

TOWN OF RIDGWAY

BEAVER CREEK INFILTRATION GALLERY

MARCH, 2026

TOWN OF RIDGWAY

BEAVER CREEK INFILTRATION GALLERY

MARCH, 2026

I hereby certify that these plans and specifications have been prepared under my direct supervision and to the best of my knowledge represent the work required for infiltration gallery installation. Engineer makes no warranties, expressed or implied in connection with consultant's services. Any additions, deletions, or modifications to any part of these documents will void any warranty expressed or implied.



Joanne Fagan

3/23/26

These Contract Documents and supporting reports, plans, files, field data, notes, and other documents and instruments prepared by Consolidated Consulting Services (CCS) and RESPEC as instruments of service shall remain the property of CCS and the Town of Ridgway. The Town, RESPEC, and CCS shall retain all common law, statutory, and other reserved rights, including the copyright thereto. These documents may not be used by others or duplicated for any other purpose.

TABLE OF CONTENTS



Request for Bids	1
Section 00100 - Instructions to Bidder	6
Section 00300 - Bid Form	6
Bid Bond Form	
Section 00350 - Measurement & Payment	4
Section 00410 – Qualification Statement	4
Section 00500 - Agreement	13
Sample Contract Forms	
Notice of Award	
Payment Bond	
Performance Bond	
Notice to Proceed	
Change Order Form	
Certificate of Substantial Completion	
Final Payment Request	
<u>FEDERAL REQUIRED BID SPECIFICATIONS & FORMS</u>	12
<u>DIVISION ONE –GENERAL REQUIREMENTS</u>	
Section 01000 - General Requirements	14
Scope of Supplemental General Requirements	
Conformance with Town Standards & SRF Bid Specifications	
Materials	
Design Criteria and Coordination	
Contractor's Use of Premise	
Additional Contractor Responsibilities	
Nuisances	
Site Security	
Supervision	
Work Sequence	
Completion Schedule	
Existing Conditions	
Project Layout	
Code Issues	
Notifications	

Protection of Facilities, Property and Improvements

- Utility Conflicts

- Responsibility for Repair

- Public Safety and Convenience

 - Disruption in Service

 - Emergency Disruptions

 - Minimizing Disruptions

 - Phasing Disruptions

Protection of Potable Water Supply, Streams, Lakes and Reservoirs

Traffic Control

Site Information

- Property Limits and Access

- Groundwater and River Flows

- Coordination

- Additional Site Information

- Limited Use of Site Information

Required Permits

- Dewatering

- CDPHE Stormwater Permit

- CDOT Permit

- 404/Dredge and Fill

Temporary Facilities

Substitutions and Alternates

Referenced Standards

Manufacturer's Instructions

Product Delivery, Storage, and Handling

Rejected Materials

Removal of Unacceptable and Unauthorized work

Landscape Preservation

Submittals

- Construction Schedule

- Sub Contractor and Suppliers

- Schedule of Values

- Shop Drawings and Samples

- Contractor Responsibilities

- Engineer's Duties

- Operation and Maintenance Manuals

- Record Drawings

- Failure to Comply

- Resubmission Requirements

Quality Control and Testing

Cleaning and Site Maintenance

Project Closeout

- Instruction

- Final Inspection

- Reinspection Costs

- Final Adjustment of Accounts



Closeout Submittals

DIVISION TWO - SITEWORK

Section 02200 – Site Preparation, Excavation, Backfill, Compaction, and Restoration	16
Section 02713 – Pipe Line Construction	12

PROJECT SPECIFIC SPECIFICATIONS

01 33 00 Submittals	
01 55 00 Beaver Creek Channel Access	
01 71 13 Mobilization	
02 41 13 Selective Site Demolition	
31 05 19.16 Infiltration Gallery Impermeable Liner	
31 23 19 Dewatering	
31 25 00 Erosion and Sedimentation Controls	
31 37 00 Riprap Boulders Soil Riprap and Bedding	
32 77 00 Wood Structures	
32 92 19 Seeding	
32 93 00 Restoration Planting	
33 12 00 Infiltration Gallery	
33 46 26 Geotextile	
40 05 06 Couplings, Adaptors, And Specials for Process Pipe	
40 05 23 Stainless Steel Process Pipe and Tubing	
40 05 51 Common Requirements for Process Valves	

**REQUEST FOR BIDS
TOWN OF RIDGWAY
BEAVER CREEK INFILTRATION GALLERY**

Notice is given that the Town of Ridgway, Colorado will receive sealed bids from qualified contractors to furnish all labor, equipment, and materials for the Beaver Creek Infiltration Gallery Project for installation of approximately 30 lineal feet of well screen and 300 feet of pipe and appurtenances. Note the Owner will furnish the well screen.

Two paper copies and one electronic copy of the proposal in a sealed envelope clearly marked "Beaver Creek Infiltration Gallery" and the name, address and phone number of the bidder must be received by the Pam Kraft, Town Clerk at Town Hall, 201 N. Railroad Street, or PO Box 10, Ridgway, CO 81432 by noon **on Tuesday April 28, 2026**

Plans and specifications may be obtained by contacting jfagan@town.ridgway.co.us

The project was supported by grant #24DWEF25-RGWY issued by the Colorado Division of Homeland Security and Emergency Management and funded in part by a grant from the Natural Resources Conservation Service, and a CWCB loan. Bidder's attention is called to the funding agency requirements in the bid package. Buy America, Build America is required.

