten days.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

D. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first workday of each week.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Submit separate schedule of submittal dates for shop drawings, product data, and samples.

1.5 PRODUCT DATA

A. Product Data: Submit to ENGINEER for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 78 50 - Project Closeout.

1.6 SHOP DRAWINGS

A. Shop Drawings: Submit to ENGINEER for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Fabrication of an item may be commenced only after ENGINEER has reviewed the pertinent submittals and returned copies to CONTRACTOR marked either "NO EXCEPTIONS TAKEN", or "MAKE CORRECTIONS NOTED". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work.

C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.

1. Include signed and sealed calculations to support design.
2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 78 50 - Project Closeout.

1.7 SAMPLES

A. Whenever indicated in the Specifications or requested by ENGINEER, CONTRACTOR shall submit at least 1 sample of each item or material to ENGINEER for acceptance at no additional cost to OWNER.

B. Samples, as required herein, shall be submitted for acceptance prior to ordering such material for delivery to the jobsite, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delay in the Work.

C. Unless otherwise specified, all colors and textures of specified items will be selected by ENGINEER from the manufacturer's standard colors and standard materials, products, or equipment lines.

1.8 CERTIFICATES

A. When specified in individual Specification sections, submit certification by manufacturer, installation/application subcontractor, or CONTRACTOR to ENGINEER, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product but must be acceptable to ENGINEER.

1.9 NSF CERTIFICATION

A. Where NSF/ANSI 61 and/or NSF/ANSI 600 approval is required, submit ANSI/NSF 61/600 certification letter from the testing agency, i.e., NSF International (NSF), ALS - Truesdail Laboratories, UL Solutions, Water Quality Association (WQA), etc., for each item indicating the product fabrication location and application limits such as plant location, size of tank or diameter of piping, or other limitations.

B. See example NSF certificate below in Exhibit A.

1.10 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to ENGINEER for delivery to OWNER in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.11 MANUFACTURER'S FIELD REPORTS

A. When required in individual sections, have Manufacturer or Supplier provide qualified representative to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable and to make written report of observations and recommendations to ENGINEER.

1.12 OPERATIONS AND MAINTENANCE MANUAL SUBMITTAL

A. CONTRACTOR shall furnish to ENGINEER five (5) identical sets of Operations and Maintenance Manuals. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose-leaf, vinyl, hard-cover binder suitable for

bookshelf storage. Binder ring size shall not exceed 2.5 inches. A Table of Contents shall be provided which indicates all equipment and suppliers in the Operations and Maintenance Manuals.

B. CONTRACTOR shall also furnish ENGINEER one copy of the Operations and Maintenance Manuals in PDF electronic format.

C. CONTRACTOR shall include in the Operations and Maintenance manuals full details for care and maintenance for all visible surfaces as well as the following for each item of mechanical, electrical, and instrumentation equipment (except for equipment furnished by OWNER):

1. Complete operating instructions, including location of controls, special tools or other equipment required, related instrumentation, and other equipment needed for operation.
2. Preventative maintenance procedures and schedules
3. A description of proper maintenance activities
4. Complete parts lists, by generic title, identification number, and catalog number, complete with exploded views of each assembly.
5. Disassembly and reassembly instruction
6. Name and location of nearest supplier and spare parts warehouse
7. Name and location of manufacturer
8. Recommended troubleshooting and start-up procedures
9. Prints of the record drawings, including diagrams and schematics, as required under the electrical and instrumentation portions of these specifications.

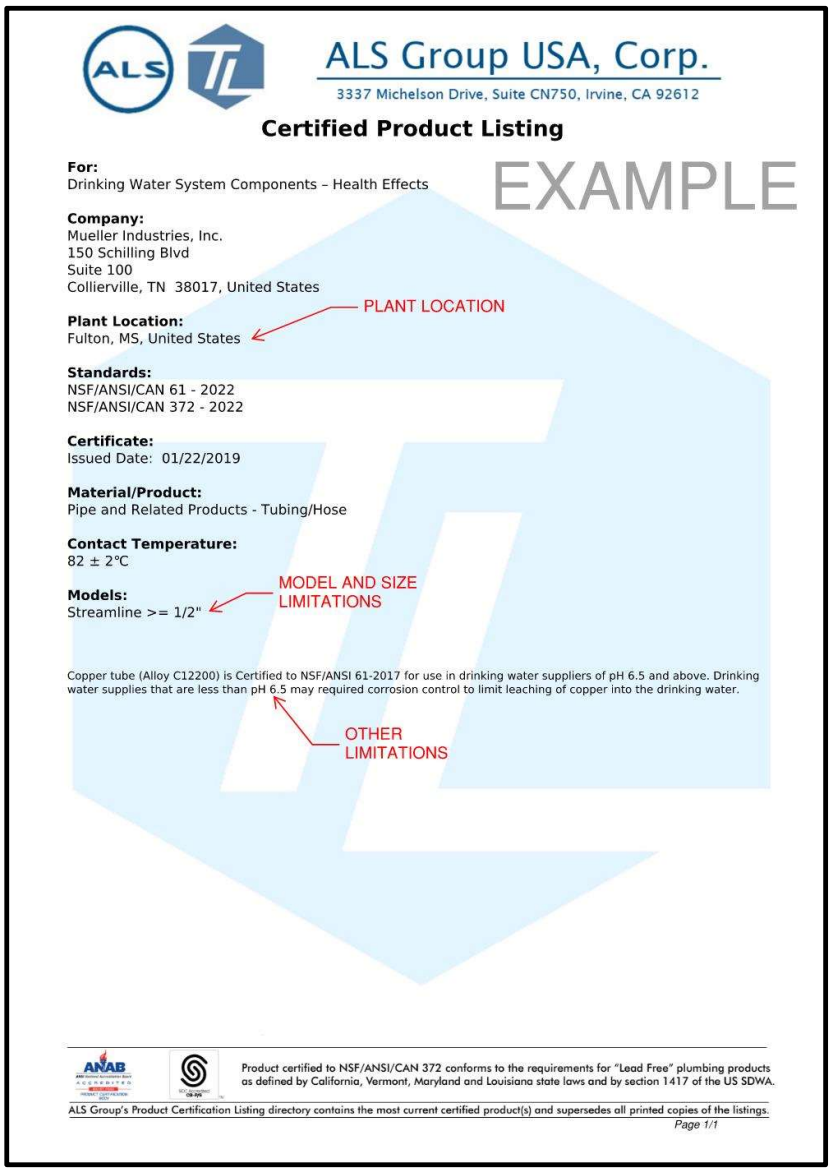
D. All Operations and Maintenance manuals shall be submitted in final form to ENGINEER not later than the 75 percent of construction completion date. All discrepancies found by ENGINEER in the Operations and Maintenance manuals shall be corrected by CONTRACTOR prior to final acceptance of the project.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

- END OF SECTION –

Exhibit A - Example NSF 61 Certification



ALS Group USA, Corp.
3337 Michelson Drive, Suite CN750, Irvine, CA 92612

Certified Product Listing

EXAMPLE

For:
Drinking Water System Components – Health Effects

Company:
Mueller Industries, Inc.
150 Schilling Blvd
Suite 100
Collierville, TN 38017, United States

Plant Location:
Fulton, MS, United States

PLANT LOCATION

Standards:
NSF/ANSI/CAN 61 - 2022
NSF/ANSI/CAN 372 - 2022

Certificate:
Issued Date: 01/22/2019

Material/Product:
Pipe and Related Products - Tubing/Hose

Contact Temperature:
82 ± 2°C

Models:
Streamline >= 1/2"

MODEL AND SIZE LIMITATIONS

Copper tube (Alloy C12200) is Certified to NSF/ANSI 61-2017 for use in drinking water suppliers of pH 6.5 and above. Drinking water supplies that are less than pH 6.5 may required corrosion control to limit leaching of copper into the drinking water.

OTHER LIMITATIONS

Product certified to NSF/ANSI/CAN 372 conforms to the requirements for "Lead Free" plumbing products as defined by California, Vermont, Maryland and Louisiana state laws and by section 1417 of the US SDWA.

ALS Group's Product Certification Listing directory contains the most current certified product(s) and supersedes all printed copies of the listings.

Page 1/1

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SECTION 01 45 00
QUALITY CONTROL AND MATERIALS TESTING

PART 1 GENERAL

1.1 SUMMARY

A. This Section outlines responsibilities for controlling the quality of materials, products, and workmanship.

1.2 MATERIALS

A. All materials incorporated in the project shall be new and shall fully comply with the Specifications. Unless otherwise clearly provided in the Specifications, all workmanship, equipment, materials, and articles incorporated in the Work covered by the Contract are to be of the best available grade of their respective kinds. Whenever, in the specifications, any material, article, device, product, fixture, form, type of construction, or process indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired and shall be deemed to be followed by the words "or approved equal" and CONTRACTOR may in such case, upon receiving ENGINEER's approval, purchase and use any item, type, or process which shall be substantially equal in every respect to that indicated or specified.

B. Materials and equipment may be used in the Work based upon receipt of a Supplier's certificate of compliance. Certificate must be in possession of CONTRACTOR and reviewed by ENGINEER prior to use.

C. Quality Assurance Testing by OWNER and/or ENGINEER shall not relieve CONTRACTOR of responsibility to furnish materials and work in full compliance with Contract Documents.

1.3 MANUFACTURER'S INSTRUCTIONS

A. Should instructions conflict with Contract Documents, request clarification before proceeding.

B. When required in individual sections, submit manufacturer's instructions in the quantity required for product data, delivery, handling, storage, assembly, installation, start-up, adjusting, balancing, and finishing, as appropriate.

1.4 WORKMANSHIP

A. Maintain performance control and supervision over Subcontractors, Suppliers, manufacturers, products, services, workmanship, and site conditions, to produce work in accordance with Contract Documents.

B. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

C. Provide suitable qualified personnel to produce specified quality.

D. Ensure finishes match approved samples.

1.5 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerance to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from ENGINEER before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.6 TESTING AND INSPECTION SERVICES

A. The testing agency and testing for quality control and material testing shall be furnished by CONTRACTOR as part of the project. Results of testing shall be reported to CONTRACTOR and ENGINEER on site. Reports of the testing shall be transmitted directly to ENGINEER.

B. Materials to be supplied under this contract will be tested and/or inspected either at their place of origin or at the site of the work by the testing agency. CONTRACTOR shall give ENGINEER written notification well in advance of actual readiness of materials to be tested and/or inspected at point of origin so ENGINEER may witness testing by the testing agency. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material nor shall it preclude retesting or reinspection at the site of the work.

C. CONTRACTOR shall furnish such samples of materials as are requested by the ENGINEER, without charge. No material shall be used until reports from the testing agency have been reviewed and accepted by ENGINEER. See Section 01 33 00 - Submittal Procedures.

1.7 UNSATISFACTORY CONDITIONS

A. Examine areas and conditions under which materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

1.8 AUTHORITY AND DUTIES OF PROJECT REPRESENTATIVE

A. Refer to Section [00 73 00][00 80 00] "Supplementary Conditions" sub-section SC 10.03 [EJCDC] "Resident Project Representative" or SC 9.3 [APWA] “Authorities and Duties of Resident Project Representative”.

1.9 QUALITY CONTROL TESTING

A. ENGINEER's failure to detect any defective Work or materials does not prevent later rejection when such defect is discovered nor does it obligate ENGINEER for acceptance.

B. CONTRACTOR shall provide 24-hours minimum notice to ENGINEER for all testing required by these specifications so ENGINEER may coordinate or be present during testing.

1.10 TESTING ACCEPTANCE AND FREQUENCY

A. Minimum Quality Control Testing Frequency: As defined in Table 01 45 00-1, CONTRACTOR shall be responsible to ensure that all testing is performed at the frequencies shown. CONTRACTOR shall uncover any work at no cost to OWNER to allow the testing agency to perform required testing at the frequency shown.

B. Acceptance of Defective Work: As defined in Article 14.04 [EJCDC] or Article 13.8 [APWA] of the General Conditions.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying the next material or substance.

B. Seal cracks or openings of substrate prior to applying the next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

TABLE 01 45 00-1: QUALITY CONTROL TESTING FREQUENCY

SYSTEM or MATERIAL	TESTS	MINIMUM REQUIRED FREQUENCY
SUBGRADE AND BACKFILL MATERIALS		
Section 31 23 15 Excavation and Backfill for Buried Pipelines	Field Density	1 test per 200 linear feet per 1.5 feet of backfill thickness placed.
	Laboratory	1 test for each material type which includes proctor, classification, and gradation.
Section 31 22 00 Site Grading	Field Density	Embankment Fills – 1 test per lift for every 10,000 square feet of embankment
	Laboratory	1 test for each material type which includes proctor, classification, and gradation.
Section 31 23 23 Excavation and Backfill for Structures	Field Density	Footing and Wall Backfill – 1 test per every other lift for each 50 linear feet
		Under Structures – 1 test per lift for every 1,000 square feet of structure
		Around Structures – 1 test per lift for every 1,500 square feet of structure
		Unimproved Area – 1 test per lift for every 25,000 square feet of unimproved area
	Laboratory	1 test for each material type which includes proctor, classification, and gradation.
Section 32 11 23 Road Base - Untreated Base Course	Field Density	Base course subgrade: 1 test per 2,000 square feet of area. Base course: 1 test per 2,000 square feet of area.
	Laboratory	Base course: 1 test for each material type which includes proctor, classification, and gradation.
ASPHALT		
Section 32 12 16 Hot-Mix Asphalt Concrete Paving	Mix Design	Marshall Test Method: 1 test initially per each type of material and each change in target, and for each day of production thereafter. Specific Gravity: 1 per each Marshall Test Extraction: 1 test per each Marshall Test
	Field Density	Bituminous surfaces: 1 test per 2,000 square feet placed or part thereof.
	Asphalt Thickness and Core Density	Bituminous surfaces: 1 test sample every 300 linear feet of completed roadway.

SYSTEM or MATERIAL	TESTS	MINIMUM REQUIRED FREQUENCY
PORTLAND CEMENT CONCRETE		
Section 3 30 00 Cast-in-Place Concrete	Slump	1 test every day of placement (if less than 100 cubic yards in a day), 1 test for every 100 cubic yards, or 1 test for each 3,000 square feet of surface area for slabs and more frequently if batching appears inconsistent.
	Entrained air	1 test with slump test.
	Ambient and concrete temperatures	1 test with slump test.
	Water cement ratio.	to be verified and provided with batch tickets.
	Compressive strength	1 set of 5 cylinders (See Note 5). 1 test every day of placement (if less than 100 cubic yards in a day), 1 test for every 100 cubic yards, or 1 test for each 3,000 square feet of surface area for slabs, and more frequently if batching appears inconsistent. (See Section 03 30 00-3.5.A.3 for additional requirements.) Each sample used to mold strength test specimens shall be tested for slump, air content, and temperature.

NOTES:

1 Additional tests shall be conducted when variations occur due to CONTRACTOR's operations, weather conditions, site conditions, etc.

2 Classification, moisture content, Atterberg limits and specific gravity tests shall be conducted for each compaction test, if applicable.

3 Tests can substitute for same tests required under "Aggregates" (from bins or source), although gradations will be required when blending aggregates.

4 Aggregate moisture tests are to be conducted in conjunction with concrete strength tests for water/cement calculations.

5 Strength tests shall be the average of the strengths of at least two (2) 6-inch diameter by 12-inch high cylinders. If 4-inch diameter cylinders are used, collect an additional cylinder (6 total) and the strength test shall be the average of the strengths of at least three (3) 4-inch by 8-inch high cylinders.

- END OF SECTION –

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SECTION 01 45 23
TESTING AGENCY SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. CONTRACTOR shall be responsible for providing Construction Quality Control Testing of all soils, concrete, etc. as required by the various sections of these Specifications. This section includes the following:

1. Use of independent testing agency
2. Control testing report submittal requirements
3. Responsibilities of testing agency

1.2 RELATED WORK

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures

1.3 REFERENCES

A. Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract. The publication is referred to in the text by basic designation only.

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. ASTM D 3740 Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
2. ASTM D 4561 Standard Practice for Quality Control Systems for Organizations Producing and Applying Bituminous Paving Materials
3. ASTM E 329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

1.4 DEFINITIONS

A. Independent Testing Agency: A testing agency NOT owned by CONTRACTOR, and an agency that does not have any preferential affiliation or association with CONTRACTOR, or any of CONTRACTOR's Subcontractors and Suppliers other than entering into a contract with CONTRACTOR to perform the duties defined in these Specifications.

B. Professional Engineer: An engineer who complies with Utah licensing law and is acceptable to the authority having jurisdiction.

1.5 QUALITY ASSURANCE

A. CONTRACTOR shall employ and pay for services of an independent testing agency which complies with ASTM D 3740, ASTM D 4561, and ASTM E 329 to test materials for contract compliance.

1.6 CONTRACTOR SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures

B. If CONTRACTOR is employing and paying for an independent testing agency, prior to start of Work, submit testing agency's name, address, telephone number and the following:

1. Concrete Technician: Approved by ENGINEER or ACI certified.
2. Person charged with engineering managerial responsibility
3. Professional engineer on staff to review services
4. Level of certification of technicians

1.7 TESTING AGENCY SUBMITTALS

A. Field Test Report: Submit report no later than the end of the current day.

B. Laboratory Test Report: Submit original report within 48 hours after test results are determined.

C. Final Summary Report: Submit prior to final payment

D. On all reports include:

1. Project title, number and date of the report
2. Date, time and location of test
3. Name and address of material Supplier
4. Identification of product being tested and type of test performed
5. Identify whether test is initial test or retest
6. Results of testing and interpretation of results
7. Name of technician who performed the testing

1.8 RESPONSIBILITIES OF TESTING AGENCY

A. Calibrate testing equipment at least annually with devices with an accuracy traceable to either National Bureau of Standards or acceptable values of natural physical constraints.

B. Provide sufficient personnel at site and cooperate with CONTRACTOR, ENGINEER and OWNER's Representative in performance of testing service.

C. Secure samples using procedures specified in the applicable testing code.

D. Perform testing of products in accordance with applicable sections of the Contract Documents.

E. Immediately report any compliance or noncompliance of materials and mixes to CONTRACTOR, ENGINEER, and OWNER's Representative.

F. When an out-of-tolerance condition exists, perform additional inspections and testing until the specified tolerance is attained, and identify retesting on test reports.

1.9 LIMITS ON TESTING AGENCY AUTHORITY

A. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Agency may not suspend Work.

C. Agency has no authority to accept Work for OWNER.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

- END OF SECTION –

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SECTION 09 90 00
PAINTING AND FINISHES

PART 1 GENERAL

1.1 DESCRIPTION

A. This section covers furnishing, surface preparation, and applying paints and coatings, complete and in place, to all specified surfaces including exposed valves, piping, or fittings.

B. Definitions

1. The term “paint”, “coatings”, or “finishes” as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.
2. The term “DFT” means minimum dry film thickness, without any negative tolerance.
3. The term “mil” means thousandths of an inch.
4. The term “SSPC” means The Society for Protective Coatings.