A hybrid in person and virtual meeting will be held at the Ridgway Town Hall on Tuesday April 21, 2026, at 1:00 pm and include a site visit for interested bidders. The zoom link is:

<https://us02web.zoom.us/j/81512957586?pwd=9m47I82SFRdebUE79SQNo1cCgb6WQD.1>

Meeting ID: 815 1295 7586 Passcode: 541293

Questions regarding the contract documents should be submitted by 5:00 pm on Tuesday April 21, 2026.

The Town reserves the right to reject any and all bids, to waive any and all informalities in bidding and to negotiate contract terms with the successful bidder, or to make award in such a manner as it may deem right for the best interest of the Town.

By: Pam Kraft Town Clerk

Publication: Ouray County Plaindealer – March 26, and April 2, 2026

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1. COPIES OF BIDDING DOCUMENTS

- 1.1. Complete sets of the Bidding Documents in the number and for the sum, if any stated in the Request for Bids may be obtained from Engineer or the Owner.
- 1.2. Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 1.3. Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

2. QUALIFICATIONS OF BIDDERS

To be considered as a qualified bidder, bidder must demonstrate that he has satisfactorily completed similar work of similar size and complexity on other projects and that the lead personnel that will be assigned to the project have the necessary experience to satisfy these requirements. Bidder must also demonstrate that he and his staff assigned to this Work meet or exceed the minimum experience requirements for the various types of work specified in the Contract Documents and that he has the financial resources to satisfactorily complete the project. Qualification statements shall be submitted for any entity (bidder, sub-contractor, supplier, etc.) providing 5% or more of the project scope.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- 3.1. It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, performance of furnishing of the Work, including without limitation, improvements, soil conditions, conflicts, drainage, topography and all other features of the terrain, (c) consider federal, state and local laws, ordinances, rules and regulations; and (d) study and carefully correlate Bidder's observations with the Contract Documents as each may affect cost, progress, or performance of the work, or apply in any manner whatsoever to the work.
- 3.2 Bidder has given the Owner written notice of all conflicts, errors, or discrepancies that he discovered in the contract documents and such documents are acceptable to the Contractor.
- 3.3 A prebid meeting and site visit is detailed in the advertisement for bids. Bidders are strongly encouraged to participate in both.
- 3.4. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor.
- 3.5. The submission of a Bid will constitute an incontrovertible representation by the Bidder that Bidder has complied with every requirement of this Article 3 without exception, that the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences, or procedures of

construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work, and to provide for a completed, properly functioning installation in conformance with all applicable codes, ordinances, statutes and intent of Contract Documents. The failure or omission of any Bidder to do any of the foregoing shall in no way relieve any Bidder from any obligation with respect to its bid or to complete the Work.

4. INTERPRETATIONS

The Owner and Engineer will conduct a meeting prior to bid opening at the date and time specified in the Request for Bids for the purpose of reviewing the project scope and field conditions and interpreting the meaning or intent of the Contract Documents. Interested bidders are strongly encouraged to attend the conference.

Questions about the meaning or intent of the Contract Documents are to be submitted to the Engineer in writing by the deadline for such questions in the Request for Bids. All questions will be answered in writing after the pre-bid meeting by Addenda or written response emailed, mailed, or delivered to all parties recorded by Engineer as having received the Bidding Documents. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5. BID SECURITY

Each Bid must be accompanied by Bid Security made payable to Owner in an amount of 5% of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached). The bid security of the successful Bidder will be retained until such Bidder has executed the Agreement and furnished required Contract Security, whereupon it will be returned. If the Successful Bidder fails to execute and deliver Agreement and furnish the required contract security within 10 days of Notice of Award, Owner may annul the Notice of Award and Bid Security of that Bidder will be forfeited.

6. CONTRACT TIME

The number of days within which, or the date by which, the Work is to be completed and ready for final payment (the Contract Time) are set forth in the Agreement. Strict adherence to timeframe is required.

7. LIQUIDATED DAMAGES

Provisions for liquidated damages are set forth in the Agreement.

8. SUBSTITUTE MATERIAL AND EQUIPMENT – N/A

A list of materials the owner will furnish is included Section 00300.

9. SUBCONTRACTORS, ETC.

9.1. The apparent Successful Bidder, and any other Bidder so requested, shall within two (2) days after the day of the Bid opening submit to Owner a list of all Subcontractors, Suppliers, and others (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work which is equal to more than 5% of the contract price. Such list shall be accompanied by an experience statement and qualification statement with

pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person or organization. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either may before giving the Notice of Award, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next best qualified Bidder that proposes to use acceptable Subcontractors, Suppliers and other persons and organizations.

9.2. No Contractor shall be required to employ any Subcontractor, other person or organization against who he has reasonable objection.