C. The following surfaces shall not be coated:

1. Concrete, unless required by items on the concrete coating schedule below or the Contract Drawings.
2. Stainless steel
3. Machined surfaces
4. Grease fittings
5. Glass
6. Equipment nameplates
7. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.

D. The protective coatings applicator (Applicator) shall possess a valid state license as required for the performance of the painting and coating work called for in this specification and shall provide 5 references which show the Applicator has previous successful experience with the indicated of comparable coating systems. Include the name, address, and the telephone number for the owner of each installation for which the Applicator provided the protective coating.

1.2 RELATED WORK

A. Related Work in other Sections includes, but is not limit to:

1. Section 01 33 00 Submittal Procedures
2. Section 33 05 05 Ductile Iron Pipe

1.3 REFERENCES AND STANDARDS

A. Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract:

1. OSHA — Occupation Safety and Health Act: State of Utah and Federal
2. ICRI — International Concrete Repair Institute Guideline No. 310.2 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. ANSI A 13.1 — Standard for Scheme for the Identification of Piping Systems
2. ANSI Z 535 — Standard for Safety Colors

C. AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

1. ASTM C 309 — Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
2. ASTM D 520 — Standard Specification for Zinc Dust Pigment
3. ASTM D 521 — Standard Test Methods for Chemical Analysis of Zinc Dust (Metallic Zinc Powder)
4. ASTM D 6943 — Standard Practice for Immersion Testing of Industrial Protective Coatings Linings
5. ASTM D 1653 — Standard Test Methods for Water Vapor Transmission of Organic Coating Films
6. ASTM D 2370 — Standard Test Method for Tensile Properties of Organic Coatings
7. ASTM D 2794 — Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
8. ASTM D 4263 — Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
9. ASTM D 4414 — Standard Practice for Measurement of Wet Film Thickness by Notch Gages
10. ASTM D 4417 — Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
11. ASTM D 7234 — Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers
12. ASTM D 7682 — Standard Test Method for Replication and Measurement of Concrete Surface Profiles Using Replica Putty
13. ASTM E 96 — Standard Test Methods for Water Vapor Transmission of Materials
14. ASTM F 1869 — Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
15. ASTM F 2170 — Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

D. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C 210 — Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
2. AWWA C 222 — Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings

E. AMERICAN CONCRETE INSTITUTE (ACI)

1. ACI 301 Specifications for Structural Concrete

F. NACE International (NACE)

1. NACE RP0287 Field Measurement of Surface Profile of Abrasive Blast-Cleaned Steel Surfaces Using a Replica Tape
2. NACE SP0188 Standard Practice for Discontinuity (Holiday) Testing of Protective Linings
3. NACE SP0892 Standard Practice for Coatings and Linings over Concrete for Chemical Immersion and Containment Service
4. NACE No. 1/SSPC-SP 5 White Metal Blast Cleaning
5. NACE No. 2/SSPC-SP10 Near White Metal Blast Cleaning
6. NACE No. 3/SSPC-SP6 Commercial Blast Cleaning
7. NACE No. 6/SSPC-SP13 Surface Preparation of Concrete

G. SSPC: The Society for Protective Coatings (SSPC)

1. SSPC PA1 - Shop, Field, and Maintenance Painting of Steel
2. SSPC-PA2 – Paint Application Specification No. 2: Measurement of Dry Coating Thickness with Magnetic Gages.
3. SSPC-PA11 - Protecting Edges, Crevices, and Irregular Steel Surfaces by Stripe Coating
4. SSPC-SP 6/NACE No. 3 - Commercial Blast Cleaning.
5. SSPC-SP10/NACE 2 - Near White Metal Blast Cleaning
6. SSPC-SP16 – Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
7. SSPC-VIS 1 - Guide to Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

H. NSF INTERNATIONAL (NSF)

1. NSF/ANSI 61 Drinking Water System Components – Health Effects
2. NSF/ANSI 600 Health Effects Evaluation and Criteria for Chemicals in Drinking Water

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. CONTRACTOR shall supply shop drawings for approval on all paint materials at least 30 days prior to installation. Submittals shall include the following data sheets:

1. For each paint system used herein, furnish a Paint System Data Sheet (PSDS), Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system, except for products applied by equipment manufacturers.

C. Where NSF/ANSI 61 and/or NSF/ANSI 600 approval is required, submit ANSI/NSF 61/600 certification letter for each coating in the system indicating the product application limits on size of tank or piping, dry film thickness, number of coats, specific product tests, colors certified, and approved additives.

D. Quality Control Submittals:

1. Furnish a list of references for the Applicator substantiating the requirements as specified.
2. Manufacturer's certification stating factory applied coating systems meets or exceeds requirements specified herein.
3. If the manufacturer of finish coating differs from that of shop primer, provide both manufacturers' written confirmation that materials are compatible.

1.5 PAINT DELIVERY, STORAGE, AND HANDLING

A. Deliver paint to the project site in unopened containers that plainly show, at the time of use, the designated name, date of manufacture, color, and name of manufacturer.

B. Store paints in a suitable protected area that is heated or cooled as required to maintain temperatures within the range recommended by the manufacturer.

1.6 QUALITY ASSURANCE

A. All inspection for quality assurance shall ultimately be the responsibility of CONTRACTOR. OWNER retains the right to observe, accept, or reject the work based on the results of CONTRACTOR's inspection or observations by ENGINEER, at OWNER's discretion, in accordance with the Specifications.

B. Repair and recoat all runs, overspray, roughness, or any other signs of improper application in accordance with paint manufacturer's instructions and as reviewed by ENGINEER.

C. Observations by OWNER or ENGINEER, or the waiver of inspection of any particular portion of the work, shall not be construed to relieve CONTRACTOR of his responsibility to perform the work in accordance with these Specifications.

1.7 MANUFACTURER'S SERVICES

A. Furnish paint manufacturer's representative to visit jobsite at intervals during surface preparation and painting as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions and these specifications, and as may be necessary to resolve field problems attributable to, or associated with, manufacturer's products furnished under this Contract.

1.8 SPECIAL CORRECTION OF DEFECTS REQUIREMENTS

A. An inspection may be conducted during the eleventh month following completion of coating work. CONTRACTOR and a representative of the coating material manufacturer shall attend this inspection. Defective work shall be repaired in accordance with these specifications and to the satisfaction of OWNER. OWNER may, by written notice to CONTRACTOR, reschedule the inspection to another date within the one-year correction period or may cancel the inspection altogether. CONTRACTOR is not relieved of its responsibilities to correct defects whether or not the inspection is conducted.

PART 2 PRODUCTS

2.1 GENERAL

A. CONTRACTOR shall use suitable coating materials as recommended by the manufacturer. Materials shall comply with Volatile Organic Compound (VOC) limits applicable at the Site.

B. Where manufacturers and product numbers are listed, it is to show the type and quality of coatings that are required. If a named product does not comply with VOC limits in effect at the time of Bid opening, that product will not be accepted, and CONTRACTOR shall propose a substitute product of equal quality that does comply. Proposed substitute materials will be considered as indicated below. Coating materials shall be materials that have a record of satisfactory performance in industrial plants, manufacturing facilities, and water and wastewater treatment plants.

C. In any coating system only compatible materials from a single manufacturer shall be used in the work. Particular attention shall be directed to the compatibility of primers and finish coats. If necessary, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

D. Colors and shades of colors of coatings shall be as indicated or selected by ENGINEER. Each coat shall be of a slightly different shade to facilitate observation of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples by OWNER.

E. Substitute or “Or-Equal” Products

1. Basis of Design: The Coating Systems listed below in paragraph 2.3 are based on products from Tnemec Company Incorporated, except where indicated below.
2. Product Substitution: To establish equality under Section 01 60 00 – Product Requirements, the specified coating systems are the minimum standard of quality for this project. Equivalent materials of other manufacturers may be substituted only by approval of ENGINEER. Requests for material substitutions shall be in accordance with the requirements of the project specification.
3. Product Requirements: CONTRACTOR shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "or equal" product that the material meets the indicated requirements and is equivalent or better in the following properties: Quality, Durability, Resistance to abrasion and physical damage, Life expectancy, Ability to recoat in the future, Solids content by volume, Dry film thickness per coat, Compatibility with other coatings, Suitability to chemical attack, Temperature limitations during application and in service, Type and quality of recommended undercoats or topcoats, Ease of repairing damaged areas, and stability of colors.
4. Manufacturers of “or equal” products shall provide direct performance comparison with the materials specified, in addition to complying with all other requirements of these Specifications. “Or equal” products shall employ the same generic type materials and system components as the specified coating systems.
5. Requests for product substitution shall be made and approved at least 10 days prior to bid date.
6. CONTRACTOR shall bear any additional costs, if a proposed substitution requires changes or additional work.

2.2 COLORS

A. Provide colors as selected by OWNER or ENGINEER.

B. Colors shall be formulated with colorants free of lead, lead compounds, or other materials which might be affected by the presence of hydrogen sulfide or other gas likely to be present at the project.

C. Proprietary identification of colors is for identification only. Any authorized manufacturer may supply color matches.

D. Equipment colors;

1. Equipment shall mean the machinery or vessel itself plus the structural supports and fasteners.
2. Paint non-submerged portions of equipment in the same color as the process piping it serves, except as indicated below:

a. Dangerous parts of equipment and machinery:	OSHA Orange
b. Fire protection equipment and apparatus:	OSHA Red
c. Radiation hazards:	OSHA Purple
d. Physical hazards in normal operating area:	OSHA Yellow

3. Fiberglass reinforced plastic (FRP) equipment with an integral colored gel coat does not require painting, provided the color is as specified.

E. Piping color coding shall be in accordance with ANSI A13.1, Division of Drinking Water R-309-525, and International Plumbing Code.

1. Color code non-submerged metal piping except electrical conduit. Paint fittings and valves the same color as the pipe unless otherwise specified.
2. Pipe supports: If pipe supports are not galvanized or stainless steel, supports shall be painted ANSI No. 70 light gray as specified in ANSI Z535.
3. Fiberglass reinforced plastic (FRP) pipe and polyvinyl chloride (PVC) pipe located outside of buildings and enclosed structures will not require painting, unless noted otherwise on the Contract Drawings.

2.3 COATING SYSTEMS

A. System No. 1A Steel Pipe Lining – Potable Water NSF 61 Certification

1. Not Used

B. System No. 1B Steel – Immersion Potable Water NSF/ANSI 61/600 Certification

1. Not Used

C. System No. 2 Steel – Immersion Non-Potable Water

1. Not Used

D. System No. 3 Steel – Interior Exposed

1. Not Used

E. System No. 4 Steel – Exterior Exposed

1. Not Used

F. System No. 5 Buried Steel Pipe

1. Not Used

G. System No. 6 Steel – Doors and Frames

1. Not Used

H. System No. 7 Galvanized Steel and Cast/Ductile Iron – Exterior Exposed

1. Not Used

I. System No. 8 Galvanized Steel and Cast/Ductile Iron – Interior Exposed

1. Materials

Type	Polyamide Epoxy
VOC content, max, g/L	250
Demonstrated Suitable for	Ferrous, galvanized, nonferrous, cast/ductile iron surfaces in industrial exposure, resistant to mild corrosion and chemical fumes, has good color and gloss retention

2. Surface preparation and Coating System

Surface Preparation	**Products**	**Total System** (mils)
Galvanized Steel and Non-Ferrous: SSPC-SP16 brush-off blast cleaning of coated and uncoated galvanized steel and non-ferrous metals to achieve a uniform anchor profile of 1.0-2.0 mils. Ductile and Cast Iron: Prepare all surfaces as per NAPF 500-03 -	Primer: Tnemec Series 69 Hi-Build Epoxoline II Finish: Tnemec Series 69 Hi-Build Epoxoline II	Primer: 3-5 DFT Finish: 3 – 5 DFT
	Primer: Sherwin Williams Macropoxy 646 Fast Cure Epoxy Finish: Sherwin Williams Macropoxy 646 Fast Cure Epoxy	

Uniformly abrasive blast the entire exterior surface using abrasive to an NAPF 500-03-04 with a minimum angular anchor profile of 1.5 mils.	Primer: Carboline Carboguard 60 Finish: Carboline Carboguard 60	

3. Application
   a. Exposed cast/ductile iron surfaces located inside of structures requiring painting and the following specific surfaces unless noted otherwise:
      1) All exposed cast/ductile iron pipe
   b. Do not paint galvanized steel mechanical pipe and equipment supports unless noted otherwise.

J. System No. 9 Concrete Floors – Light Traffic, Low Impact

1. Not Used

K. System No. 10 Concrete Floors – Chemical Exposure

1. Not Used

L. System No. 11 – Gypsum Wallboard and Plaster

1. Not Used

M. System No. 12 – Concrete Walls and Concrete Masonry Units, Interior – Not Exposed to Chemicals

1. Not Used

N. System No. 13 – Concrete Walls and Concrete Masonry Units, Interior – Exposed to Chemicals

1. Not Used

O. System No. 14 Concrete – Concrete Exposed to Severe Wastewater

1. Not Used

P. System No. 15 Wood, Interior Exposed

1. Not Used

2.4 SPECIAL COATING SYSTEMS

A. System 200 - PVC Tape

1. Not Used

B. System 201 – Water Retardant, Concrete and Masonry

1. Not Used

C. System 202 – Polyethylene Encasement

1. Not Used

D. System 203 - Cement Mortar Coating

1. Not Used

E. System 204 – Ductile or Cast-Iron, Valves and Gates - Immersion in Water and Wastewater

1. Not Used

F. System 205 – Anti-Graffiti Coating, Concrete and Masonry

1. Not Used

PART 3 EXECUTION

3.1 GENERAL

A. The intention of this specification is for all new, interior and exterior, masonry, concrete, and metal, whether atmospheric or submerged exposure surfaces to be painted whether specifically mentioned or not, except as modified herein. Concealed structural steel surfaces shall receive a prime coat only unless modified herein.

B. Surface preparation and coating application shall be in accordance with these specifications and the coating manufacturer's written product data sheets and written recommendations of the manufacturer's technical representative. Where conflict occurs between the manufacturer's recommendations and these specifications, the more stringent of the two shall apply unless approved by ENGINEER.

C. For immersion coatings, obtain full cure for completed system before immersing or allowing exposure to water of condensation for more than 12 hours.

3.2 REGULATORY REQUIREMENTS

A. Meet federal, state, and local requirements limiting the emission of volatile organic compounds and worker exposures.

B. Protect workers and comply with applicable federal, state, and local air pollution and environmental regulations for surface preparation, blast cleaning, disposition of spent aggregate and debris, coating application, and dust prevention including but not limited to the following Acts, Regulations, Standards, and Guidelines:

1. Clean Air Act
2. National Ambient Air Quality Standard
3. Resource Conservation and Recovery Act (RCRA)
4. SSPC Guide 6

C. Comply with applicable federal, state, and local regulations for confined space entry.

D. Provide and operate equipment that meets explosion proof requirements.

3.3 ENVIRONMENTAL CONDITIONS

A. Do not apply paint in extreme heat, temperatures below 40 degrees F, nor in dust, smoke-laden atmosphere, damp or humid weather. The Applicator shall adhere to the manufacturer's recommendations regarding environmental conditions. The Applicator shall monitor humidity, air temperature, and surface temperature with properly calibrated instruments.

B. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85 percent, nor whenever surface temperature is less than 5 degrees F above dew point of ambient air. Strictly adhere to manufacturer's recommendations.

C. Surface preparation power tools and blast equipment shall contain dust collection devices that will prevent discharge of dust particles into the atmosphere around electrical or mechanical equipment unless otherwise permitted by ENGINEER.

D. Where weather conditions or project requirement dictate, the Applicator shall provide and operate dehumidification equipment to maintain environmental conditions suitable for abrasive blasting and coating application as specified.

3.4 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on coating work.

B. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure thorough surface preparation. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given so that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other precautionary measures.

C. Damage to other surfaces resulting from the work shall be cleaned, repaired, and refinished to original condition.

3.5 STORAGE, MIXING, AND THINNING OF MATERIALS

A. Unless otherwise indicated, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for other procedures relative to coating shall be strictly observed.

B. Coating materials shall be used within the manufacturer's recommended shelf life.

C. Coating materials shall be stored under the conditions recommended by the Product Data Sheets, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings from different manufacturers shall not be mixed together.

3.6 SURFACE PREPARATION

A. All surfaces which receive paint or other coatings shall be prepared in accordance with the recommendations of the manufacturer of the material being used. The Applicator shall examine surfaces to be coated and shall correct surface defects before application of any coating material. Marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any field coating application.

B. Perform sandblasting for piping and any other items and equipment where specified and as required to restore damaged surfaces previously shop or field blasted and primed. Materials, equipment, and procedures shall meet requirements of the Society for Protective Coatings (formerly the Steel Structures Painting Council).

3.7 PROTECTION OF MATERIALS NOT TO BE PAINTED

A. Surfaces that are not to receive coatings shall be protected during surface preparation, cleaning, and coating operations.

B. Remove, mask or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted.

C. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.

D. Protect working parts or mechanical and electrical equipment and motors from damage.

E. Care shall be exercised not to damage adjacent work during blasting operations. Spraying shall be conducted under carefully controlled conditions. CONTRACTOR shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blasting or coating operations.

3.8 SURFACE PREPARATION STANDARDS

A. The following referenced surface preparation specifications of the the Society for Protective Coatings shall form a part of this specification:

1. Solvent Cleaning (SSPC SP1): Removal of oil, grease, soil, salts, and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.
2. Hand Tool Cleaning (SSPC SP2): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by hand chipping, scraping, sanding, and wire brushing.
3. Power Tool Cleaning (SSPC SP3): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by power tool chipping, descaling, sanding, wire brushing, and grinding.
4. White Metal Blast Cleaning (SSPC SP5): Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.
5. Commercial Blast Cleaning (SSPC SP6): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.
6. Brush-Off Blast Cleaning (SSPC SP7): Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust, and loose paint.

7. Near-White Blast Cleaning (SSPC SP10): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.
8. Surface Preparation of Concrete (SSPC-SP13): Removal of protrusions, laitance and efflorescence, existing coatings, form-release agents, and surface contamination by detergent or steam cleaning, abrasive blasting, water jetting, or impact or power tool methods as appropriate for the condition of the surface and the requirements of the coating system.
9. Surface Preparation (SSPC-SP16): Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals

3.9 SHOP COATING REQUIREMENTS

A. Unless otherwise indicated, items of equipment or parts of equipment which are not submerged in service shall be shop-primed and then finish-coated in the field after installation with the indicated or selected color. The methods, materials, application equipment, and other details of shop painting shall comply with this Section. If the shop primer requires topcoating within a specific period of time, the equipment shall be finish coated in the shop and then be touched up after installation.

B. Items of equipment or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves, shall have surface preparation and coating performed in the field.

C. For certain pieces of equipment, it may be undesirable or impractical to apply finish coatings in the field. Such equipment shall be primed and finish coated in the shop and touched up in the field with the identical material after installation. CONTRACTOR shall require the manufacturer of each such piece of equipment to certify as part of its Shop Drawings that the surface preparation is in accordance with these specifications. The coating material data sheet shall be submitted with the Shop Drawings for the equipment.

D. For certain small pieces of equipment, the manufacturer may have a standard coating system that is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the Shop Drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

E. Shop-painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before being topcoated, or less time if recommended by the coating manufacturer.

F. CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment Shop Drawings.

G. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturer's printed instructions.

3.10 APPLICATION

A. General

1. Schedule inspection with ENGINEER in advance for cleaned surfaces and all coats prior to each succeeding coat.
2. Apply coatings in accordance with the paint manufacturer's recommendations and these specifications, whichever is more stringent. Allow sufficient time between coats to assure thorough drying of previously applied paint.
3. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same day.
4. Special attention shall be given to materials that will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.
5. Finish coats, including touch-up and damage repair coats shall be applied in a manner that will present a uniform texture and color matched appearance.
6. Non-buried steel piping shall be abrasive blast cleaned and primed before installation.
7. Finish coats shall be applied after concrete, masonry, and equipment installation is complete, and the working areas are clean and dust free.

3.11 CURING OF COATINGS

A. CONTRACTOR shall maintain curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the most stringent, prior to placing the completed coating system into service.

B. In the case of enclosed areas, forced air ventilation, using heated air, if necessary, may be required until the coatings have fully cured.

3.12 SHOP AND FIELD OBSERVATION AND TESTING

A. CONTRACTOR shall give ENGINEER a minimum of 3 Days advance notice of the start of any field surface preparation or coating application, and a minimum of 7 Days advance notice of the start of any surface preparation activity in the shop.

B. Observation by ENGINEER, or the waiver of inspection of any particular portion of the work, shall not relieve CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.

C. CONTRACTOR shall furnish inspection devices in good working condition for the detection of holidays and measurement of dry film thicknesses of coatings. Dry-film thickness gauges shall be made available for ENGINEER's use while coating is being done, until final acceptance of such coatings. CONTRACTOR shall furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of ENGINEER.

D. CONTRACTOR shall test for continuity (holiday test) all coated surfaces inside reservoirs, other surfaces that will be submerged in water or other liquids, surfaces that are enclosed in a vapor space in such structures, and surfaces coated with any of the submerged and severe service coating systems. Areas that contain discontinuities shall be marked and repaired or recoated in accordance with the coating manufacturers' printed instructions and then be retested.

    1. Coatings with thickness exceeding 20-mils total DFT: Pulse-type holiday detector such as Tinker & Rasor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used.

The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the required coating thickness.

2. Coatings with thickness of 20-mils or less total DFT: Tinker & Rasor Model M1 nondestructive type holiday detector, K-D Bird Dog, or equal shall be used. The unit shall operate at less than 75 volts. For thicknesses between 10- and 20-mils, a nonsudsing type wetting agent, such as Kodak Photo-Flo or equal, shall be added to the water prior to wetting the detector sponge.

E. On ferrous and non-ferrous the dry film coating thickness shall be measured in accordance with the SSPC PA 2 using a magnetic type dry film thickness gauge such as Mikrotest Model FM, Elcometer Model 111/1EZ, or equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

F. Evaluation of blast cleaned surface preparation will be based upon comparison of the blasted surfaces with the standard samples available from SSPC and NACE, such as using NACE standards TM-01-70 and TM-01-75.

G. Visually inspect concrete, nonferrous metal, plastic, drywall, and wood surfaces to ensure proper and complete coverage has been attained.

3.13 CLEANUP

A. Place cloths and waste that might constitute a fire hazard in closed metal containers or destroy at the end of each day.

B. Upon completion of the work, remove staging, scaffolding, and containers from the site or destroy in a legal manner.

C. Completely remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

D. Damages due to overspray on buildings, vehicles, trees, or other surfaces not specified to be painted would be the responsibility of CONTRACTOR.

3.14 MANUFACTURER' SERVICES

A. Furnish paint manufacturer's representative to visit jobsite at intervals during surface preparation and painting as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions and these specifications, and as may be necessary to resolve field problems attributable to, or associated with, manufacturer's products furnished under this Contract.

- END OF SECTION –

SECTION 31 23 15
EXCAVATION AND BACKFILL FOR BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

A. This item shall consist of excavating all pipeline trenches to the lines and grades indicated on the Contract Drawings or as directed by ENGINEER in the field, and the backfilling of all pipeline trenches. Excavation shall include the removal of all materials of whatever nature encountered to the depths shown on the Contract Drawings, or as modified in the Field by ENGINEER.

1.2 RELATED SECTIONS

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures
2. Section 33 05 05 Ductile Iron Pipe
3. Section 33 05 11 HDPE Pressure Pipe

1.3 REFERENCES

A. The latest edition of the following publications form a part of this Specification to the extent referred. The publications are referred to in the text by basic designation only.

B. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

1. M 145 Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
2. T 27 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
3. T 88 Standard Method of Test for Particle Size Analysis of Soils
4. T 96 Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
5. T 180 Standard Method of Test for Moisture Density Relations of Soils Using a 10 lb. (4.54 kg) Rammer and an 18 in (457 mm) Drop
6. T 191 Standard Method of Test for Density of Soil In Place by the Sand Cone Method
7. T 205 Density of Soil In-Place by the Rubber-Balloon Method
8. T 238 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
9. T 239 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
10. T 310 Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. C 131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

2. C 136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
3. D 422 Standard Test Method for Particle Size Analysis of Soils
4. D 698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft3)
5. D 1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone method
6. D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft3)
7. D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity -Flow Applications
8. D 2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
9. D 6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.4 DEFINITIONS

A. Degree of Compaction: Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

B. Pipe Zone: That zone in an Excavation which supports, surrounds, and extends to 12 inches above the top of the pipe barrel. Specifically, 4 inches below the bottom (where rock, hard pan, boulders, etc. are encountered), 12 inches above the top of the pipe, and 1 foot laterally beyond both sides of the pipe, unless noted otherwise on the Drawings.

C. Trench Zone Backfill: That zone in an Excavation which begins 12 inches above the top of the pipe barrel and extends to the natural surface level or the finished grade indicated on the Plans.

D. Unyielding Material: Unyielding material shall consist of rock and gravelly soils with stones greater than 12 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

E. Unstable Material: Unstable material shall consist of materials too wet to allow backfill compaction or to properly support the utility pipe, conduit, or appurtenant structures.

F. Rock: Solid mineral material which cannot be removed with equipment reasonably expected to be used in the Work without cutting, drilling, or blasting. Minimum equipment size, in good running order, shall be similar to a **Komatsu 300, Caterpillar 320 or 330**, or equal.

1.5 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 - Submittal Procedures:

1. Copies of Field Density Test reports shall be submitted to ENGINEER or RPR at the beginning of each workday for the previous day's testing of subgrades, embankments and backfill Materials.
2. Copies of all Laboratory Test Reports shall be submitted to ENGINEER or RPR within 24 hours of the completion of the test.
3. Submit gradations and proctors for Pipe Zone Material and Trench Zone Backfill.

4. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.6 SITE CONDITIONS

A. Unsuitable Weather Limitations: CONTRACTOR shall not place, spread, or roll any fill material during unsuitable weather conditions. CONTRACTOR shall not resume operations until moisture content of material is satisfactory.

B. Weather Softened Subgrade: CONTRACTOR shall remove and replace at no additional cost to OWNER soft subgrade materials resulting from adverse weather conditions.

C. Protection of Graded Areas: CONTRACTOR shall protect all graded areas from traffic and erosion and shall keep these areas free of trash and debris. Work required to repair and reestablish grades in settled, eroded, and rutted areas shall be completed to specified tolerances at CONTRACTOR's expense.

D. Reconditioning Compacted Areas: All areas compacted to required specifications that become disturbed by subsequent construction operations or weather conditions shall be scarified, moisture conditioned, and re-compacted to the required density prior to further construction.

E. Grading: the final compacted surface of base course shall not vary more than 1/4 inch above or below design grade.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stabilization Material: Stabilization material shall consist of hard, durable particles of stone or gravel, screened, or crushed to the required size and gradation. The material shall be free from vegetation matter, lumps or balls of clay, or other deleterious matter and shall conform to the following gradation when tested in accordance with AASHTO T 27 or ASTM C 136.

1. Coarse material shall be crushed or washed, and fine material shall be wasted to meet the grading requirements set forth below. Note that if stabilization material is required, an 8 oz. non-woven filter fabric shall be placed between the stabilization material and the pipe zone material.
2. Coarse aggregate, retained on the No. 4 sieve, shall have a percentage of wear not greater than 40 percent when tested by the Los Angeles Test, AASHTO T-96 or ASTM C 131.

Sieve Size (Square Opening)	Percent By Weight Passing Screen
2-inch	100
1-1/2 inch	10 - 50
3/4-inch	0 - 25
No. 4	0 - 10
No. 200	0 - 3

B. Select Pipe Zone Material: Select material shall consist of 1-inch minus, well-graded native or import material, shall be free from vegetative matter, or other deleterious matter, and shall meet manufacturer's recommendations for the type of pipe installed. Select Pipe Zone Material shall be capable of meeting the compaction requirements.

C. Pipe Zone Material: All material in the pipe zone shall be clean and free from alkali, salt, petroleum products, vegetative matter or other deleterious matter, slag, cinders, ashes and rubbish or other material that in the opinion of the ENGINEER may be objectionable or deleterious. "Squeegee" or any other flowable material shall not be permitted. Pipe zone material shall conform to the following:

1. Waterline – Sand per the following gradation:

U.S. Standard Sieve Size (Square Opening)	Percent By Weight Passing Screen
1/2 - inch	100
No. 10	30-60
No. 40	0-30
No. 200	0-15

2. Waterline – Controlled Low-Strength Material (Flowable Fill):

   a. Flowable Fill shall be per APWA Section 03 31 05 – Controlled Low Strength Material.

D. Select Trench Backfill: Select backfill shall consist of native or imported materials (soils or bedrock which can be broken down to a compactible size). Maximum particle size for backfill shall be no greater than 4-inches. Select backfill shall be capable of meeting the compaction requirements.

E. Native Trench Backfill: Trench backfill may consist of native fill material meeting soils classifications A-1, A-2 or A-3 (A-1-a for Granular Borrow material) of AASHTO M 145, with a maximum particle size no greater than 4-inches in any dimension and shall be capable of meeting the compaction requirements. Trench backfill shall be non-plastic. Trench backfill shall be free from alkali, salt, petroleum products, vegetative matter or other deleterious matter, slag, cinders, ashes and rubbish or other material that in the opinion of the ENGINEER may be objectionable or deleterious. "Squeegee" or any other flowable material shall not be permitted.

F. Imported Granular Trench Backfill: At the direction of the OWNER where native materials are unable to achieve satisfactory compaction or meet the required soils classification, imported granular trench backfill shall be used and shall consist of imported materials meeting soils classifications A-1, A-2 or A-3 (A-1-a for Granular Borrow material) of AASHTO M 145 and shall be non-plastic. The maximum particle size for backfill shall be no greater than 6 inches. Imported granular trench backfill shall be capable of meeting the compaction requirements.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavation shall be performed to the lines and grades indicated. All excavated materials not intended for reuse shall be removed from the site and disposed of by the Contractor.

B. Rock Removal

1. CONTRACTOR shall cut away Rock at excavation bottom to form level bearing.
2. All shaled layers shall be removed to provide sound and unshattered base for foundations.
3. CONTRACTOR shall remove and legally dispose of excess excavated material and debris off-site unless indicated otherwise.
4. CONTRACTOR shall correct unauthorized Rock removal at no additional cost to OWNER.

3.2 SAFETY

A. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety requirements and the latest requirements of OSHA Safety and Health Standards for Construction (29 CFR 1926). CONTRACTOR is responsible for assessing safety needs to meet such requirements, arranging for proper equipment and/or construction methods, and maintaining such equipment, methods, and construction practices so as to fully comply with all safety requirements.

B. CONTRACTOR is responsible for assessing needs related to confined space entry, as defined by OSHA. CONTRACTOR shall meet all such requirements, arranging for proper equipment and/or construction methods, and maintaining such equipment, methods and construction practices so as to fully comply with all confined space safety requirements.

3.3 DEWATERING

A. Water removal shall be in accordance with Section 31 23 19 - Dewatering.

3.4 TRENCH WIDTH

A. The bottom of the trench shall have a minimum width equal to the outside diameter of the pipe plus 24-inches or as detailed on the Contract Drawings.

B. The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be placed and compacted as specified. Trenches shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting, and bracing, and the handling of special units as necessary.

3.5 TRENCH PREPARATION

A. Each trench shall be excavated so that the pipe can be laid to the alignment and grade as required. The trench wall shall be so braced that the workmen may work safely and

efficiently. All trenches shall be drained so the pipe laying may take place in dewatered conditions.

B. Bottom Preparation

1. Where rock, hard pan, boulders or other material which might damage the pipe are encountered, the bottom of the trench shall be over excavated 4 inches below the required grade and replaced with Stabilization Material. Otherwise, the bottom of the trench shall be over excavated 6 inches or 1/12 the outside diameter of the pipe, whichever is greater, below the required grade and replaced with Pipe Zone Backfill.
2. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 1-inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

C. Removal of Unstable Material

1. Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed by ENGINEER and replaced to the proper grade with Stabilization Material. When removal of unstable material is required due to the fault or neglect of CONTRACTOR in his performance of the work, the resulting material shall be excavated and replaced by CONTRACTOR without additional cost to OWNER.

D. The trench bottom (at the level of the base of the pipe) shall be given a final trim using a string line, laser, or another method approved by ENGINEER for establishing grade, such that each pipe section when first laid will be continually in contact with the ground along the extreme bottom of the pipe. Bell holes shall be provided at each joint to permit the jointing to be made properly. The trench grade shall permit the pipe spigot to be accurately centered in the preceding laid pipe joint, without lifting the pipe above the grade, and without exceeding the permissible joint deflection.

3.6 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures, and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.7 LAYING AND JOINING PIPE

A. Laying pipe: Provide proper facilities for lowering pipe sections into place. Dropping pipe will not be permitted. Place each section true to line and gradient in close and true contact with adjacent sections.

B. Joining pipe:

1. Use methods of joining conduit sections ensuring ends are fully entered and inner surfaces are flush and even. The equipment used to force the joints together must be adequate to overcome the gasket pressure involved. Pipe shall be installed in accordance with these specifications and the manufacturers' written specifications.
2. Just prior to joining the pipes, both spigot and bell ends shall be thoroughly cleaned to remove all foreign substances which may have adhered to the bell and spigot surfaces. All dust and dirt shall be removed with a clean rag. An approved lubricant (recommended by the manufacturer), that is not injurious to the gasket, shall be applied in accordance with the manufacturer's recommendations.
3. In the event any foreign material becomes embedded in the lubricant, or the lubricant becomes contaminated by water or other substances before the joint is started, the area affected shall be re-cleaned and new lubricant applied.
4. The pipe being joined shall be carefully moved into position, line and grade checked, and, as the spigot end is started into the bell of the section previously laid, the gasket shall be checked to insure uniform entry into the bell at all points. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Apply firm steady pressure either by hand or by bar and block assembly, until the spigot easily slips through the gasket. Care must be taken to ensure that the spigot is not over-inserted and that previously assembled pipe joints are not disturbed.

3.8 PIPELINE TRENCH BACKFILLING AND COMPACTION

A. Pipe Zone:

1. Pipe Zone Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise approved or specified. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be compacted to at least 95 percent of the maximum Modified Proctor density (ASTM D-1557), unless otherwise specified.
2. Replacement of Unyielding Material: Unyielding material removed from the bottom of the trench shall be replaced with Stabilization Material placed in layers not exceeding 6 inches loose thickness.
3. Replacement of Unstable Material: Unstable material removed from the bottom of the trench or excavation shall be replaced with Stabilization Material placed in layers not exceeding 6 inches loose thickness.
4. Where the pipe grade exceeds 30%, cohesive material shall be used in lieu of pipe bedding. The cohesive material shall be moistened to within 2% of optimum moisture and compacted as noted.
5. The relative density of the compacted cohesionless material shall not be less than 60% as determined by the Bureau of Reclamation Relative Density of Cohesionless Soil Test (Designation E-12) of the "Earth Manual."

B. Trench Backfill: Trenches shall be backfilled to the grade shown with Trench Backfill material as specified.

1. Trench backfill in asphalted road shall consist of backfilling the trench from above the pipe zone up to underneath the noted recommended depth for untreated base course and asphalt or concrete of finished grade with Trench Backfill material compacted to 95 percent of maximum density (ASTM D-1557). Backfill shall be placed in layers not exceeding 6-inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise approved or specified.
2. Trench backfill in unimproved or landscaped areas shall consist of backfilling the trench from above the pipe zone to 8-inches below finished grade with Trench Backfill material compacted to 95 percent of maximum density (ASTM D-1557). Backfill from 8-inches below finished grade to finished grade shall consist of topsoil replacement in addition to replacement of all landscaped materials. Trench backfill shall be placed in layers not exceeding 8 inches loose thickness.
3. It shall be the responsibility of CONTRACTOR to be assured that the Trench Backfill material is capable of being compacted to the degree specified. It shall be CONTRACTOR's responsibility to remove and dispose of all excess excavated material.

C. Final Backfill:

1. Unimproved and Landscaped Areas: The top 8-inches of the trench shall be filled with topsoil. Topsoil may be native material stripped prior to excavation of the trench. Backfill shall be deposited in layers of a maximum of 12-inch loose thickness and compacted to a minimum of 85 percent maximum density (ASTM D-1557). Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.
2. Roadways shall be completed with the type and thickness of materials (i.e., Untreated Road Base and Asphalt) as indicated or shown on the Contract Drawings

3.9 SPECIAL REQUIREMENTS

A. Special requirements for both excavation and backfill relating to the specific utilities from above the pipe zone to the natural surface level or the finished grade indicated on the Plans shall be placed and compacted as follows:

1. Where existing underground pipes or conduits larger than 3-inches in diameter and all sizes of sewer lines or sewer laterals cross the trench above the new work, the backfill from the bottom of the trench to 1 foot above the top of the intersecting pipe or conduit shall be pipe zone material compacted to 95 percent of maximum density (ASTM D-1557). The pipe zone material shall extend 2 feet on either side of the intersecting pipe or conduit to ensure that the material will remain in place while other backfill is placed.

B. The maximum trench length open at any given time shall not exceed 200 feet unless approved by ENGINEER and must be backfilled in a timely manner.

3.10 MAINTENANCE OF BACKFILL

A. All backfill shall be maintained in satisfactory condition, and all places showing signs of settlement shall be filled and maintained during the life of the Contract and for a period of one year following the day of final acceptance of all work performed under the Contract. When CONTRACTOR is notified by ENGINEER or OWNER that any backfill is hazardous, CONTRACTOR shall correct such hazardous condition at once. Any utility, road and/or parking surfacing damaged by such settlement shall be repaired by CONTRACTOR to the satisfaction of OWNER and ENGINEER. In addition, CONTRACTOR shall be responsible for the cost to OWNER of all claims for damage filed with the Court, actions brought against the said OWNER for, and on account of, such damage.