9.3 More than one contractor and/or the owner may be working on the same area at the same time. The contractors and the Owner shall have equal right to the work area and be equally responsible for coordinating with others working at this site. All costs for coordination and impacts of coordination including but not limited multiple mobilization and demobilization, materials handling and storage and timing shifts shall be included in the relevant bid items.

10. BID FORM

10.1. The Bid Form is attached hereto.

10.2. The price(s) quoted in the Bid Form shall include the costs of labor, materials, equipment, and all incidentals, not specifically listed as to be furnished by the Owner, required to provide a fully complete and functioning system requested in the plans and specifications. The price(s) stated in the Bid Form shall be complete and total payment for each item in the Bid Form. No additional payment will be made for the work needed to complete the Work.

10.3. Bid Forms must be completed in ink or by typewriter.

10.4. Unit price quantities stated in the bid form are estimates only and may vary when constructed. The Contractor will perform the required quantity of work for the unit price stated in the bid form. Owner reserves the right to modify the quantity of work without a change in unit price and to delete entire bid items in order to make the scope of work fit the budget or to align with funding options.

10.5. Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

10.6. Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

10.7. The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form.)

11. SUBMISSION OF BIDS

Bids shall be submitted at the time and place indicated in the Request for Bids and shall be enclosed in an opaque sealed envelope, marked with the Project title and name and address of the Bidder and accompanied by Bid Security and the other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

12. MODIFICATION AND WITHDRAWAL OF BIDS

Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

13. OPENING OF BIDS

When Bids are opened publicly, at the time and place specified in the request for bids, the bid total will be read aloud, and an abstract of the amounts of the base Bids and major alternates (if any) will be made available after the opening of Bids if the Contract is awarded. Bids will be acted upon by the Owner at a later date. Only if the bid is awarded with the details pricing in the bids be made public.

14. BIDS TO REMAIN OPEN

All Bids shall remain open for ninety (90) days after the day of the Bid opening, but Owner may, at its sole discretion, release any Bid and return the Bid Security (if any) prior to that date.

15. AWARD OF CONTRACT

15.1. Owner reserves the right to reject any of the individual bid items of a bid, to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with apparent Successful Bidder, and the right to disregard all nonconforming, non-responsive or conditional Bids. Also Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsible or responsive or the Bidder is unqualified or of doubtful technical and/or financial ability or fails to meet any other pertinent qualifications, standards, or criteria established by the Owner.

15.2 Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof based on the quantity times the unit price will be resolved in favor of the correct sum. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices.

15.3. In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids are balanced, comply with the prescribed requirements, and such alternates, unit prices and other data as may be requested in the Bid form or requested prior to the Notice of Award. Owner may accept or delete bid items and/or alternates in any order or combination.

15.4. Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those

portions of the Work for which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided under sub section 2 above "Qualification of Bidders".

15.5. Owner may conduct such investigations as he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

15.6. Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

15.7. If the contract is to be awarded, it will be awarded to the best qualified, responsible and responsive Bidder(s) whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project including an assessment of life cycle costs of any equipment and/or alternatives proposed even if it is not the low bid. The Owner shall be solely responsible for determining its best interests and life cycle costs. NOTE: In evaluating and comparing costs, the total cost will be determined based on the amount for the scope of work the Owner intends to award.

15.8. If the contract is to be awarded, Owner will give the Successful Bidder(s) a Notice of Award within ninety (90) days after the day of the Bid opening or if agreed to by both parties such extension of time beyond the 90 days to allow for execution the funding agency contract(s).

16. CONTRACT SECURITY

The Owner's requirements as to Performance and Payment Bonds are set forth in the Agreement. When the Successful Bidder delivers the executed Agreement to Owner it shall be accompanied by the required Performance and Payment Bonds.

17. Funding Agency Requirements

17.1 The project is funded in part from a grant from the Natural Resources Conservation Service, Emergency Watershed Protection Program (NRCS-EWP), Colorado Department of Public Safety, Division of Homeland Security and Emergency Management (DHSEM) Disaster Emergency Fund, and a loan from the Colorado Water Conservation Board (CWCB). Bidders shall comply with all the requirement of funding agencies and include those costs in the cost of the work.

Disadvantaged Business Enterprise (DBE) or a consortium of certified DBE's are encouraged to bid.

Bidders are required to comply with Williams Steiger Occupational Safety and Health Act of 1970 and with other federal requirements associated with the funding agency requirements. Contractors and subcontractors shall demonstrate that they are not prohibited from working on federally funded projects, and comply with EEO requirements, and all other funding agency requirements. Copies of funding agency contracts are available for review at Town Hall. Compliance with the terms of the funding agencies is a requirement of this contract.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder(s), it will be accompanied by an unsigned counterpart of the Agreement with all other written Contract Documents attached. Within ten (10) days thereafter Contractor shall sign and deliver a copy of the Agreement with attached documents to Owner with 3 originals of the required Bonds and copies of insurance certificates.

19. AGREEMENT

The Contract, when executed, shall be deemed to include the entire Agreement between the parties thereto, and the Bidder shall not claim any modifications thereof resulting from any representation or promise made at any time by an officer, agent, or employee of the Owner or by any other person.

20. STATE STATUTES

The Contractor must comply with all State Statutes including but not limited to the requirements HB 13-1292- and CRS 8-17.5-101.