3.11 FINISH GRADING AND CLEANUP

A. CONTRACTOR shall grade the trench line to a smooth grade to affect a neat and workmanlike appearance of the trench line.

B. All tools, equipment and temporary structures shall be removed. All excess dirt and rubbish shall be removed from the site by CONTRACTOR.

C. CONTRACTOR shall restore the site to at least as good as original condition, including but not limited to final trench grade and restoration of affected public and private facilities whether in the public right-of-way or on private property. Any exception to this requirement must be in writing from ENGINEER for the job specific conditions.

3.12 COMPACTION TESTS

A. It shall be the responsibility of CONTRACTOR to accomplish the specified compaction for backfill, fill, and other earthwork. It shall be the responsibility of CONTRACTOR to control his operations by performing any additional tests necessary to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the requirements of these Specifications concerning compaction, control, and testing.

1. Testing of Backfill Materials
   a. Characteristics of backfill materials shall be determined in accordance with the requirements of Section 01 45 00 - Quality Control & Materials Testing.
   b. The CONTRACTOR shall demonstrate the adequacy of compaction equipment and procedures before exceeding any of the following amounts of earthwork quantities:
      i) 50 linear feet of trench backfill.
   c. Until the specified degree of compaction on the previously specified amounts of earthwork is achieved, no additional earthwork of the same kind shall be performed.
   d. After satisfactory conclusion of the initial compaction demonstration and at any time during construction, earthwork which does not comply with the specified degree of compaction shall not exceed the previously specified quantities.
   e. Compliance tests may be made by ENGINEER to verify that compaction is meeting the requirements previously specified at no cost to CONTRACTOR.
   f. ENGINEER may require retesting of backfill that has settled from water penetration in the trench. CONTRACTOR shall remove the overburden above

the level at which ENGI¬NEER wishes to test and shall backfill and recompact the excavation after the test is complete at no additional cost to the OWNER.

g. If compaction fails to meet the specified requirements, CONTRACTOR shall remove and replace the backfill at proper density or shall bring the density up to specified level by other means acceptable to ENGINEER. Subsequent tests required to confirm and verify that the reconstructed backfill has been brought up to specified density shall be paid by CONTRACTOR. CONTRACTOR's confirmation tests shall be performed in a manner acceptable to ENGINEER.

2. Field Density Tests

a. Field density tests shall be made in accordance with ASTM D 1557.

- END OF SECTION -

SECTION 31 23 23
EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 GENERAL

1.1 DESCRIPTION

A. This section covers excavating, backfilling, and compacting of disturbed areas for structures and roadways as directed by ENGINEER.

1.2 RELATED WORK

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures
2. Section 31 23 15 Excavation and Backfill for Buried Pipelines

1.3 REFERENCES

A. The latest edition of the following publications form a part of this Specification to the extent referred. The publications are referred to in the text by basic designation only.

B. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

1. M 145 Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
2. T 27 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
3. T 88 Standard Method of Test for Particle Size Analysis of Soils
4. T 180 Standard Method of Test for Moisture Density Relations of Soils Using a 10 lb. (4.54 kg) Rammer and an 18 in (457 mm) Drop
5. T 191 Standard Method of Test for Density of Soil In Place by the Sand Cone Method
6. T 310 Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. D 422 Standard Test Method for Particle Size Analysis of Soils
2. D 698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft3)
3. D 1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone method
4. D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft3)
5. D 2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
6. D 6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

D. The latest Edition of the Utah Department of Transportation Standard Specification for Road and Bridge Construction.

E. The latest Edition of the American Public Works Association (APWA) and Associated General Contractors of America Standard Plans and Standard Specifications.

1.4 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 Submittal Procedures:

1. Submit gradations and proctors for structural fill materials and backfill materials.

PART 2 PRODUCTS

2.1 STRUCTURAL FILL

A. Structural fill material, if required, shall meet the following requirements.

1. Material shall be non-expansive granular soil with less than 35 percent passing the No. 200 sieve, with a liquid limit less than 30, and free from rocks larger than 4 inches in the largest dimension, frozen lumps, roots, trash, lumber and organic material. The natural soils may be used as structural fill where it meets the above stated criteria.

2.2 3/4" WASHED ROCK

A. 3/4" Washed Rock shall consist of hard, durable particles of stone or gravel, screened or crushed, to the required size and gradation. The material shall be free from vegetation matter, lumps or balls of clay, or other deleterious matter and shall conform to the following gradation when tested in accordance with AASHTO T 27 or ASTM C 136.

Sieve Size (Square Opening)	Percent By Weight Passing Screen
1-inch	100
3/4-inch	95-99
1/2-inch	60
3/8 inch	30
No. 4	0 - 5
No. 8	0 - 3
No. 200	0 - 1

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavation shall be performed to the lines and grades indicated. Excavated material not required or not satisfactory for backfill shall be removed from the site.

B. Excavations shall be braced and supported as needed to prevent the ground adjacent to the excavation from sliding or settling. Slides shall be promptly removed and corrected by CONTRACTOR.

3.2 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with granular fill and compact to density equal to or greater than requirements for subsequent fill material.

C. Scarify subgrade surface to depth of 6 inches.

3.3 DEWATERING

A. Water removal shall be in accordance with Section 31 23 19 - Dewatering.

3.4 BACKFILL

A. Backfill material shall not be placed against concrete structures that have not been properly cured. No backfill material shall be placed until concrete has cured for a minimum of 7 days or until the compressible strength is 3,400 psi, whichever is greater.

B. Backfill material shall be placed in no more than 6-inch loose lifts for compaction by hand operated machine compactors, and 8 inches loose lifts for other than hand operated machines.

C. Structural fill placed beneath foundations, footings or the floor slab shall be placed and compacted to at least 96% of maximum dry density at a moisture content within 2 percent of optimum moisture content in accordance with ASTM D 1557.

D. Backfill material shall be placed and compacted to at least 95 percent of maximum dry density at a moisture content within 2 percent of optimum moisture content in accordance with ASTM D-1557.

E. Where the moisture content is not suitable and/or sufficient compaction has not been obtained, the fill shall be reconditioned to an approved moisture content and re-compacted to the minimum required compaction prior to placing any additional fill material.

F. CONTRACTOR shall be responsible for arranging for the placing and compacting of approved fill material in accordance with these Specifications. If it is determined that CONTRACTOR is failing to meet the minimum requirements, CONTRACTOR shall stop operations and make adjustments as necessary to produce a satisfactorily compacted fill at no additional cost to OWNER.

G. Sufficient personnel, equipment, sumps or other means should be provided to maintain the site in an acceptable dry condition for the duration of this contract.

H. Excavations shall be so braced and supported as needed to prevent the ground, adjacent to the excavation, from sliding or settling. Localized slides or settlements shall be promptly removed and corrected by CONTRACTOR.

3.5 FINISHED GRADE

A. The finished subgrade and grade of the fill shall not vary more than 0.05 feet from the established grades and cross sections shown on the Contract Drawings.

3.6 COMPACTION TESTS

A. Compaction testing shall be the provided and paid for in accordance with Section 01 45 00 – Quality Control and Materials Testing.

B. It shall be the responsibility of CONTRACTOR to accomplish the specified compaction for backfill, structural fill, Untreated Base Course and other earthwork. It shall be the responsibility of CONTRACTOR to control his operations by performing any additional tests necessary to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the requirements of these Specifications concerning compaction, control, and testing.

1. Testing of Backfill Materials
    a. Characteristics of backfill materials shall be determined in accordance with the requirements of Section 01 45 00.
    b. Contractor shall demonstrate the adequacy of compaction equipment and procedures before exceeding any of the following amounts of earthwork quantities:
        1) One (1) test per 1.0 feet of backfill thickness placed per structure.
    c. Until the specified degree of compaction on the previously specified amounts of earthwork is achieved, no additional earthwork of the same kind shall be performed.
    d. After satisfactory conclusion of the initial compaction demonstration and at any time during construction, earthwork which does not comply with the specified degree of compaction shall not exceed the previously specified quantities.
    e. Quality Control tests may be made by ENGINEER to verify that compaction is meeting the requirements previously specified at no cost to CONTRACTOR. If ENGINEER requires retesting of backfill, CONTRACTOR shall remove the overburden above the level at which ENGINEER wishes to test and shall backfill and recompact the excavation after the test is complete at no additional cost to OWNER.
    f. If compaction fails to meet the specified requirements, CONTRACTOR shall remove and replace the backfill at proper density or shall bring the density up to specified level by other means acceptable to ENGINEER. Subsequent tests required to confirm and verify that the reconstructed backfill has been brought up to specified density shall be paid in accordance with Section 01 45 23 – Testing Agency Services. The confirmation tests shall be performed in a manner acceptable to ENGINEER. Frequency of confirmation tests for remedial work shall be double that amount specified for initial confirmation tests.
2. Field Density Tests
    a. Tests shall be performed in sufficient numbers to meet the requirements of Section 01 45 00 and to ensure that the specified density is being obtained.

C. Field density tests shall be made in accordance with ASTM D 1557 and ASTM D 6938.

- END OF SECTION -

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SECTION 33 05 05
DUCTILE IRON PIPE

PART 1 GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall furnish and install all pipe, fittings, closure pieces, supports, bolts, nuts, gaskets, jointing material, polyethylene wrap, marker tape, tracer wire, and appurtenances as shown and specified, and as required for a complete and workable piping system.

B. Hydrostatic testing shall meet the requirements of Section 33 13 00 – Pipeline Testing and Disinfection.

C. If there is a discrepancy between this Section or applicable AWWA Standards, the more stringent requirement shall apply.

1.2 RELATED WORK

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures
2. Section 09 90 00 Painting and Finishes
3. Section 31 23 15 Excavation and Backfill for Pipelines
4. Section 33 12 00 Mechanical Appurtenances
5. Section 33 13 00 Pipeline Testing and Disinfection

1.3 REFERENCES

A. The Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract. The publication is referred to in the text by basic designation only.

B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. ASTM D 2041 Cast-Iron Pipe Flanges and Flanged Fittings Class 25, 125, and 250

C. AMERICAN STANDARDS FOR TESTING AND MATERIAL (ASTM)

1. ASTM A 193 Standard Specification for Alloy-Steel and Stainless-Steel Bolting for High Temperature or High-Pressure Service and Other Special Purpose Applications
2. ASTM A 194 Standard Specification for Carbon Steel, Alloy Steel, and Stainless-Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
3. ASTM A 283 Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
4. ASTM A 536 Standard Specification for Ductile Iron Castings

D. American Society of Mechanical Engineers (ASME)

1. ASME B1.1 Unified Inch Screw Threads, (UN And UNR Thread Form)
2. ASME B18.2.1 Square, Hex, Heavy Hex, And Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, And Lag Screws (Inch Series)
3. ASME B18.2.2 Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, And Coupling Nuts (Inch Series)

E. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C 104 Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
2. AWWA C 105 Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
3. AWWA C 110 Standards for Ductile-Iron and Gray-Iron Fittings, 3-inch Through 48-inch, for Water
4. AWWA C 111 Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
5. AWWA C 115 Standard for Flanged Ductile-Iron Pipe with Ductile Iron or Gray-Iron Threaded Flanges
6. AWWA C 150 Standard for the Thickness Design of Ductile-Iron Pipe
7. AWWA C 151 Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water
8. AWWA C 153 Standard for Ductile-Iron Compact Fittings, 3-inch Through 64-inch for Water
9. AWWA C 219 Standard for Bolted, Sleeve-Type Couplings for Plain-End Pipe
10. AWWA C 600 Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances
11. AWWA C 606 Standard for Grooved and Shouldered Joints
12. AWWA C 651 Standard for Disinfecting Water Mains

F. NSF INTERNATIONAL (NSF)

1. NSF 61 Drinking Water System Components – Health Components

1.4 SUBMITTALS

A. Submit catalog information on all pipe, fittings, valves, couplings, gaskets, tapes, bolts and nuts, wraps, safety tapes, and tracer wires as shown on the Contract Drawings. Information shall indicate manufacture specification compliance and dimensional data.

B. Submit shop drawings on all fabricated piping and pipe supports.

C. Submit bolting patterns, procedures, and bolting equipment data, and calculations for target torque calculations.

D. Certified affidavit of compliance for pipe and fittings or other materials furnished under this Section and as specified in the referenced standards.

E. Submit certification from NSF International, Truesdail Laboratories, UL Solutions, WQA, or other approved laboratory showing NSF 61 approval and limitations, if any.

1.5 QUALITY ASSURANCE

A. Except as modified herein, materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.

PART 2 PRODUCTS

2.1 DUCTILE IRON PIPE

A. Ductile iron pipe shall conform to the requirements of the AWWA C151 and AWWA C150 and pipe must be certified for potable water use by the National Sanitation Foundation (NSF/ANSI 61) and must bear the logo "NSF-pw" or "NSF-61" indicating such certification. Pipe thickness rating shall be minimum Class 53, unless otherwise noted on the Contract Drawings. The pipe shall be provided with rubber gaskets, specials, and fittings as required. Nominal pipe laying lengths shall be 20-feet.

B. Buried Ductile Iron Pipe shall be encased with 8 mil (minimum), Group 2, Class C black polyethylene, conforming to the requirements of AWWA C105. All seams in the polyethylene encasement shall be taped with a minimum 12 mil adhesive tape, **Polyken #900**, **3M Scotchrap 51,** or approved equal, to completely seal the seam.

2.2 FITTINGS

A. MJ and Push-on fittings shall conform to the (AWWA C110 or C153), be NSF certified to ANSI/NSF 61 and shall be for a minimum rated working pressure of 150 psi.

B. Ductile Iron flanges shall have either raised or plain faces and shall have a minimum working pressure rating as required for the Project conditions. For pipe sizes 24-inch and smaller, flanged joints may be rated for a maximum of 350 psi with the use of specially designed gaskets. CONTRACTOR shall be responsible to provide flanges that match connecting equipment and fittings.

C. All buried fittings shall be completely coated with food grade grease, **Chevron FM Grease**, or approved equal, and shall be completely encased with 8 mil (minimum), Group 2, Class C polyethylene, conforming to AWWA C105 and color to match the pipe wrap. All seams in the polyethylene encasement shall be taped with a minimum 12 mil adhesive tape, **Polyken #900**, **3M Scotchrap 51,** or approved equal, to completely seal the seam.

2.3 DUCTILE IRON PIPE JOINTS

A. Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints, or restrained joints as required.

1. Mechanical and push-on joints shall conform to the requirements of AWWA C111.
2. Flanged joints shall conform to the requirements of AWWA C115.
3. Restrained joints shall conform to the requirements of AWWA C151. Restrained joints shall **be Flex-Ring, Field Flex-Ring, or Lok-Ring by American Ductile Iron Pipe, Field Lok, TR-Flex by U.S. Pipe**, or approved equal.
4. Joint restraining devices that impart point loads on the pipe wall or that require a tapped anchor as a means of joint restraint shall not be allowed unless there are no other options available. The joint restraint devices shall be **MegaLug Model 1100 by EBAA Iron**, or approved equal.

2.4 RESTRAINED BOLTED SLEEVE-TYPE COUPLINGS

A. Restrained bolted sleeve-type couplings shall be provided where shown on the Contract Drawings. Couplings shall be of ductile iron or ASTM A283 Grade C steel, without pipe stop, and shall be of sizes to fit the pipe and fittings shown. Coating shall be fusion bond epoxy. Couplings shall be rated for 250 psi and comply with AWWA C219. Sleeve length shall be 7 inches for pipe diameters 4-inch through 12-inch and 10 inches for pipe diameters 14-inch and larger. Restraint gland shall be ductile iron meeting the requirements of ASTM A 536. Couplings shall be **Series 470 by Smith-Blair, Style 400RG by Romac, Series 3800 by EBAA Iron, Inc.**, or approved equal.

2.5 DISMANTLING JOINT

A. Provide dismantling joints were shown on the Contract Drawings. CONTRACTOR will not be allowed to substitute any other type of dismantling joint unless approved by ENGINEER. The coupling shall be rated as indicated on the Contract Drawings or to match the pressure rating of the adjoining pipe.

B. Dismantling joint bodies shall be fabricated from steel, ASTM A512 or A 513 or Ductile Iron ASTM A536, without pipe stop. The body shall not be less than 1/4-inch thick or at least the same wall thickness as the pipe to which the joint is connected. If the strength of the body material is less than the strength of the pipe material, the thickness of the middle ring shall be increased to have the same strength as the pipe. The follower ring shall be fabricated from steel, ASTM A576 or A36.

C. For dismantling joints installed in piping systems rated for positive pressure, the joint shall be restrained with harness bolts or tie rods. Other means of restraining the joint such as set screws will not be accepted. Harnesses shall be designed in accordance with AWWA Manual 11, or as indicated. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed.

D. Gaskets shall be composed of a rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions.

E. Dismantling joints shall be **Model 975 by Smith-Blair, Model 309 by JCM, Model DJ400 by Romac**, or approved equal.

2.6 MJxMJ ADAPTER

A. Provide a positive, bolt-through restraint mechanism to connect mechanical joint valves and fittings without the use of pipe. The MJ x MJ Adapter will incorporate a bolt-through restraint mechanism design that allows for connection of MJ x MJ bells of valves and fittings with T-head bolts and pigtail bolts. The MJ x MJ Adapter and spacers shall be manufactured from high strength ductile iron in accordance with ASTM A536, Grade 65-45-12. Supplied with standard NSF-61 Approved asphaltic seal coat that conforms to ANSI/AWWA C104/A21.4 or NSF-61 approved FBE coating that conforms to ANSI/AWWA C116/A21.6. Provide gaskets, bolts, and nuts as specified herein.

B. The MJ x MJ Adapter shall have a maximum water working pressure of 350 PSI for sizes 3-inch to 24-inch, and 250 PSI for sizes 30-inch to 36-inch and shall be used with standard Mechanical Joint fittings and valves. The MJ x MJ Adapter shall be **Star Pipe Products Series 100, Foster Adapter by Infact Corporation,** or approved equal.

2.7 GASKETS

A. Except as otherwise provided, gaskets for flanged joints shall be full face, 1/8-inch thick SBR elastomer and shall have at least three (3) bulb type rings molded into both faces of the gasket. Class 250 or less flange gaskets shall be **Flange-Tyte by U.S. Pipe** or approved equal. Higher pressure joint gaskets shall be **Garlock BLUE-GARD Style 3000**, or approved equal. Wherever blind flanges are shown, the gaskets shall consist of 1/8-inch thick cloth-inserted rubber sheet which shall cover the entire inside surface of the blind flange and shall be cemented to the surface of the blind flange.

B. All buried fittings using steel bolts shall be coated with no-oxide wax and wrapped with polyethylene or as otherwise approved by ENGINEER.

2.8 BOLTS AND NUTS

A. Bolts and nuts shall be rated for the system working pressure with a minimum safety factor of three. Bolts and nuts buried, submerged, and inside vaults shall be Type 304 stainless steel. Bolts and nuts above grade, exposed or inside structures, shall be Type 304 stainless steel. Bolts and nuts in exposed to wastewater or in corrosive environments shall be Type 316 stainless steel.

B. All flange bolt lengths shall be selected by CONTRACTOR such that three full threads, as a minimum, protrude from the hex nut and washer after assembly.

C. Flange bolts shall have ASME B1.1, Class 2A threads, and be manufactured of ASTM A 193, Grade B7 steel. Bolts shall conform to ASME B18.2.1.

D. Flange nuts shall have Class 2B fit, and be manufactured of ASTM A 194, Grade 2H steel, having square or hex heavy dimensions in accordance with ASME B18.2.2.

E. Connection T-bolts for mechanical joint (MJ) fittings shall be Cor-Ten high strength, low alloy steel conforming to AWWA C111. T-Bolts and nuts shall have a zinc plating base coat and PTFE finish coat and shall be **R-Blue by Romac**, or approved equal, or a baked-on ceramic filled fluorocarbon resin and shall be **Blue Fluoropolymer by Trumbull Mfg, NAPAC Kor-10Blu, Sigma**, or approved equal.

2.9 CEMENT MORTAR LINING

A. Ductile iron pipe and fittings shall be lined with cement mortar in accordance with the requirements of the AWWA C104 except that the lining thickness shall be not less than 1/8 of an inch. The pipe interior surfaces shall be smooth and free from fractures, excessive crazing, and roughness.

2.10 THRUST BLOCKS/ RESTRAINTS

A. All fittings for pipe 20-inch diameter and larger shall not have thrust blocks, but joint restraints for the adjacent pipe shall be provided for the distances indicated on the Contract Drawings. All fittings for pipes smaller than 20-inch diameter shall have proper thrust blocks and restraints as noted for the type of installation required. Joint restraint shall be provided for all bends, fittings, and valves regardless of pipe size or location. Thrust blocks shall be concrete as per OWNER's Standards.

B. Joint restraints may be tie rods, **TR Flex piping system as manufactured by US Pipe**, or approved equal, or a **Megalug system as manufactured by EBAA Iron**. Where the required pipeline deflection exceeds the recommended deflection of the TR Flex piping system, CONTRACTOR shall use Megalugs to achieve specified deflections.

C. Restrained joints shall be suitable for 200 psi test pressures.

2.11 SAFETY TAPE

A. Safety tape shall be a minimum of 3-inch wide by 5.0 mil overall thickness, with no less than a 0.35-gauge solid aluminum foil core. It shall be Safety Blue in color per American Public Works Association (APWA) National Color Code and shall be clearly labeled with the words “CAUTION WATER LINE BELOW” or similar wording approved by ENGINEER. Safety tape shall be **MagnaTec by Empire Level Mfg Corp**, or approved equal.

2.12 TRACER WIRE

A. All piping (including service lines) shall be installed with [12 gauge solid copper THHN, #14 UF-G direct bury blue] tracer wire for pipeline location purposes by means of an electronic line tracer.

1. The wires must be installed along the entire length of the pipe on the top of the pipe and be held in place with poly tape at all pipe joints and at 5 foot intervals.
2. Sections of wire shall be spliced together using approved splice caps and waterproof seals. Twisting the wires together is not acceptable.

2.13 PIPE COATINGS

A. All exposed piping, valves, and fittings including inside vaults and buildings and exposed to the atmosphere shall be painted as specified in Section 09 90 00 – Painting and Finishes. Exposed piping, valves, and fittings to be painted shall be primed by the manufacturer in preparation for painting. CONTRACTOR shall provide verification from the finish coating supplier that the field applied coatings are compatible with the manufacturer’s prime coat. Pipe to be painted shall not have asphalt emulsion coating. The exterior of buried pipe and fittings shall be an asphaltic coating approximately one-mil thick.

PART 3 EXECUTION

3.1 INSTALLATION

A. Excavation and backfill of trenches and for appurtenances shall be in accordance with Section 31 23 15 - Excavation and Backfill for Buried Pipelines.

B. Ductile iron fittings shall be installed in accordance with the ANSI/AWWA C 600. Inspect each pipe and fitting prior to installation to verify there is no damage and clean each pipe and fitting prior to installation.

C. Pipe shall be laid directly on the bedding material. Bell holes shall be formed at the ends of the pipe to prevent point loading.

D. No pipe shall be installed on a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation before backfilling occurs.

E. Immediately before joining the pipe, the bell end of the pipe shall be thoroughly cleaned. The spigot end of the pipe and the inside surface of the gasket shall be cleaned and lubricated. The lubricant shall be non-toxic, shall not support bacteria growth, shall not be harmful to the gasket material, and shall be compliant with NSF/ANSI 61 requirements. The lubricant shall not impart a taste or odor to the water in the pipe. Tilting of the pipe to insert the spigot into the bell will not be permitted.

F. Buried Ductile Iron pipe shall be polyethylene encased in accordance with the requirements of AWWA C105 Method A. Remove all lumps of clay, mud, cinders, etc. on the pipe surface before installation of the encasement. During installation, soil or embedment material shall not be trapped between the pipe and the polyethylene. Cut polyethylene tube to a length at least 2 feet longer than the pipe section. Wrap shall overlap the adjacent pipe joint at least 1 foot. After assembling the pipe joint, overlap the joint with the polyethylene tube and secure to the pipe with adhesive tape completely around the seam. Overlap the joint on the previous pipe with the polyethylene tube and secure to the existing wrap with adhesive tape and completely seal the seam. Take up the slack width at the top of the pipe to make a snug but not tight fit along the barrel of the pipe and secure with poly tape at 5 foot intervals. For installations below the water table or wet areas, circumferential wraps of tape should be placed at 2 foot intervals along the barrel of the pipe prior to lowering the pipe into the trench.

G. All buried Ductile Iron fittings and valves shall be completely coated with food grade grease, **Chevron FM Grease**, or approved equal, and shall be encased with polyethylene wrap and installed in conformance with AWWA C105 standards. All seams in the polyethylene encasement shall be taped with **Polyken #900, 3M Scotchrap 51,** adhesive tape, or approved equal, to completely seal the seam.

H. Repair punctures to the polyethylene wrap with adhesive tape. Repair cuts, tears, or damage to the polyethylene wrap with a tube cut open, wrapped around the pipe to cover the damaged area, and secure in place with **Polyken #900, 3M Scotchrap 51,** adhesive tape, or approved equal, to completely seal the seam.

I. Provide openings for branches, service taps, blowoffs, air valves, and similar appurtenances by cutting an “X” in the polyethylene and temporarily folding back the film. After the appurtenance is installed, tape the slack securely to the appurtenance, and repair the cut and any other damaged areas.

J. To make a direct tap, apply two or three wraps of adhesive tape completely around the polyethylene encased pipe to cover the area where the tapping machine and chain will be mounted. Install the corporation stop directly through the tape and polyethylene encasement. After the direct tap is completed, inspect for damage and repair if needed.

K. Where polyethylene wrapped pipe joins an adjacent pipe that is not wrapped, extend the polyethylene wrap to cover the adjacent pipe for a distance of 3 feet. Secure the end with adhesive tape completely around the seam. Service lines with dissimilar metals shall be wrapped with polyethylene or approved dielectric tape for a minimum clear distance of 3 feet away from the ductile iron pipe.

L. Valves shall be handled in a manner to prevent damage to any part of the valve. CONTRACTOR shall adjust stem packing and operate each valve prior to installation to insure proper operation. Valves shall be installed so that the valve stems are plumb and, in the location, indicated on the drawings.

M. The pipe shall be plugged at the end of each workday or period of suspension.

N. Safety tracer tape shall be installed 12-inches above the pipe along the entire length of pipeline.

O. Tracer wire shall be brought into the vault. When splicing a wire use a greased filled or approved connector. All splices should occur within a valve box or vault. Wire is to be continuous underground. Underground splices may only be used by specific permission of the OWNER and must be inspected before backfill.

3.2 THRUST BLOCKS

A. Thrust blocks shall be installed at points where the pipe changes direction such as: at all tees, elbows, wyes, caps, valves, hydrants, reducers, etc.

B. Thrust blocks shall be constructed so that the bearing surface is in direct line with the major force created by the pipe or fitting.

C. Thrust blocks shall bear against solid undisturbed earth at the side and bottom of the trench excavation and shall be shaped so as not to obstruct access to the joints or the pipe or fitting.

D. Thrust blocks shall be sized and constructed per OWNER's Standards or the Contract Drawings, whichever is greater.

3.3 PRELIMINARY CLEANING AND FLUSHING

A. CONTRACTOR shall flush the pipeline as the work progresses by a means in accordance with good practice to ensure that sand, rocks, or other foreign material do not remain in any of the pipeline. If possible, the flushing shall be made with an open pipe end.

B. CONTRACTOR shall provide to ENGINEER a proposed schedule and method of flushing for review before the flushing starts.

3.4 BOLTING PROCEDURES FOR FLANGED JOINTS

A. Flange joints shall be assembled per the gasket manufacturer's instructions and as specified herein. Utilize calibrated bolting equipment capable of applying a measured torque to flange bolts during joining. Bolting patterns, procedures, and bolting equipment data shall be submitted prior to pipe fitting and bolting.

B. Gaskets, bolts, and anti-seize lubricant used in the bolting procedure shall be selected from those specified herein. Submit target torque calculations for each application. Calculations shall identify specific gasket (manufacturer, model, size, configuration, material), bolts (size and material), and anti-seize lubricant. The calculations shall document and take into consideration the pipe service, working and test pressures, pipe diameter, gasket data sheet, bolt material, gasket supplier-recommended assembly stress, and gasket-supplier recommended bolt stress. Calculations shall be stamped by a

professional engineer. Target torque calculations shall be used in the assembly of bolted joints.

C. Flange bolts, nuts, and washers shall be visually inspected and cleaned prior to bolting. Lubricate bolts and nuts; if hardened washers are not used, lubricate the flange surface around the bolt holes. This lubricant must be removed by cleaning solvent prior to applying a coating system. Hand-tighten all nuts and bolts then tighten them to 10 to 20 percent of the target torque. The initial torque shall not exceed 20 percent of the target torque. The bolts shall be tightened according to the pattern included in AWWA Manual M11, Figure 12-3.

D. For flanges having 4 to 8 bolts there shall be three rounds of tightening, after hand tightening, to 30 percent, 60 percent and then 100 percent of the target torque. For flanges having 12 or more bolts there shall be four rounds of tightening, after hand tightening, to 20 percent, 40 percent, 80 percent and 100 percent of the target torque. At 100 percent of target torque the flange gap shall be measured at every other bolt to confirm uniformity. The bolts shall be re-tightened to the target torque 24 hours after completion of the initial bolting sequence.

3.5 TRACER WIRE TESTING

A. Tracer wire shall be installed where indicated above or shown on the Contract Drawings on the pipe along the entire length of pipeline.

B. Upon completion of the pipe installation, CONTRACTOR shall demonstrate that the wire is continuous and unbroken through the entire run of the pipe.

1. Demonstration shall include full signal conductivity (including splices) when energizing for the entire run in the presence of OWNER and/or ENGINEER.
2. If the wire is broken, CONTRACTOR shall repair or replace it. Pipeline installation will not be accepted until the wire passes a continuity test.

3.6 HYDROSTATIC FIELD TESTING OF PIPE

A. CONTRACTOR shall provide additional temporary blow-off valves and fittings as required to flush and disinfect new pipelines as required in Section 33 13 00 – Pipeline Testing and Disinfection. Temporary blow-off valves and fittings shall be removed prior to placing pipeline into service.

B. Source of Water

1. CONTRACTOR shall assume all responsibility to obtain the necessary water supplies for pressure testing of the pipeline.

C. Testing Procedure

1. The pipe working pressure is 200 psi unless noted otherwise on the Contract Drawings.
2. Pipe test pressure shall not exceed 125% of the working pressure unless taken into consideration during design. The test pressure shall not exceed the thrust-restraint design pressure or 1.5 times the pressure rating of the pipe or joint, whichever is less.

3. For projects with long pipeline segments, the test pressure shall not be less than 125% of the design operating pressure at the highest elevation on the pipeline and shall not be less than 150% of the working operating pressure at the lowest elevation on the pipeline.
4. Hydrostatic testing shall be in accordance with the requirements of AWWA C 600 and Section 33 13 00 - Pipeline Testing and Disinfection. In case of a conflict between these two references, the more stringent requirement shall be followed.
5. In the case of pipelines that fail to pass the leakage test, CONTRACTOR shall determine the cause of the excessive leakage, shall take corrective measures necessary to repair the leaks, and shall repeat the pipeline test, all at no additional cost to OWNER.
6. ENGINEER shall be notified at least 48 hours before the pipeline is to be tested so that ENGINEER may be present during the test
7. Air pressure testing will not be allowed.

D. Exposed piping and valves shall show no visible leaks and no pressure loss during the test.

3.7 DISINFECTING

A. Disinfection shall be in accordance with Section 33 13 00 – Pipeline Testing and Disinfection.

B. Connection of new piping to existing piping will only be allowed after successful completion of disinfection and testing of the new piping.

3.8 PAINTING

A. All exposed piping including inside vaults and structures shall be coated as specified in Section 09 90 00 – Painting and Finishes.

- END OF SECTION –

SECTION 33 05 11
HDPE PRESSURE PIPE (AWWA C906)

PART 1 GENERAL

1.1 DESCRIPTION

A. This section covers furnishing and installation of high-density polyethylene (HDPE) pipe as shown in the Contract Drawings and specified herein.

1.2 RELATED WORK

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures
2. Section 31 23 15 Excavation and Backfill of Buried Pipelines
3. Section 33 13 00 Pipeline Testing and Disinfection

1.3 REFERENCES

A. The Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract. The publication is referred to in the text by basic designation only.

B. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

1. ASTM D 1248 Standard Specifications for Polyethylene Plastics Extrusion Materials for Wire and Cable
2. ASTM D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
3. ASTM D 2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
4. ASTM D 2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
5. ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
6. ASTM D 3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
7. ASTM F 585 Standard Guide for Insertion of Flexible Polyethylene Pipe Into Existing Sewers
8. ASTM F 714 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
9. ASTM F 1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing
10. ASTM F 1804 Standard Practice for Determining Allowable Tensile Load for Polyethylene (PE) Gas Pipe During Pull-In Installation
11. ASTM F 2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

12. ASTM F 3124 Standard Practice for Data Recording the Procedure used to Produce Heat Butt Fusion Joints in Plastic Piping Systems or Fittings
13. ASTM F 3183 Standard Practice for Guided Side Bend Evaluation of Polyethylene Pipe Butt Fusion Joint
14. ASTM F 3190 Standard Practice for Heat Fusion Equipment (HFE) Operator Qualification on Polyethylene (PE) and Polyamide (PA) Pipe and Fittings

C. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C 901 Polyethylene (PE) Pressure Pipe and Tubing, 1/2"-inch through 3-inch, for Water Service.
2. AWWA C 906 Polyethylene (PE) Pressure Pipe and Fittings, 4-inch through 63-inch, for Water Distribution and Transmission.
3. AWWA M 55 PE Pipe – Design and Installation

D. PLASTICS PIPE INSTITUTE (PPI)

1. PPI Handbook Handbook of Polyethylene Pipe
2. PPI MAB-01 MAB Generic Electrofusion Procedure for Field Joining of 12 Inch & Smaller Polyethylene (PE) Pipe
3. PPI MAB-02 MAB Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe
4. PPI TR 33 Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. The following shall be submitted:

1. Product data sheets, brochures, and other information demonstrating conformance to applicable pipe specifications before pipe is installed.
2. Certified dimensional as-built drawings/profile of all installed pipe, specials, and fittings.
3. Details of fittings and specials such as elbows, tees, outlets, connections, test bulkheads, nozzles or other special items where shown in the Contract Drawings. All connections to jointed gasketed pipe materials, valves or fire hydrants must be restrained and supported independently to withstand the pressure transients, soil settlement, and external loading conditions.
4. The Supplier of the material shall submit, through CONTRACTOR, a Certificate of Compliance that the HDPE pipe and fittings furnished for this project meet or exceed the standards set forth in this Specification. CONTRACTOR shall submit these certificates to ENGINEER prior to installation of the pipe materials.
5. A plan for pipe joining and installation. The plan must be reviewed and approved by ENGINEER prior to pipe installation.
6. Provide a certification that personnel responsible for fusing the pipe have been trained and qualified per ASTM F 3190.
7. Information on manufacturer and model of machine to be used for fusion of HDPE pipe.

1.5 QUALITY ASSURANCE

A. Pipe shall be subject to inspection at the place of manufacture. Notify ENGINEER not less than 14 days prior to the start of any phase of the pipe manufacture. During manufacture ENGINEER shall be given access to all areas of the process and shall be permitted to make inspections necessary to confirm compliance with the Specifications.

B. Materials used in the manufacture of the pipe shall be tested in accordance with this Section and the referenced standards. CONTRACTOR shall perform said material tests. ENGINEER shall have the right to witness testing if CONTRACTOR's schedule is not delayed for convenience of ENGINEER.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

A. Pipe up to 3-inch nominal diameter shall meet the requirements of AWWA C901. Pipe 4-inch through 63-inch nominal diameter shall meet the requirements of AWWA C906.

B. The high-density polyethylene pipe shall be manufactured by **JM Eagle, WL Plastics Corp.**, or approved equal, and shall have a minimum pressure rating as noted on the Contract Drawings. The HDPE pipe shall have designation of PE 4710 (IPS size), made from prime virgin resin with a minimum cell classification of PE 445574C or higher in accordance with ASTM F 714 and D 3350. The resin shall be listed by the Plastic Pipe Institute (PPI) in its pipe-grade registry Technical Report (TR) 4, "Listing of HDB/HDS/SDB/PDB/MRS for Thermoplastic Piping Materials or Pipe".

C. The manufacturer shall comply with NSF Standard 14 and NSF 61 by certifying in writing to the design engineer and making the pipe with the NSF logo in the print line. The manufacturer shall comply with AWWA Standard C901 or C906 by certifying to the design engineer and marking the pipe with the appropriate AWWA standard in the print line.

D. Pipe shall be marked per AWWA C901 or C906 and NSF. Pipe markings shall include nominal size, OD base, dimension ratio, pressure class, manufacturer's name, manufacturer's production code including day, month, and year extruded, and manufacturer's plant and extrusion line.

E. Fittings shall be pressure rated to match the system piping to which they are joined. At the point of fusion, the outside diameter and minimum wall thickness of the fitting shall meet the outside diameter and minimum wall thickness specifications of AWWA C901 or AWWA C906 for the same size of pipe.

F. Service connections shall be electrofusion saddles with stainless steel outlet, electrofusion saddle, tapping tees, or mechanical saddles. Electrofusion fittings shall be made of the same material as the mainline pipe and meet manufacturer standard ASTM F1055 and have a pressure rating equal to the pipe unless noted otherwise on the Contract Drawings. Tapping tees shall meet ASTM D3261 or ASTM D2683. Mechanical strap-on saddles can only be used where their use on PE pipe is approved by the mechanical saddle manufacturer. The body of the saddle shall be stainless steel with a minimum of 2-inch wide straps. The gasket material and design must be

acceptable to PE pipe. Mechanical strap-on saddles will be installed per the manufacturer's instructions.