SECTION 00300 - BID

PROJECT IDENTIFICATION: Town of Ridgway – Beaver Creek Infiltration Gallery

THIS BID IS SUBMITTED TO: Town of Ridgway
P.O. Box 10
Ridgway, CO 81432

Bid of _____ (hereinafter called "Bidder", organized and existing under the laws of the State of _____ doing business as _____ (a corporation, partnership, individual).

To the Town of Ridgway (hereinafter called "Owner").

In compliance with your request for Bids, BIDDER hereby proposes to perform all WORK for the construction of Beaver Creek Infiltration Gallery in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

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

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the number of days and date specified in the Agreement. BIDDER further agrees to pay as liquidated damages, the sum specified in the Agreement each calendar day thereafter as provided in Agreement

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

(a) Bidder has examined copies of all the Bidding and Contract Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date	Number
_____	_____
_____	_____
_____	_____
_____	_____

(b) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, characteristics of the area and physical conditions, including without limitation, improvements, conflicts, soil conditions, drainage, topography, access, and all other features of the terrain, and with the local conditions and site constraints, and federal, state, and local laws, ordinances, rules, and regulations that in any manner may affect cost, progress, or performance or furnishing of the Work, or apply in any manner whatsoever to the Work. After a bid has been submitted, the Bidder shall not assert that there was a misunderstanding concerning the nature or quantities of work to be done or the conditions under which the work will need to be performed nor that the Bidder was unaware that the scope of the work could be modified to fit the budget.

(c) Bidder has given Engineer written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder.

(d) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation not disclosed; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

(e) Bidder hereby certifies that, as of the date hereof, it does not knowingly employ or contract with an illegal alien who will perform work under this Agreement, and the Contractor will participate in the federal e-verify program or the state program pursuant to CRS 8-17-102(5) in order to confirm eligibility of all employees who are newly hired for employment under this agreement.

Bidder acknowledges that the Contract Price is based on the estimated quantities listed which are approximate and are furnished only for the purpose of estimating probable cost and comparing Bids offered on the Work, except where the unit is Lump Sum (LS), in which case payment will be based on the lump sum price bid for all work necessary to complete the item. Owner reserves the right to add and/or delete work in any order and in any quantity at no change in unit price.

Bidder agrees to perform all Work described in the Contract Documents for the following unit prices or lump sum which each include the full scope of work specified and detailed in Section 00350 Measurement and Payment and as required to complete the work:

Beaver Creek Restoration – Infiltration Gallery Bid Form

Bid Item	Specs	DESCRIPTION	Qty	PAY UNIT	UNIT PRICE	COST
1	01 71 13	Mobilization	1	LS		\$ -
2	02200	Clearing and Grubbing	1	LS		\$ -
3	Div. 1, 14.06	Surveying	1	LS		\$ -
4	31 23 19	Dewatering and Water Control	1	LS		\$ -
5	02 41 13	Selective Site Demolition	1	LS		\$ -
6	31 25 00	Concrete Washout Area	1	EA		\$ -
7	01 55 00	Temporary Stream Crossing	1	LS		\$ -
8	01 55 00	Channel Access Ramp	2	EA		\$ -
9	02200	Earthwork, Excavation and Fill On-Site	108	CY		\$ -
10	31 37 00	Salvage Onsite Boulders (>3' Dia.)	17	EA		\$ -
11	02713	4" C900 PVC Pipe	59	LF		\$ -
12	02713	4" DIP MJ Fitting (22.5 Degree Bend)	8	EA		\$ -
13	02713	4" PVC Cleanout with Cap	3	EA		\$ -
14	02713	6" x 4" PVC Reducer	3	EA		\$ -
15	02713	6" PVC Bulkhead Fitting with Threaded x PE Spool	3	EA		\$ -

16	02713	12" C900 PVC Pipe	157	LF		\$ -
17	02713	12" x 8" PVC Reducer	1	EA		\$ -
18	02713	12" Gate Valve	1	EA		\$ -
19	02713	8" Gear Drive Plug Valve	1	EA		\$ -
20	02722	Slab Manhole, 5-Foot Diameter w/Halliday Pneumatic Lid	1	EA		\$ -
21	02722	Slab Manhole, 4-Foot Diameter w/Halliday Pneumatic Lid	1	EA		\$ -
22	02713	12" DIP Pipe Class 50	40	LF		\$ -
23	02713	12" DIP MJ Fitting (22.5 Degree Bend)	4	EA		\$ -
24	02713	12" DIP MJ Fitting (45 Degree Bend)	3	EA		\$ -
25	02713	12"x 12" DIP MJ Full Bodied Wye	2	EA		\$ -
26	02713	12" DIP Flange x PE Spool Pipe (2-foot long)	3	EA		\$ -
27	33 12 00	Install Owner Furnished 12" x 10' Infiltration Gallery Screens	3	EA		\$ -
28	31 37 00	Infiltration Gallery Gravel - 3/8"	66	CY		\$ -
29	31 37 00	Infiltration Gallery 12" d50 Riprap Armor Mix	34	CY		\$ -
30	31 37 00	Native Alluvium Mix	15	CY		\$ -
31	31 05 19.16	Infiltration Gallery Impermeable Liner	835	SF		\$ -
32	33 46 26	Infiltration Gallery Permeable Geotextile	1025	SF		\$ -
33	32 77 00	Bank Stabilization Toewood with Backfill	21	LF		\$ -
34	32 77 00	Remove, Salvage, Prep Trees for Wood Structures	1	LS		\$ -
35	31 37 00	Grade Control V-structure (3'-4' boulders)	67	LF		\$ -
36	31 37 00	Type A Channel Backfill (2' boulders 50% mix) Armor Mix	25	CY		\$ -
37	32 92 19	Mulch, Crimped Straw with Tackifier	0.26	AC		\$ -
38	32 92 19	Seeding, Riparian, Drilled	0.26	AC		\$ -
39	32 93 00	Riparian Container Plantings	50	EA		\$ -
40	32 93 00	Riparian Plantings, Live Stakes	25	EA		\$ -
				TOTAL BASE BID		\$ -
BID ALTERNATE A - AIRBURST SYSTEM						
A1	40 05 23	2" Stainless Steel Pipe with Unions	69	LF		\$ -
A2	40 05 23	2" Perforated Stainless Steel Pipe	30	LF		\$ -

A3	40 05 06	2" Stainless Steel Tube Union 90 Degree Elbow	5	EA		\$ -
A4	40 05 06	2" Stainless Steel Tube Union Tee	2	EA		\$ -
A5	40 05 06	2" Stainless Steel Cap	3	EA		\$ -
A6	40 05 51	Pressure Valve Assembly with Fittings and Gages	1	LS		\$ -
			TOTAL BID ALTERNATE A			\$ -
BID ALTERNATE B - HAUL OFF EXCESS EARTHWORK						
B1	02200	Earthwork, Excavation and Fill On-Site	-108	CY		\$ -
B2	02200	Excavation	108	CY		\$ -
B3	02200	Fill	27	CY		\$ -
B3	02200	Export of Excess Material	81	CY		\$ -
			TOTAL BID ALTERNATE B			\$ -

All specific cash allowances are included in the price(s) set forth above.

UNIT PRICE (Indefinite Quantity):The following unit prices, Items 1 through 2 shall be applicable to the extent that the Owner, Owners Representative, or Engineer directs the Contractor in writing to perform these work items. These unit prices shall be used in adjusting the Contractor's cost on written Change Orders. Prices listed shall include furnishing and installing the materials or work complete including overhead and profit and conformance with all contract requirements in accordance with the Contract Documents unless otherwise specified. The Owner reserves the right to reject any of these unit prices, should they appear unbalanced or excessive. Such rejection shall not invalidate the acceptance of the Proposal or any contract based thereon.

Task Number	Specification Section	Description	Units	Unit Price
1	31 37 00	Streambed Fine Grading Directed by Engineer	CY	
2	02200	Excavation, Muck, Replace with Approved Material	CY	

Note: No work will be paid for unless it is authorized in writing by the Owner, Owners Representation, or Engineer before the work is started and the work is satisfactorily completed in accordance with the Project Specifications.

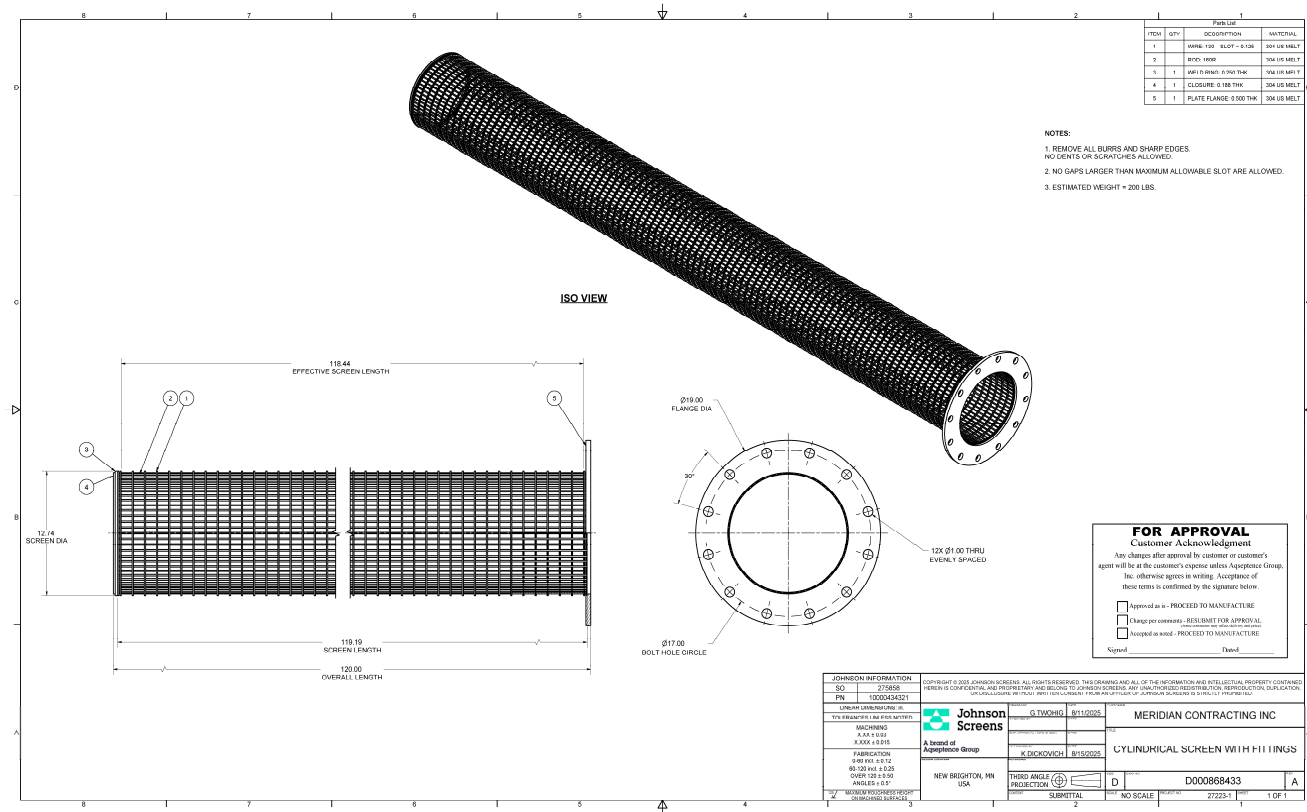
Bidder agrees that the Work will be substantially complete within the timeframe described in the Agreement and completed and ready for final payment within accordance with the time required in the Agreement.

Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

Owner will furnish the following materials to the Contractor:

Three (3) 12” diameter by 10-foot-long Johnson Infiltration Screens as shown in the photograph and on the Manufacturer’s cut sheet shown on the following page.

Materials to be furnished are available for inspection by appointment at the Town of Ridgway Public Works yard. Accepting an award of the contract indicates that the Contractor is agreeing that the materials are in satisfactory condition and that he is taking responsibility for the materials.



The following documents are attached to and made a condition of this Bid:

(a) A tabulation of Subcontractors, Suppliers and other persons and organizations required to be identified in this Bid.

(b) A statement of Bidder's Qualification with supporting data and references regarding similar projects.

(c) Required Bid Security shall be made payable to the Owner, in an amount specified in the Information to Bidders and in the form of a certified or bank Check or a Bid Bond (on form attached) issued by a surety meeting the requirements of the General Conditions.

Submitted on _____, 20____.

Respectfully submitted:

_____	_____
Signature	Address

_____	_____
Title	Date

_____	_____
License number (if applicable)	Phone

SEAL - (if BID is by a corporation)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____ as Principal, and as Surety, are hereby held and firmly bound unto _____ as OWNER in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed, this _____ day of _____, 20__.

The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

NOW, THEREFORE,

- (a) If said BID shall be rejected, or in the alternate,
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attachment hereto (Properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

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

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

_____(L.S.)
Principal

Surety

By:_____

SECTION 00350 - MEASUREMENT AND PAYMENT

PART I – GENERAL

This section is intended to further define the scope of the bid items on the bid form. It is the intent of these Contract Documents that the costs for all the work required for a complete project as described in the Contract Documents be included on the bid form. If there is a question of what bid items should include what costs, a written request shall be made to the Owner at least 7 days prior to bid opening. Nothing in this Section or in the Bid Form, including not finding a specific item or scope described, will negate the Contractor's responsibility to furnish a complete, functional project as described in the Contract Documents.

All pricing in each bid item shall be the complete cost to complete each scope of work whether specifically listed or needed to complete the work including all materials, equipment, labor, quality control and all testing, testing equipment and materials, protection of the work, sanitation facilities, coordination with others working on the site, general conditions expenses, and shall include permitting (including but not limited to securing, complying, and closing) stormwater, 404/Dredge and Fill, dewatering, and all other required permits, compliance with applicable Town, Colorado Department of Public Health and Environment (CDPHE), and federal regulations and standards, compliance with all funding agency requirements, compliance with terms of easements and permits, stabilization, traffic control, project safety, coordination with others, all submittals specified (including O&M manuals and as-constructed shots and drawings), schedules, surveying and staking, temporary facilities, clean up, restoration and demobilization, and shall include bonds and insurance, overhead profit, supervision, all applicable taxes, copyright, licensing, trademark and patent fees, warranties, and incidental work, tools, and materials and the associated costs of complying with all the requirements of the Contract Documents including, the Town's Standard Conditions and Typical Drawings for Infrastructure Construction.

Compensation included in each bid item shall also include any contractor loss or damage caused by the nature of the work, the action of the elements, or any unforeseen difficulties which may be encountered during the prosecution of the work, for all expenses incurred in consequence of the suspension or discontinuance of the work as herein specified.

Work in each item shall also include the cost of locating, exposing, and crossings obstacles such as but not limited to buried utilities that might conflict with the work in each bid item.

Owner reserves the right to add, modify, and/or delete work in any order and in any quantity at no change in unit price. The order of any additive alternates, if any, is not indicative of the order in which they might be awarded as that decision will in part be based on if there is available funding and how much is available. If there is insufficient funding to complete the base contract, the Owner may adjust the scope as needed to fit the budget and the Town's needs.