2.2 TRACER WIRE

A. All HDPE piping installed by horizontal directional drilling shall be installed with continuous tracer wire, 12 AWG **SoloShot Extra High Strength (EHS) 1245B by Copperhead Industries**, or approved equal, with 45 mil HDPE jacket with minimum 1,150-pound break load or approved equal.

B. All direct bury piping (including service lines) shall be installed with 12-gauge solid copper THHN tracer wire for pipeline location purposes by means of an electronic line tracer.

1. The wires must be installed along the entire length of the pipe on the top of the pipe and be held in place with ties or hitches spaced not more than 12-feet apart.
2. Sections of wire shall be spliced together using approved splice caps and waterproof seals or solder. Twisting the wires together is not acceptable.

2.3 FUSION UNIT REQUIREMENTS

A. All Fusion Equipment, whether new or used, rented, or owned, shall comply with the requirements of ISO 12176-1 "Equipment for Fusion Jointing Polyethylene Systems".

B. The butt fusion equipment must be in satisfactory working order and the hydraulic system must be leak free. Heater plates shall be free from scrapes, gouges, and have a consistent clean coated surface. The pressure gauge and thermometer should be properly calibrated. When requested by ENGINEER, records showing a maintenance service/inspection within 3 months prior to use for this project shall be provided.

C. Rental Butt Fusion Equipment must be maintained by an Authorized Service and Repair Center with at least one Certified Master Mechanic on staff. When requested by ENGINEER, an inspection report detailing the components inspected within 3 months prior to arrival at the jobsite will be provided.

D. For 16-inch diameter and larger pipe sizes, the butt fusion machine shall be capable of autonomously calculating the drag pressure and perform the shift sequence autonomously.

E. Electrofusion Processors shall be maintained and calibrated per manufacturer's requirements and recommendations.

PART 3 EXECUTION

3.1 STORAGE AND HANDLING

A. Pipe shall be stored on clean level ground to prevent undue scratching or gouging. Sections of pipe with deep cuts or gouges shall be removed and ends of pipes rejoined. Handling of the joined pipe shall be in such a manner that the pipe is not damaged by dragging over sharp or cutting objects.

B. Lifting of joined pipe sections shall preclude concentration of bending stresses at joints and shall be done in a manner which evenly distributes lifting stresses along the full length of the pipe.

C. Pipe shall be stored in a shaded area or covered to avoid temperature extremes which may cause the pipe to bow or warp.

3.2 EXCAVATION AND BACKFILL

A. Excavation and backfill of trenches and for appurtenances and backfilling for high density polyethylene pipe shall be in accordance with Section 31 23 15 Excavation and Backfill for Buried Pipelines.

3.3 INSTALLATION

A. High density polyethylene pipe shall be installed according to the requirements of ASTM D 2321, AWWA M 55, and the manufacturer's requirements. Wherever these requirements are in conflict, the more stringent requirement shall apply.

B. Pipe embedment - Embedment material should be Class I, Class II, or Class III materials as defined by ASTM D 2321 Section 6. The use of Class IV or Class V materials is not recommended; however, they may be used only with the evaluation and approval of ENGINEER at a demonstrated achievable compaction.

C. Bedding: Pipe bedding shall be in conformance with ASTM D 2321 Section 8. Compaction rates should be as specified in ASTM D 2321. Deviations shall be approved by ENGINEER.

D. Haunching and backfill shall be as specified in ASTM D 2321 Section 9 with Class I, II, or III materials. Compaction shall be in excess of 85% Proctor, providing a minimum modulus of 1,000 psi or greater.

E. Sections of pipe shall be joined into continuous lengths by the butt fusion method and shall be performed in strict conformance with the pipe manufacturer's recommendations using approved equipment. Sections of pipe shall be as long as practical to minimize the number of joints.

F. High density polyethylene pipe shall be installed, backfilled, and allowed to acclimatize to the typical soil temperatures prior to connection to other piping systems.

3.4 PULL-IN INSTALLATION

A. Pull-In Installation

1. Per ASTM F 1804, CONTRACTOR shall determine and document the maximum proposed pull-in length and pull-in force for the pressure class and pipe diameter to be pulled into an open trench. Pull-in lengths will not exceed the maximum lengths for the class and diameter pipe. A commercially available load limiter (weak link) approved by ENGINEER shall be used between the puller and the pipe.
2. Prior to pulling the pipeline, CONTRACTOR shall place rollers or other approved devices beneath the pipe to avoid unnecessary damage and to reduce pipe drag.

3.5 FUSION AND JOINING

A. Fusion Joining Requirements:

1. All HDPE pipes shall be joined to by the heat fusion process which produces homogeneous, sealed, leak-tight joints. Tie-ins between sections of HDPE pipe shall be made by butt fusion whenever possible.
2. Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F2620 or PPI TR 33. All fusion joints shall be made in compliance with the pipe or fitting manufacturer's recommendations. Fusion joints shall be made by qualified fusion technicians per ASTM F 3190. A record or certificate of training for the fusion operator must be provided which documents training to the fundamentals of ASTM F2620. Considerations should be given to, and provisions made, for adverse weather conditions, such as temperatures below freezing, precipitation, or wind, which is accepted by OWNER and ENGINEER. The use of a controlled cooling cycle procedure to reduce cooling time is acceptable only as part of a controlled cooling cycle procedure where testing demonstrates that acceptable joints are produced using the controlled cooling cycle procedure.
3. Electrofusion: Electrofusion for joints and appurtenances must be approved by OWNER and ENGINEER prior to beginning the project. Electrofusion joining shall be done in accordance with the manufacturer's recommended procedure. Other sources of electrofusion joining information are PPI MAB-01 and PPI MAB-02. The process of electrofusion requires an electric source, commonly called an electrofusion processor that has wire leads. The electrofusion processor must be capable of reading and storing the input parameters and the fusion results for later download to a record file. The qualification of the fusion technician shall be demonstrated by evidence electrofusion training within the past year on the equipment to be utilized for this project.

B. Fusion Operators:

1. The employer of the fusion machine operator is responsible for the fusion joint quality of the fusion weld made by that individual. The employer is responsible for documenting all training and qualification records for that individual, including compliance with any code requirements for fusion/bonder operators.
2. All HDPE fusion equipment operators shall be qualified in the procedure used to perform pipe joining. Fusion equipment operators shall have current, formal training on all fusion equipment employed on the project. Training received more than two years prior to operation with no evidence of activity within the past 6 months shall not be considered current.
3. For Projects with at least 5,000 feet or with pipe larger than 24-inches diameter, operators or their supervisor must have a current training certificate for the equipment to be used on the project.
4. When the fusion machine operator is employed by the HDPE pipe and fusion machine supplier, the supplier shall maintain an ISO 9001 Certified Quality Management System.

C. Butt Fusion Equipment:

1. For 6-inch and larger pipe sizes, the pipe butt fusion machine shall be a self-contained hydraulic fusion machine capable of butt fusing HDPE pipe. The carriage must be removable from the chassis for in-ditch use. The machine must be

compatible with an electronic data recording device. Accessories will include all butt fusion inserts for the specified range of pipe sizes, a pyrometer kit for checking the surface temperature of the heater, extension cord of appropriate gauge (25 feet minimum), and hydraulic extension hoses (minimum of four). The butt fusion machine will be **McElroy,** or approved equivalent.

2. For 16-inch diameter and larger pipe sizes, the butt fusion machine shall be capable of autonomously calculating the drag pressure and perform the shift sequence autonomously.
3. In areas where there may be insufficient space for layout of the entire length of fused pipe to be pulled-back, CONTRACTOR shall utilize a continuous HDPE pipe fusion equipment such as a PolyHorse by McElroy or other means to fuse the length of pipe necessary for the installation.

D. Fusion Data Recording:

1. For 6-inch and larger pipe sizes, McElroy DataLogger or equivalent fusion data recorder shall be used to record all fusion welds on hydraulically operated fusion machines. The device shall be capable of meeting the requirements of ASTM F3124. The device, or combination of devices, shall record the following variables of each fused joint:
   a. Heater surface temperature- immediately before inserting the heater plate, measure with a pyrometer and manually enter into the weld record.
   b. Gauge pressure during the initial heat cycle
   c. Gauge pressure and elapsed time during the heat-soak cycle
   d. Heater removal (dwell) time
   e. Gauge pressure and elapsed time during the fusing/cool cycle
   f. Drag pressure
   g. Pipe diameter and wall thickness
   h. Type of HDPE material (Specification and Classification) and manufacturer
   i. Fusion Machine Identification
2. The device shall record the operator’s name and a unique operator ID number, along with the date and time of each weld.
3. Records showing the device is up to date on all required calibration should be available for presentation when requested.
4. All fusion welds should be traceable to the report (via operator and weld ID) with an indentation weld stamp or by permanent paint marker/pen next to fusion weld.
5. A weld location map may be requested, prior to commencement of work, by the OWNER or OWNER’s representative.

E. Butt Fusion Examination and Testing:

1. Examinations
   a. Visual: For pipe sections, examine the full exterior circumference for bead uniformity before cutting. After cutting the pipe section, review the interior bead. All beads should have visually acceptable bead formation as shown in Fig 4 and Appendix X2 of ASTM F 2620. In addition, the following characteristics are expected:
      1) There shall be no evidence of cracks or incomplete fusing.
      2) There shall be no evidence of captured objects (e.g., pipe shavings, facer ribbons) between bonded surfaces.
      3) Variations in upset bead heights on opposite sides of the cleavage and around the circumference of fused pipe joints are acceptable.
      4) The apex of the cleavage between the upset beads of the fused joint shall remain above the base material surface.
      5) Fused joints shall not display visible angular misalignment, and outside diameter mismatch shall be less than 10% of the nominal wall thickness.
      6) Fusion data record review that meets criteria of section 3.04.D.1 can be used as additional verification of visual indicators.
   b. Fusion Data Record Review: The fusion date record for each fused joint shall be compared to the approved fusion procedure. The reviewer shall verify the following:
      1) That all data required by section 3.04.D.1 was recorded
      2) Interfacial pressure was within the acceptable range.
      3) The heater surface temperature was within the acceptable range.
      4) The butt fusion pressure applied during the fusing/cool cycle was correctly calculated to include drag pressure, fell within the acceptable range for the applicable size and agrees with the recorded hydraulic fusing pressure.
      5) The butt fusing pressure was reduced to a value less than or equal to drag pressure at the beginning of the heat soak cycle.
      6) The fusing machine was opened at the end of the heat soak cycle, the heater was removed, and the ends were brought together at the fusion pressure with the acceptable time range.
      7) Cooling time at butt fusing pressure met the minimum time specified.
   c. If the recorded data in section 3.4.D.1 is outside the limits of the acceptable range, the joint is unacceptable, and must be removed and replaced.
   d. Frequency. Records for test fusion joints should be reviewed immediately after the joint is completed. Fusion joints for jobsite fusions should be reviewed daily or before being covered with backfill.
2. Mechanical Tests
   a. CONTRACTOR shall mechanically test the first fusion of each operator and each machine used on the project. Installation shall not continue until a fusion test has passed the test. Additional mechanical tests are not required as long as long as the fusion is reviewed with the frequency specified in section 3.4.E.1.d. Testing of fusion joints with no fusion data record review shall be at a frequency specified by OWNER or ENGINEER.
   b. The fusion shall be allowed to cool completely, then fusion test straps shall be cut out.
   c. All samples shall be labeled with operator information. Testing must be done at 73 degrees F plus or minus 5 degrees. The test temperature and sample size are

critical to testing. Testing performed at cold or elevated temperatures may not give similar results to tests performed at ambient temperatures.

d. Each pipe sample weld shall be subjected to testing at two locations 180 degrees apart from each other in the joint weld. All specimens shall be tested by one of the following methods:
   1) Reverse Bend Test are allowed for pipe sizes 4-inch diameter IPS or smaller. The specimens shall be prepared and tested in accordance with ASTM F 2620, Appendix X4.
   2) Guided Side Bend Test is allowed for all wall thicknesses of 1-inch or greater. The specimens shall be removed and tested in accordance with ASTM F 3183.
   3) Hydrostatic Burst Test is allowed for pipe sizes 2- to 24-inch. The specimen length should measure 6 times pipe diameter with the butt fusion joint in the center of the specimen. The specimen should be tested in a tank filled with water, and testing conditions monitored and recorded with computerized equipment. The specimen will be tested at 4 times pipe rated pressure for 5 minutes with no failure of joint allowed.
e. Results of any mechanical test should be documented. Information on the weld and operator should be transferred from the sample to the testing record.

3.6 TRACER WIRE TESTING

A. Safety tracer tape shall be installed above the pipe as required by the Contract Drawings. Tracer wire shall also be installed as required by the Contract Drawings.

B. Upon completion of the pipe installation, CONTRACTOR shall demonstrate that the wire is continuous and unbroken through the entire run of the pipe.

1. Demonstration shall include full signal conductivity (including splices) when energizing for the entire run in the presence of OWNER or ENGINEER.
2. If the wire is broken, CONTRACTOR shall repair or replace it. Pipeline installation will not be accepted until the wire passes a continuity test.

3.7 PRELIMINARY CLEANING AND FLUSHING

A. CONTRACTOR shall flush the pipeline as the work progresses by a means in accordance with good practice to ensure that sand, rocks, or other foreign material are not left in any of the pipeline. If possible, the flushing shall be made with an open pipe end.

B. CONTRACTOR shall provide to ENGINEER a proposed schedule and method of flushing for review before the flushing starts.

3.8 TESTING OF PIPELINE

A. When connecting to a PVC pipeline the testing for the HDPE pipe shall be in accordance with Section 33 05 07 – Polyvinyl Chloride (PVC) Pressure Pipe, Rubber Joints (AWWA C 900).

3.9 PRESSURE AND LEAK TEST

A. The system design pressure shall be 150 psi for the new pipeline.

B. Testing prior to pipe installation outside of the trench.

1. CONTRACTOR shall test all piping either in sections or as a unit. The test shall be made by placing temporary bulkheads as needed in the pipe and filling the line slowly with water. Care shall be taken to see that all air vents are open during the filling. After the piping or section thereof has been filled, subject the pipe to a hydrostatic test pressure that is equal to 1.5 times the system design pressure for a maximum of three hours. During this time, add water periodically to maintain the test pressure; this compensates for the initial stretching of the pipe. The line-pressure tightness is determined by visual observation; therefore, it is not necessary to measure the make-up water. Examine every fused joint; any leakage must be repaired and then retested.
2. CONTRACTOR shall be responsible to ensure that appropriate safety precautions are observed during the hydrostatic testing above ground.

C. Testing in the trench. Fill the pipeline with water after it has been laid; bleed off any trapped air. Subject the lowest element in the system to a test pressure that is 1.5 times the design pressure and check for any leakage. When, in the opinion of the engineer, local conditions require that the trenches be backfilled immediately after the pipe has been laid, apply the pressure test after backfilling has been completed but not sooner than a time which will allow sufficient curing of any concrete that may have been used.

1. The test procedures consist of two steps: the initial expansion and the test phase. When test pressure is applied to a water-filled pipe, the pipe expands. During the initial expansion of the pipe under test, sufficient make-up water must be added to the system at hourly intervals for three hours to maintain the test pressure. After about four hours, initial expansion should be complete, and the actual test can start.
2. When the test is to begin, the pipe is full of water and is subjected to a constant test pressure of 1.5 times the system design pressure. The test phase should not exceed three hours, after which time any water deficiency must be replaced and measured. Add and measure the amount of make-up water required to return the test pressure and compare this to the maximum allowance in Table 33 05 11-1 below.

TABLE 33 05 11-1
ALLOWANCE FOR EXPANSION UNDER TEST PRESSURE

Nominal Pipe Size	U.S. Gal/100 ft of Pipe			Nominal Pipe Size	U.S. Gal/100 ft of Pipe		
	1-Hour	2-Hour	3-Hour		1-Hour	2-Hour	3-Hour
2	0.08	0.12	0.15	20	2.80	5.50	8.00
3	0.10	0.15	0.25	22	3.50	7.00	10.50
4	0.13	0.25	0.40	24	4.50	8.90	13.30
5	0.21	0.41	0.63	28	5.50	11.10	16.80
6	0.30	0.60	0.90	30	6.20	12.60	19.10
8	0.50	1.00	1.50	32	7.00	14.30	21.50
10	0.75	1.30	2.10	36	9.00	18.00	27.00
12	1.10	2.30	3.40	42	12.00	24.00	36.00
14	1.40	2.80	4.20	48	15.00	27.00	43.00
16	1.70	3.30	5.00	54	18.00	30.00	50.00
18	2.20	4.30	6.50				

From PPI Technical Report TR-31 by the Plastic Pipe Institute.

D. An alternate leakage test consists of maintaining the test pressure over a period of four hours, and then dropping the pressure by 10 psi. If the pressure then remains within 5% of the target value for one hour, this indicates there is no leakage in the system.

E. Under no circumstances shall the total time under the test exceed eight hours at 1.5 times the system pressure rating. If the test is not complete within this time limit (due to leakage, equipment failure, etc.), the test section shall be permitted to “relax” for eight-hours prior to the next test sequence.

3.10 DISINFECTING

A. Disinfection shall be in accordance with Section 33 13 00- Pipeline Testing and Disinfection.

- END OF SECTION –

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SECTION 33 12 00
MECHANICAL APPURTENANCES

PART 1 GENERAL

1.1 SUMMARY

A. CONTRACTOR shall furnish and install all valves, and equipment, complete and operable in accordance with the Specifications.

B. Where 2 or more valves or equipment of the same type and size are required, the valves shall be furnished by the same manufacturer.

C. CONTRACTOR shall verify that flanges on pipe match the bolt hole pattern of the flanges on the mechanical appurtenances.

D. All appurtenances shall be NSF 61 certified if used in potable water systems.

E. Unless noted otherwise below or in the Contract Drawings, all system components shall be rated for the maximum system pressure or higher.

1.2 RELATED WORK

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures
2. Section 31 23 15 Excavation and Backfill for Buried Pipelines
3. Section 31 23 23 Excavation and Backfill for Structures
4. Section 33 05 05 Ductile Iron Pipe and Fittings
5. Section 33 05 11 HDPE Pressure Pipe (AWWA C906)

1.3 REFERENCES

A. The latest edition of the following publications form a part of these Specifications to the extent referenced. The publications are referred to in the text to by basic designation only.

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. A 126 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
2. A 216 Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
3. B 584 Standard Specification for Copper Alloy Sand Castings for General Applications

C. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C 504 Rubber-Seated Butterfly Valves, 3-inch through 72-inch
2. AWWA C 509 Resilient-Seated Gate Valves for Water Supply Service
3. AWWA C 512 Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
4. AWWA C 515 Reduced-Wall, Resilient-Seated Gate Valves for Water Supply

Service

5. AWWA C 518 Dual-Disc Swing-Check Valves for Waterworks Service
6. AWWA C 550 Protective Interior Coatings for Valves and Hydrants
7. AWWA C 800 Underground Service Line Valves and Fittings

D. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. ANSI B 16.1 Gray Iron Pipe Flanges and Flanged Fittings
2. ANSI B 16.34 Valves – Flanged, Threaded, and Welding End

E. NSF INTERNATIONAL (NSF)

1. NSF/ANSI 61 Drinking Water System Components - Health Effects

F. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS)

1. MSS-SP-80 Bronze Gate, Globe, Angle, and Check Valves
2. MSS-SP-110 Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
3. MSS-SP-139 Copper Alloy Gate, Globe, Angle, and Check Valves for Low Pressure/Low Temperature Plumbing Applications

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Submit catalog cut sheets on all mechanical appurtenances including fittings, valves, or other items shown on the Contract Drawings referencing each item by mark number. Information shall indicate manufacturer specification compliance, Cv factor, pressure rating, and dimensional data.