All materials incorporated into the work shall be free from defects and new, unless otherwise specified. Unless explicitly listed as provided by others, contractor shall furnish all materials and incidentals necessary to complete the work.

Note: The Contractor shall anticipate that there will be utility conflicts, challenges related to accessing and working at the project location, that the soils may be saturated, incompetent and/or unstable, rocky, and/or that the ground and surface water will be present and shall include the costs of handling those conditions in each relevant bid item. This note is applicable to each bid item. Encountering such conditions shall NOT be an unanticipated site condition.

Access to the work area is limited as is the space in which to conduct the work. There are also in places with steep slopes on either side of the work area. Contractor shall become familiar with the site prior to submitting a bid and include the costs associated with the limited access, limited work area, steep slopes, site constraints, and any needed improvements and include the costs of such work in the bid items which are impacted by such constraints.

LUMP SUM BID ITEMS: Lump Sum bid items shall be paid as follows (the numbering below corresponds to the numbering on the Bid Form):

Bid Item 1. Mobilization

Mobilization will be paid in accordance with CDOT Specifications, Section 626.

The following Bid Items will be paid 100% upon completion of the work associated with the bid item.

- 2. Clearing and Grubbing
- 3. Surveying,
- 5. Remove Structures and Obstructions,
- 7. Temporary Stream Crossing, and
- 35. Remove, Salvage, Prep Trees for Wood Structures

Bid Item 4. Water Control:

Water control will be paid as a percentage of the bid price based upon the number of days of actual water control at the time of the payment request divided by the number of days of anticipated water control as stated by the Contractor prior to start of construction, minus 20% of the bid price. The remaining 20% of the bid price will be paid at completion of water control.

UNIT PRICE BID ITEMS (with units of EA, CY, LF, SF, AC): These bid items will not be measured and will be paid for complete in place based on the plan quantity as presented on the Bid Form unless a change order adjusts the quantity. Bid quantities are based upon horizontal and vertical measurements based on the dominant direction (no slope adjustments).

UNIT PRICE ITEMS (Indefinite Quantity)

Each of the unit price indefinite quantity bid items are intended to provide pricing should the Owner request and authorize the addition of this work in writing. As with the unit price bid items on the Bid form, the costs for the unit price indefinite quantity work should include all the appurtenant and incidentals listed above which are associated with the work.

QUALIFICATION STATEMENT

Please complete all the questions. If additional space is needed, please attach a separate sheet of paper which references the question number.

Contractor Name: _____

Address: _____

Telephone _____ Email _____

Principal Owner/Officer: _____

Name Title

___ Corporation ___ Partnership ___ Individual ___ Joint Venture

I. TYPES OF WORK (list years of experience for each type of work desired)

Earthwork and Grading	_____	Dewater & Water Control	_____
Concrete	_____	Welded HDPE Pipe	_____
Pipeline	_____		
Others (list) _____			

II. GENERAL EXPERIENCE INFORMATION

2.1 Are you licensed as a Contractor Yes ☐ No ☐

[illegible]

2.2 How many years has your organization been in business as a Contractor under your present business name? ____ Under the current owners? ____
Under what previous names has the business and/or the Owners done business?

2.3 Date of organization or incorporation: _____ State _____
Names, Titles of Officers/Owners/Partners: _____

If a partnership is it a general, limited, or association?

2.4 If you have controlling interest in any firm(s) other than the one listed above, list here:

2.5 List percent of work normally performed with own forces
List trades: _____

If the answer to any of questions 2.6 - 2.11 is yes, provide explanation and/or details on a separate sheet of paper.

2.6 Have you or your organization or any officer or partner thereof failed to complete a contract awarded to it? Yes ___ No ___ If yes, give details:

2.7 Has the firm, any of its officers, principals, superintendents, or managers been involved in any, negotiated settlement, arbitration, litigation or court proceeding in the past eight (8) years? Yes ___ No ___ If yes, explain (listing type, kind, plaintiff, defendant, current status, etc.

2.8 Are there any judgments, claims, arbitration matters, unresolved contract disputes, or suits pending or outstanding against the firm, or any of its officers or principals? Yes ___ No ___ If yes, explain.

2.9 In the last ten years (10) has your firm, any of its officers, principals, managers, or superintendents filed any lawsuits or requested arbitration or formal mediation for or related to a construction contract? Yes ___ No ___ If yes, explain.

2.10 Has the firm, any of its officers, principals, superintendents, or managers been involved in any bankruptcy action as a bankrupt? Yes ___ No ___ If yes, explain

2.11 In the last ten (10) years has any of the firms officers, principals, managers, or superintendents ever been an officer or principal in another organization when it failed to complete a construction contract or filed any claims, lawsuits or requested arbitration or formal mediation for a construction contract? Yes ___ No ___ If yes, explain.

2.12 List on a separate sheet of paper the major projects your firm, its officers and principals, has completed during at least the last 5 years, providing, at a minimum, the following information for each project.