PART 2 PRODUCTS

2.1 GATE VALVES

A. Gate valves shall conform to the requirements of AWWA C-509 or C-515. Valves shall be of the resilient-seat type with non-rising stem (NRS), opening to the left, and provided with a 2-inch square operating nut for buried valves or hand wheel for valves located in structures. Buried valves shall be of flange or mechanical joint design to match pipe joint system.

B. Valves, valve-operating units, stem extensions and other accessories shall be installed by CONTRACTOR where shown, or where required in the opinion of ENGINEER, to provide for convenience in operation. Where buried valves are indicated, CONTRACTOR shall furnish and install valve boxes to 3-inches above grade in unimproved areas or at grade with concrete collar in improved areas. All valves and gates shall be new and of current manufacture.

C. The valve shall have a two-part thermosetting or fusion bonded epoxy protective coating (10 mil minimum inside and out) system that is non-toxic and imparts no taste to water. The epoxy shall be applied in accordance with AWWA C550 and be ANSI/NSF 61 certified.

D. The flanges of valves may be raised or plain faced. Flanges of valves shall be faced and drilled to 125-lb American Standard template. Provide ASME Class 250 flanges for valves located on the high-pressure discharge side piping.

E. All valves shall be furnished with pressure classes equal to or better than the pressure class of the pipe with which the valves are to be used. Unless otherwise specified, each valve body shall be tested under a test pressure equal to twice its design water-working pressure.

F. Valves shall be manufactured by **Mueller Co., Clow Valve Co., American Flow Control, Kennedy Valve Co.,** or approved equal.

2.2 BALL VALVES

A. Valves shall be rated for the working pressure of the system. Valves for use in potable water systems shall be NSF 61 certified and NSF 372 lead free.

B. **Bronze Ball Valves** shall be full port opening bronze body, hard chrome plated brass ball and have adjustable stem packing gland. Seat and seals shall be PTFE. Handle shall be heavy, duty, zinc-plated steel with vinyl insulator. The valves shall conform to MSS-SP-110. They shall be **Watts Series LFB6080G2, NIBCO T685-80-LF, Apollo 70CLF-100 Series**, or approved equal.

C. **Brass Ball Valves** shall be full port opening brass, blow out proof stem design, adjustable stem packing, secondary O-ring stem seal, zinc plated steel handle with vinyl insulator. The valves shall conform to MSS-SP-110. Provide **Apollo Series 77FLF-100, Watts Series LFFBV-3C, NIBCO FP600A-LF, FNW X410C,** or approved equal.

2.3 SERVICE SADDLES

A. Shall consist of a 2-piece bronze body and strap, meeting applicable sections of AWWA C800.

B. Outlet shall be tapped with AWWA I.P. thread (F.I.P.T.). Outlet shall be o ring sealed. Saddles shall be ANSI/NSF 61 certified.

C. Shall be **Romac Style 202N-H**, or approved equal.

2.4 VALVE BOXES AND LIDS

A. All buried valves shall be installed complete with nominal 6-inch diameter screw type, two-piece cast iron valve box. Manufacturer be **Tyler Union 6850 Series**, or approved equal. The valve box lid shall be designated “WATER” unless noted otherwise on the Contract Drawings.

B. Concrete Collars shall be 10" thick x 2'- 6" in diameter centered on the valve box. They shall have two circumscribing #4 bars, one at three inches from the outside edge and a second bar nine inches from the outside edge each centered in the concrete. Concrete shall be 3,000 psi.

2.5 PRESSURE GAUGES

A. Pressure gauges shall be provided where shown on the drawings. Gauges shall meet the requirements of ASME B40.1 Grade 2A and be industrial type with stainless steel movement, liquid filled, and stainless steel, Polypropylene, or Phenolic case. Gauges shall have a rear blowout disc or panel. Unless noted otherwise on the drawings, pressure gauges shall have a 4-1/2-inch dial with white face and black lettering, a ½-inch threaded connection, and shut-off valve. The measuring element shall be a stainless-steel Bourdon Tube. Gauges shall be calibrated to read in applicable units, with an accuracy of ± 0.5 percent to 150 percent of the working pressure. Gauges shall be manufactured be **Ashcroft Model 1279 Duragauge, 1900 Series SOLFRUNT by Ametek (U.S. Gauge), Process Gauge by Marsh Bellofram**, or approved equal.

B. Pressure gauges that connect to lines other than potable water shall have gauge guards to prevent corrosion and clogging. Gauge guards shall have a durable flexible diaphragm which serves as a protective barrier between the process fluid and instrument. The diaphragm shall be either elastomer or Teflon and rated for the pressure of the gauge.

C. Pressure gauges for chemical service lines shall be 2-1/2-inch diameter with integral diaphragm seal. These gauges shall be manufactured by **Plast-o-matic**, or approved equal.

2.6 PRESSURE REDUCING VALVES

A. Pressure Reducing Valves shall automatically reduce higher inlet pressure to a steady lower downstream pressure, regardless of changing flow rate and/or varying inlet pressure. Each valve shall have an accurate, pilot-operated regulator capable of holding downstream pressure to a pre-determined limit. When downstream pressure exceeds the pressure setting of the control pilot, the main valve and pilot valve close drip tight. The valve shall be hydraulically operated, single diaphragm actuated, globe type valve. The valve stem and trim shall be stainless steel and the valve body shall be steel conforming to ASTM A 216, Grade WCB. Ends shall be threaded or Class 300 grooves and shall be rated for a working pressure of 250 psi. The valve manufacturer shall provide a 3-year warranty on the valve. The pressure reducing valve shall be **Model 90-01 by Cla-Val Company**, or approved equal.

B. A direct factory representative shall provide start-up assistance, inspection, and adjustments. The representative shall provide 2 to 4 hours of assistance for each valve installed on the project.

2.7 BRASS HOSE BIBBS

A. Hose bibbs shall be manufactured by **Watts Series SC8**, or approved equal, and shall include an integral vacuum breaker or built-in backflow protection device and cast iron wheel handle. Sampling Taps shall be smooth nose type. Valves shall be brass.

2.8 SMOOTH NOSE SAMPLING TAPS

A. Smooth nose sampling taps shall be full port design with quarter-turn operation. Sampling taps shall be no-lead brass. Sampling taps shall be **AY McDonald 2002NT, Boshart 0874NL, Merril Manufacturing SSSV,** or approved equal.

2.9 COMBINATION AIR VALVES

A. Combination Air Valves shall be single body, double orifice valves conforming to the requirements of AWWA C 512. Valve float shall be stainless steel. Valves shall be the size indicated on the Contract Drawings and shall be **Valmatic Combination Air Valve, Series 140C by APCO (DeZURIK)**, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Valves, valve-operating units, stem extensions and other accessories shall be installed by CONTRACTOR where shown, or where required in the opinion of ENGINEER, to provide for convenience in operation. Where buried valves are indicated, CONTRACTOR shall furnish and install valve boxes at grade with concrete collars. All valves and boxes shall be new and recently manufactured.

B. Install mechanical appurtenances as indicated in the Contract Drawings and in accordance with the manufacturer's written instructions.

- END OF SECTION -

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SECTION 33 13 00
PIPELINE TESTING AND DISINFECTION

PART 1 GENERAL

1.1 DESCRIPTION

A. This section covers testing and disinfection in order to remove bacteriological contamination of the pipeline. Disinfection is only required if the pipeline is used for potable water.

B. CONTRACTOR shall be responsible for obtaining permits for discharging excess testing water and dechlorination of such water, if required.

C. Hydrostatic testing shall meet the requirements of this Section, or the requirements provided in each individual pipeline Section, whichever is more stringent.

D. If there is a discrepancy between this Section, the individual pipe Sections, or applicable AWWA Standards, the more stringent requirement shall apply.

1.2 RELATED SECTIONS

A. Related Work specified in other Sections includes but is not limited to:

1. Section 01 33 00 Submittal procedures
2. Section 33 05 05 Ductile Iron Pipe
3. Section 33 05 11 HDPE Pressure Pipe (AWWA C906)

1.3 REFERENCES

A. The Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract. The publications are referred to in the text by basic designation only.

1. AWWA C 600 Standard Installation of Ductile-Iron Mains and Their Appurtenances
2. AWWA C 604 Standard Installation of Buried Steel Water Pipe – 4-inch (100mm) and larger
3. AWWA C 605 Standard Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings
4. AWWA C 651 Standard for Disinfecting Water Mains
5. Utah Public Drinking Water Regulations

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Furnish a written testing plan and schedule, including water source and methods for conveyance to the project, sequence, control, and disposal. Include the name of the certified bacteriological testing laboratory.

C. Disinfection Report:

1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and time of completion.
3. Test locations.
4. Name of person collecting samples.
5. Initial and 24 hour disinfectant residuals in treated water in parts per million (ppm) for each outlet tested.
6. Date and time of flushing start and completion.
7. Disinfectant residual after flushing in ppm for each outlet tested.

PART 2 MATERIALS

2.1 DESCRIPTION

A. All test equipment, temporary valves, bulkheads, and other water control equipment shall be as determined by CONTRACTOR. No materials shall be used which damage the project pipelines for future conveyance of potable water.

B. Disinfecting materials shall consist of liquid chlorine, sodium hypochlorite solution, or calcium hypochlorite granules or tablets.

C. Dechlorination agents may be sodium bisulfate, sodium sulfite, or sodium thiosulfate.

PART 3 EXECUTION

3.1 GENERAL

A. Source of Water

1. CONTRACTOR shall assume all responsibility to obtain the necessary water for testing and disinfection of the water line system. All testing water used in the pipeline shall be potable water from a State approved drinking water system.
2. All pressure pipelines shall be tested.
3. Disposal of flushing water and water containing chlorine shall be by methods acceptable to the State of Utah, Division of Water Quality.

3.2 HYDROSTATIC TESTING OF PIPELINES PROCEDURE

A. Prior to hydrostatic testing, pipelines 24-inches diameter and larger shall be swept free of debris and visually inspected that all debris has been removed prior to filling.

B. Prior to hydrostatic testing, pipelines shall be flushed or blown out as appropriate. CONTRACTOR may test pipelines in sections. Sections to be tested shall be defined by isolation valves in the pipeline. Where such valves are not present, CONTRACTOR shall install temporary bulkheads or plugs for the purpose of testing. Sections that do not have isolation valves shall be tested in approximate one-mile segments. Sections that have a zero-leakage allowance may be tested as a unit. No section of the pipeline shall be tested until field-placed concrete or mortar has attained an age of 14 Days. The test shall be made by closing valves when available or by placing bulkheads and filling the line slowly with water (maximum filling velocity shall not exceed 0.25 foot per

second, calculation based on the full area of the pipe). CONTRACTOR shall be responsible for ascertaining that test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to or movement of the adjacent pipe. Unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test to avoid movement and damage to piping and equipment. Remove or protect any pipeline-mounted devices that may be damaged by the test pressure. CONTRACTOR shall provide sufficient temporary tappings in the pipelines to allow for trapped air to exit or for water to be drained. After completion of the tests, such taps shall be permanently plugged. Care shall be taken that air relief valves are open during filling.

C. The pipeline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the release valves at a reasonable velocity. The air within the pipeline shall be allowed to escape completely. The differential pressure across the orifices in the air release valves shall not be allowed to exceed 5 psi at any time during filling. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 24 hours to allow the concrete or mortar lining, as applicable, to absorb water and to allow the escape of air from air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to ENGINEER shall be taken. Additional water shall be added to the pipeline to replace any water absorbed by the cement mortar lining.

D. The hydrostatic test shall consist of holding 125% of the working operating pressure on the pipeline segment for a period of 2 hours. For projects with long pipeline segments, the test pressure shall not be less than 125% of the design operating pressure at the highest elevation on the pipeline and shall not be less than 150% of the working operating pressure at the lowest elevation on the pipeline. The test pressure shall never exceed the pipe of thrust-restraint design pressure or the pressure rating of the pipe unless allowed per the type of pipe specifications.

E. Visible leaks that appear during testing shall be repaired regardless of the amount of leakage.

F. Add water to restore the test pressure if the pressure decreases 5 psi below test pressure during the test period. Record the amount of water added.

G. Pipe with welded joints shall have no leakage. In the case of pipelines that fail to pass the leakage test, CONTRACTOR shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipeline, repeating as necessary until the pipeline passes.

H. Exposed piping and valves shall show no visible leaks and no pressure loss during the test.

I. Blowoff isolation gate valves and plug valves (throttling valves) shall be operated and tested during a simulated blow down operation to demonstrate functionality of the valves to the satisfaction of ENGINEER. Isolation valves (gate valves) shall not be used for throttling.

J. CONTRACTOR shall test all piping either in sections such that dissimilar pipe materials shall not be tested together, or the more stringent leakage allowance shall hold for whole section of tested piping, regardless of pipe material.

K. Steel Pipeline Pressure and Leak Test

1. Hydrostatic testing for Steel pipe shall be in accordance with the requirements of AWWA C 604 and this Section. In case of a conflict between these two references, the more stringent requirement shall be followed.
2. The test shall be made by placing temporary bulkheads as needed in the pipe and filling the line slowly with water. Care shall be taken to see that all air vents are open during the filling. Bulkheads, valves, and connections shall be examined for leaks. If any leaks are found, corrective measures satisfactory to ENGINEER shall be taken. The test shall consist of holding a minimum pressure as shown above or on the Contract Drawings on the section being tested for a minimum period of two hours using either pneumatic or hydraulic means to maintain the pressure. Suitable means shall be provided by CONTRACTOR for determining the quantity of water lost by leakage under the test pressure.
3. Steel pipelines with fully welded joints shall have no leakage. In the case of pipelines that fail to pass the leakage test, CONTRACTOR shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipeline, repeating as necessary until the pipeline passes.
4. Steel pipeline with rubber gasketed joints. The testing allowance is defined as the quantity of water that must be applied to the pipe section being tested to maintain a pressure within 5 psi of the specified hydrostatic test pressure. The maximum allowable makeup water shall not exceed 10 gal per inch diameter per mile per 24 hours. In the case of pipelines that fail to pass the leakage test, CONTRACTOR shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipeline, repeating as necessary until the pipeline passes.

L. Ductile Iron Pipe Gasketed Joints Pipeline Pressure and Leak Test

1. Hydrostatic testing for Ductile Iron pipe shall be in accordance with the requirements of AWWA C 600 and this Section. In case of a conflict between these two references, the more stringent requirement shall be followed.
2. The test shall be made by placing temporary bulkheads as needed in the pipe and filling the line slowly with water. Care shall be taken to see that all air vents are open during the filling. Bulkheads, valves, and connections shall be examined for leaks. If any leaks are found, corrective measures satisfactory to ENGINEER shall be taken. The test shall consist of holding a minimum pressure as shown above or on the Contract Drawings on the section being tested for a minimum period of two hours using either pneumatic or hydraulic means to maintain the pressure. Suitable means shall be provided by CONTRACTOR for determining the quantity of water lost by leakage under the test pressure. The testing allowance is defined as the quantity of water that must be applied to the pipe section being tested to maintain a pressure within 5 psi of the specified hydrostatic test pressure. The maximum allowable leakage shall be defined as follows:

$$L = SD\sqrt{(P)}/148{,}000$$

L = Testing allowance (makeup water) in gallons per hour of test
S = Length of pipe tested in feet
D = Nominal diameter of pipe in inches
P = Average Test Pressure in pounds per square inch (gauge)

M. PVC C900 Pipe Gasketed Joints Pipeline Pressure and Leak Test

1. Hydrostatic testing for Ductile Iron pipe shall be in accordance with the requirements of AWWA C 605 and this Section. In case of a conflict between these two references, the more stringent requirement shall be followed.
2. The test shall be made by placing temporary bulkheads as needed in the pipe and filling the line slowly with water. Care shall be taken to see that all air vents are open during the filling. Bulkheads, valves, and connections shall be examined for leaks. If any leaks are found, corrective measures satisfactory to ENGINEER shall be taken. The test shall consist of holding a minimum pressure as shown above or on the Contract Drawings on the section being tested for a minimum period of two hours using either pneumatic or hydraulic means to maintain the pressure. Suitable means shall be provided by CONTRACTOR for determining the quantity of water lost by leakage under the test pressure. The testing allowance is defined as the quantity of water that must be applied to the pipe section being tested to maintain a pressure within 5 psi of the specified hydrostatic test pressure. The maximum allowable leakage shall be defined as follows:

$$Q = LD\sqrt{(P)}/148,000$$

Q = Testing allowance (makeup water) in gallons per hour of test
L = Length of pipe tested in feet
D = Nominal diameter of pipe in inches
P = Average Test Pressure in pounds per square inch (gauge)

3.3 DISINFECTING OF PIPELINES PROCEDURE

A. Leakage and pressure testing must be completed prior to disinfection procedures.

B. All water and solution piping installed under this Contract shall be disinfected using an approved disinfection method in accordance with the AWWA C 651.

C. CONTRACTOR may use one of the three chlorination methods – tablet, continuous feed, and slug, as outlined in AWWA C 651 that is acceptable to OWNER. Care must be taken to prevent the strong chlorine solution in the pipe being disinfected from flowing back into the line supplying the water.

D. CONTRACTOR shall provide sampling ports along the pipeline as defined in AWWA C651. Taps may be at manways and air valves to help facilitate the spacing requirement.

E. Heavily chlorinated water shall not be discharged onto the ground. Upon completion of disinfection, Sodium Bisulfate (NaHSO4), or other approved dechlorination agent, shall be applied to the heavily chlorinated water to neutralize thoroughly the chlorine residual remaining. Water shall be neutralized to less than 1 ppm total chlorine residual.

F. After approval of disinfection, CONTRACTOR shall flush the new system until the chlorine residual is a maximum of 0.3 ppm.

G. After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the pipeline being tested. Sampling and testing will be completed by CONTRACTOR. CONTRACTOR shall collect at least one set of samples from every 1,200 feet of pipeline, plus one set from the end of the line and at least one set from each branch. All samples shall be tested for bacteriological (chemical and physical) quality in accordance with "Standard Methods for Examination of Water and Wastewater" and shall show the absence of coliform organisms. If the initial disinfection fails to provide satisfactory bacteriological results, or shows the presence of coliform, then the line shall be re-chlorinated, flushed, and retested until satisfactory results are obtained at the expense of CONTRACTOR.

3.4 CONNECTIONS TO EXISTING SYSTEM

A. Where connections are to be made to an existing potable water system, the interior surfaces of all pipe and fittings used in making the connections shall be swabbed or sprayed with a one percent hypochlorite solution before installation. Thorough flushing shall be started as soon as the connection is completed and shall be continued until discolored water is eliminated.

B. Final Fill: After successful pressure and disinfection tests, the pipeline(s) shall be filled with fresh potable water and shall remain filled.

- END OF SECTION –

SECTION 40 05 13.33
BRASS PROCESS PIPING

PART 1 GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall furnish and install all brass process piping and appurtenances as shown and specified, and as required for a complete and workable piping system.

B. This Section includes schedule 40 and 80 brass process pipe in accordance with ASTM B43.

1.2 RELATED WORK

A. Related Work specified in other Sections includes, but is not limited to:

1. Section 01 33 00 Submittal Procedures
2. Section 05 45 00 Mechanical Metal Supports (Pipe Supports)
3. Section 31 23 15 Excavation and Backfill for Pipelines
4. Section 33 12 00 Mechanical Appurtenances
5. Section 33 13 00 Pipeline Testing and Disinfection

1.3 REFERENCES

A. Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract. The publication is referred to in the text by basic designation only.

B. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

1. ASME B1.20.1 Pipe Threads, General Purpose
2. ASME B 16.15 Cast Bronze Threaded Fitting Class 125 & 250

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. ASTM B 43 Standard Specification for Seamless Red Brass Pipe, Standard Sizes

D. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. AWWA C 651 Standard for Disinfecting Water Mains

1.4 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Submit manufacturer's affidavit certifying product was manufactured, tested, and supplied in accordance with applicable references in this section together with a report of the test results and the date each test was completed.

C. Submit shop drawings of pipe, fittings, supports, and appurtenances showing compliance with this Section including necessary dimensions, details, pipe joints and material lists.

PART 2 PRODUCTS

2.1 BRASS PIPE

A. Brass pipe and fittings shall conform to ASTM B 43, regular wall thickness (Schedule 40), except that nipples and pipe of sizes 1-inch and smaller shall be extra strong (Schedule 80).

B. Brass pipe joints shall be screwed ends with NPT threads. Screwed joints shall be made up with Teflon tape. Threads shall conform to ASME B1.20.1.

C. All brass pipe and fittings shall be NSF 61 or NSF 372 certified.

2.2 FITTINGS

A. Threaded fittings shall be in accordance with ASME B 16.15.

PART 3 EXECUTION

3.1 INSTALLATION

A. For buried pipelines, excavation and backfill of trenches and for appurtenances shall be in accordance with Section 31 23 15 - Excavation and Backfill for Buried Pipelines.

B. Above ground brass process piping shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the Site to avoid interferences with structural members, architectural features, openings, and equipment. Exposed pipe shall afford maximum headroom and access to equipment, and where necessary, piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points.

C. Piping shall be firmly supported with fabricated or commercial hangers or supports in accordance with Section 05 45 00. Where necessary to avoid stress on equipment or structural members, the pipe shall be anchored or harnessed. Expansion joints and guides shall compensate for pipe expansion due to temperature changes.

D. Unless otherwise indicated, connections to fixtures, groups of fixtures, and equipment shall be provided with a shutoff valve and union, unless the valve has flanged ends. Unions shall be provided at threaded valves, equipment, and other devices requiring occasional removal or disconnection. Low points shall be provided with a drain valve.

3.2 PIPE PREPARATION

A. Prior to installation, each pipe length shall be carefully inspected, flushed clean of any debris or dust, and be straightened, if not true. Ends of threaded pipes shall be reamed and filed smooth. Pipe fittings shall be equally cleaned before assembly

3.3 PIPE JOINTS

A. Pipe threads shall be full and cleanly cut with sharp dies or molded. Joints shall be made with Teflon tape.

3.4 INSPECTION AND TESTING OF PIPELINE

A. Completed brass process piping systems shall be inspected for proper supports, anchorage, and damage to pipe, fittings, and coatings. Any damage shall be repaired by CONTRACTOR at no additional cost to OWNER.

B. CONTRACTOR shall provide temporary blow-off valves and fittings as required to flush and disinfect new pipelines. Temporary blow-off valves and fittings shall be removed prior to placing pipeline into service.

C. Source of Water

1. CONTRACTOR shall assume all responsibility to obtain the necessary water supplies for disinfection and/or pressure testing of the pipeline.

D. Testing Procedure

1. Prior to enclosure or burying, piping systems shall be pressure tested as required in the Contract Drawings, for a period of not less than one hour, without exceeding the tolerances listed on the Drawings. Where no pressures are indicated, the pipes shall be subject to 1-1/2 times the maximum working pressure. CONTRACTOR shall furnish test equipment, labor, materials, and devices.
2. Leakage shall be determined by loss of pressure, soap solution, or other positive and accurate method. Fixtures, devices, or other accessories that would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines shall be plugged or capped as appropriate during the testing procedures.
3. Leaks shall be repaired, and the piping shall be re-tested until no leaks are found.
4. ENGINEER shall be notified at least 48 hours before the pipeline is to be tested so that ENGINEER may be present during the test.

3.5 DISINFECTING

A. Disinfection shall be in accordance AWWA C 651 and the requirements of Section 33 13 00 – Pipeline Testing and Disinfection.

- END OF SECTION –

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"Exhibit C"
USFS
APPROVAL LETTER

United States Department of Agriculture
Forest Service
Uinta-Wasatch-Cache National Forest
Supervisor's Office
857 West South Jordan Parkway
South Jordan, UT 84095
801-999-2103
Fax: 801-253-8118

File Code: 2720
Date: February 24, 2025

Town of Alta
C/O Chris Cawley
PO Box 8016
Alta, UT 84108

Dear Chris,

This letter authorizes the Town of Alta to proceed with the Cross Tow water transmission line construction project, in coordination with Alta Ski Lifts. Enclosed is an amendment for signature, amending special use authorization SLC102720 to include the new pipeline segments.

Construction shall adhere to the design criteria and Best Management Practices (BMPs), as outlined in the enclosed Alta Ski Lifts Letter to the File.

If you have any questions regarding this matter, please contact Lands & Special Uses Program Manager Charles Rosier at Charles.rosier@usda.gov or 801-999-2159.

Sincerely,

DAVID WHITTEKIEND
Forest Supervisor

Cross Tow Snowmaking Line Replacement, Alta Ski Lifts
Amendment 1 SLC102720 Town of Alta

cc: Shaw, Adam; Rosier, Charles; Framme, Larry

Letter to File

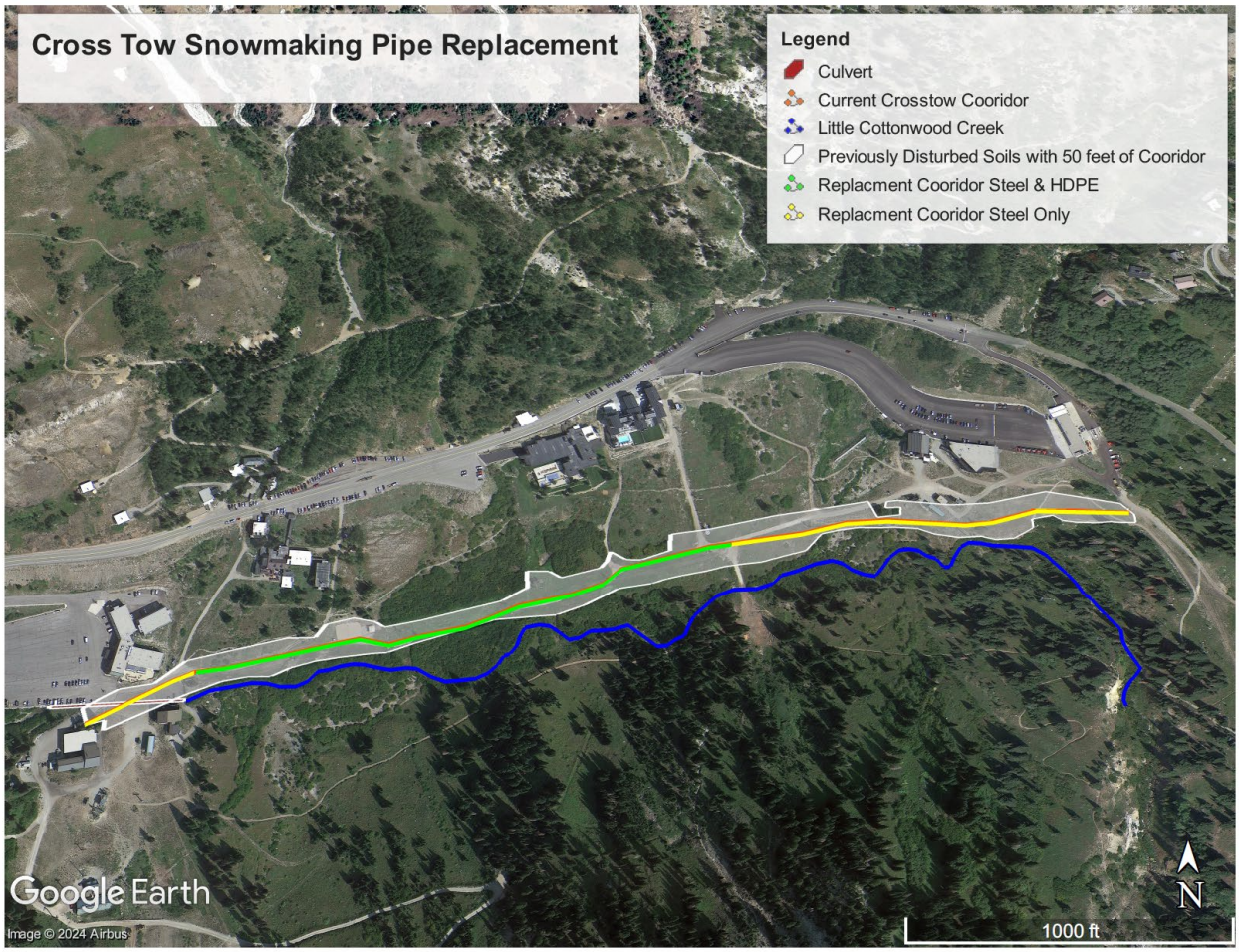
Cross Tow Snowmaking Line Replacement, Alta Ski Lifts

2024 Maintenance Project

Salt Lake Ranger District, Uinta-Wasatch-Cache National Forest
Salt Lake County, Utah

Proposal and location: The Salt Lake Ranger District of the Uinta-Wasatch-Cache National Forest completed an internal review and analysis regarding the replacement of the Cross Tow Snowmaking Line Replacement May 7, 2024.

Background and proposed modification: The steel high-pressure lines installed from the Wildcat Base to the Albion base are near the end of their life and need to be replaced. These lines are located under other power and communications lines and cannot be removed. To replace these lines a new trench will be dug adjacent to the current utility corridor in previously disturbed terrain. This project was approved as maintenance by the USFS via an email on June 15, 2022. Additional project details are being provided to the USFS per their request.



The Town of Alta will install a water line for their system in Alta Ski Lift's Cross Tow Trench for future improvements the town will be making. The water line will be capped at each end to be tied into the existing water system at a future date. At that point in time, the Town of Alta will get the necessary approvals and permits from the Forest Service.

In order to ensure potential effects as result of the maintenance project are minimized, the following best management practices must be implemented.

Botany

- There is a historic occurrence of *Draba brachystylis*, a Region 4 sensitive species, near the project area. To avoid impacts to the species, the following measures must be included near this occurrence:
  - Wet and riparian areas must not be disturbed where this species occurs.
  - The canopy where this species occurs shouldn't be removed to avoid altering humidity and light levels, altering natural flow of water, or altering the surrounding soil structure.
  - Recreational use should be located far away from occurrences of this species.
  - Do not stage or operate heavy equipment within TES populations or potential habitat.

Cultural Resources

- Alta Ski Lifts must have an archaeological monitor on site during construction. If the monitor discovers any historic and/or prehistoric properties during ground disturbing activities, all construction in the immediate vicinity must cease and they will be treated as specified in 36 CFR § 800.11 concerning Properties Discovered During Implementation of an Undertaking. The Forest Service will work with the monitor to collect and map any artifacts that the disturbance uncovers.

Engineering

For Alta Ski Lifts Maintenance Project:

- Submit detailed design drawings that include site plan, architectural, structural, and geotechnical requirements. Plans should include:
  - Site plan –location of proposed and existing structures and constructed features, utilities, related roads and parking areas, accessible routes to/from the proposed structures.
  - provide design information and calculations to include water source capacity, types water use (domestic, irrigation, fire, etc.), for average daily demands, maximum daily and hourly demand, sizing of storage tanks, etc.
  - Provide hydraulic analysis of the water system for static and dynamic conditions. Dynamic condition to include peak flow.
  - Clearly identify existing utilities within the project area.
- The drawings must be stamped by the Professional Engineer and Architect responsible for the design and must comply with all current building codes (IBC, IPC, IMC, NEC, etc.), standard, and other safety requirements.
- Maintain roads according to engineering details, specifications and Road Management Objectives, including road surface and drainage.
  - Don't travel on roads when saturated or otherwise susceptible to damage.
  - Repair roads damaged by operations.
  - Ensure that appropriate permits are acquired for transport of heavy equipment.
- Obtain necessary permits that may include Storm Water Prevention and 404.
- Schedule -Indicate approximate starting date for construction of the improvement(s) and/or related infrastructure. Provide a construction schedule for all elements that will be built.

For the Town of Alta's water line that will be co-located within the trench, the following must be met:

- Project for Water and/or Wastewater Systems Improvements

- Submit Plans and Specifications stamped & signed by the licensed professional engineer responsible for the design.
- Provide Engineering Reports to include requirements called for in the State regulations.
- For Water Systems – provide design information and calculations to include water source capacity, types water use (domestic, irrigation, fire, etc.), for average daily demands, maximum daily and hourly demand, needed fire flows, sizing of storage tanks, etc.
- Provide hydraulic analysis of the water system for static and dynamic conditions. Dynamic condition to include peak flow.
- Design should meet standards and requirement of the State, Environmental Protection Agency (EPA), and Forest Service.
- If required, obtain the appropriate permits from the State and/or Local Health Department. Provide copy of permit or documentation of application for permit.
- Clearly identify existing utilities within the project area.

- Schedule - Indicate approximate starting date for construction of the improvement(s) and/or related infrastructure. Provide a construction schedule for all elements that will be built.

Fire and Fuels

- Follow all fire restrictions on utahfireinfo.gov.

Fisheries and Amphibians

- If Boreal Toad or Columbia Spotted Frog are encountered, please contact Salt Lake Ranger District fisheries biologist or wildlife biologist to assist in documentation and relocation of the individual(s). The Salt Lake Ranger District will have staff trained to document and relocate the individual on short notice to prevent any construction delay. These species can take refuge outside of wetlands during summer months and are not always within the delineated wetland zone.

Hydrology

- Matted straw and biodegradable straw waddles should use wooden stakes in appropriate locations to ensure proper and secure placement.
- Straw Waddles shall be placed along the downslope side of the project to alleviate any potential erosion runoff and sediment movement into Little Cottonwood Creek.

Soil

- No construction or maintenance activities shall be performed during periods when the soil is too wet to adequately support equipment/vehicles. If such equipment/vehicles create ruts deeper than 3 inches, the soil shall be deemed too wet to adequately support construction equipment/vehicles.
- Salvage topsoil to an appropriate depth from construction sites and stockpile for use in reclamation. Scarify compacted areas prior to laying topsoil and seeding.
- All disturbed areas will be reseeded and matted with weed free straw in order to reduce erosion.
- The construction of the trench and installation of the new pipeline should occur as quickly as possible to reduce the possibility of a weather event causing erosion within the trench corridor.
- After the installation of the new pipeline, and before placing the fill material back into the trench, multiple trench blockers should be installed within the trench corridor to block any potential runoff being concentrated within the trench. The trench blockers should be placed with the following spacing dimensions:

Spacing of Interceptor Dikes and Trench Plugs.

Slope	Spacing
5% - 15%	150 feet
15% - 30%	100 feet
30% & or greater	50 feet

Recreation

- The utility project is contiguous with NFS admin road 80045-ADMIN (Transverse Road) which is used by the public as a trail. Access to additional trails would or could be impacted during project implementation, including Snakepit (1015), Albion Meadows 1006, and Alta Loop 4X4 (80239-ADMIN)
- Construction impacts:
    - Closures that impact access to any trail will be coordinated with FS Recreation Program Manager
    - Closures will minimize interruption of trail use to extent feasible (consider opening on weekends, non-work hours. Consider segmenting closures or providing corridors through the closure)
    - Information, signage and safety will be responsibility of ski area
- ski area must coordinate closure with any impacted special use permit holders

Noxious Weed Mitigation

- All construction equipment shall be pressure washed before delivery to the project site. The removal of mud and debris from treds, tracks and undercarriage, with emphasis on axles, frame, cross-members, motor mounts, and underneath steps, running boards, and front bumper/brushguards assemblies is required. The purpose is to reduce or eliminate the transportation of noxious weeds, which is required by Federal and State regulations.
- Pre-implementation surveys will be conducted prior to work starting on this project.
- All existing invasive plant infestations within or adjacent to the project area should be treated prior to project beginning.
- Post project, monitor for new infestations of noxious and invasive weeds for a minimum of three years. Treat and/or remove any weeds located in the areas impacted by ground disturbing project work before they seed.
- Avoid walking through, placing equipment, materials or supplies in any areas that are infested by noxious and invasive weeds.
- Native seed mix used will be approved by the Forest Service Botanist and certified weed free for revegetation of areas of ground disturbance where reseeding is necessary. Reseed as soon as practical.
- Noxious and invasive weeds, including Cheatgrass, should not be increased due to project work activities within the project area.
- All the applicable Wasatch Cache National Forest Plan standards and guidelines for Noxious Weeds Management will be followed.

Wildlife

- Trenches created shall provide wildlife escape ramps during construction. Ramps can be sloped dirt from the trench (ensure angle is ~45 degrees so wildlife cam climb up) or other items placed at an angle into trench with enough grip (e.g. plywood).

For coordination purposes, should the Mountain Resort Planner position still be vacant (vice Kraja), Alta Ski Lifts should coordinate with the Acting District Ranger as well as Charley Rosier, Recreation, Lands & Special Uses Supervisor, at Charles.rosier@usda.gov or (801)999-2159.

I have concluded that there are no extraordinary circumstances related to the decision that may result in a significant individual or cumulative environmental effect and that this decision is in compliance with the following laws and statutes: National Forest Management Act, National Environmental Policy Act, Endangered Species Act of 1973, as amended; Clean Water Act; Congressional designated areas such as wilderness, wilderness study areas, or National Recreation Areas; Inventoried Roadless Areas; Research Natural Areas; Native American religious or cultural sites, archaeological sites, or historical properties or areas; Migratory Bird Treaty Act; Environmental Justice (Executive Order 12898) and the 2003 Land and Resource Management Plan for the Wasatch-Cache National Forest, as amended.

DAVID WHITTEKIEND
FOREST SUPERVISOR
UINTA-WASATCH-CACHE NATIONAL FOREST

Date