Name, Address, Phone, Contact Name of: Project, Owner, and Engineer
If other than this firm, list Name, Address, Phone for Construction Firm
Type of Project
Contract Amount, Date Completed
Percentage of work done with own forces and nature of that work

2.13 Total average annual construction value of work for the last 5 years. \$ _____

2.14 List on a separate sheet of paper the major projects your firm has in progress at this time, providing, at a minimum, the following information for each project.

Name, Contact Name, Address, Phone of: Project, Owner, and Engineer, Type of Project
Contract Amount, Scheduled & Expected Completion Date, Percent Completed Percentage of work done being done with own forces and nature of that work

2.15 Total value of work under contract and in progress \$ _____

III. PERSONNEL OF ORGANIZATION

3.1 Provide resumes for the organization's principals, officers, and superintendents and managers the organization intends to assign to this project. Resumes shall include the last 3 projects of similar scope on which each person worked and define the role each played. This information will be used in part to determine whether the personnel meet the minimum qualifications to be awarded the contract for the work.

IV. REFERENCES

4.1 Surety - List the Surety Companies that have bonded your work for the past five years (use a separate paper if necessary):

Name of Surety Name, Address of Agent	Project and Location	Period of Bond From To	Maximum Limits & General Comments
---	----------------------------	---------------------------	--------------------------------------

4.1.a Total Currently Bonded _____ Total Current Bond Limits _____

4.2 Bank References

4.3 Trade References

V. FINANCIAL INFORMATION

5.1 If requested, provide a financial statement with balance sheet and income statement and the following minimum information:

Current Assets: Cash, joint venture accounts, accounts receivable, notes receivable, accrued interest on notes, deposits, materials, prepaid expenses, net fixed assets, and other assets.

Current Liabilities: Accounts Payable, notes payable, accrued interest on notes, provision for incomes taxes, advances received from owners, accrued salaries, accrued payroll taxes, other liabilities and capital (capital stock, authorized and outstanding shares of value, earned surplus and retained earnings).

Name of firm preparing the statement and date of the statement

5.2 Is the financial statement for the same exact firm as the qualification statement? If not, what is the relationship and the financial responsibility of the organization whose financial statement is provided?

5.3 Will the organization whose financial statement is provided act as a guarantor for the contract for which this qualification statement is provided? _____.

AFFIDAVIT

_____ certifies and says: That he is an authorized representative (list title) of (organization) _____ submitting this statement of experience; that s/he has read the same, and that the same is true of his/her knowledge; that the statement is for the purpose of providing construction bids/proposals for the **Town of Ridgway – Beaver Creek Infiltration Gallery** and that any vendor or other agent therein named is hereby authorized to provide information necessary to verify the statement; and that furthermore, should this statement at any time cease to properly or truly represent his condition in any substantial respect, it will refrain from further work for the Town until it shall have submitted a revised and corrected statement.

I certify and declare under penalty of perjury that the foregoing and attached information provided herein is true, correct, and sufficiently complete to not be misleading:

Subscribed on this _____, 20__ at _____

Note: Use full corporate name & attach corporate seal here, if corporation

Official must sign here _____

Title _____

Attested: _____

NOTE: Statement will be returned and bids and/or proposals rejected unless this affidavit is completed in EVERY respect.

CONSTRUCTION CONTRACT

AGREEMENT

THIS AGREEMENT is made between the **TOWN of RIDGWAY**, Colorado, (Owner or Town) and the Contractor, _____ for the Construction Project known as: **Town of Ridgway – Beaver Creek Infiltration Gallery Project.**

The Owner's Representative (OR) is: As designated by the Owner at the Preconstruction Conference.

The Owner and Contractor agree as follows:

ARTICLE 1

THE WORK:

The Contractor shall perform all the Work required by the Contract Documents for: **Town of Ridgway – Beaver Creek Infiltration Gallery Project** described in the Contract Documents. Contractor shall furnish all labor, services, materials, tools, and equipment for the construction and completion of the work proposed to be done under this Agreement. Contractor will construct and complete the work in a thorough and workmanlike manner in every respect to the satisfaction and approval of the Owner, within the time specified herein and in strict accordance with the Contract Documents

ARTICLE 2

TIME OF COMMENCEMENT AND COMPLETION:

The Work to be performed under this Contract shall commence upon Notice to Proceed. Work shall be completed and ready for final payment within **45 calendar days** of Notice to Proceed and no later than **October 30, 2026** for completion of the construction and by **November 13, 2026** to be ready for final payment.

ARTICLE 3

CONTRACT AMOUNT AND BASIS:

The Owner shall pay the Contractor for the satisfactory performance of the Work, subject to additions and deductions by Change Order as provided in this Agreement based on the unit prices in the Contractor's bid.

ARTICLE 4

PROGRESS PAYMENTS:

Based upon Applications for Payment submitted to the OR by the Contractor accompanied by such supporting documentation, and Certificates for Payment issued by the OR the Owner shall make progress payments to the Contractor as follows:

On a monthly basis for the work satisfactorily completed based on unit prices in the bid form. For lump sum bid items, work will be paid as presented in section 00350.

5% of each amount certified for payment shall be retained by the Owner until final payment.

ARTICLE 5

FINAL PAYMENT:

After completion of the Work, provided the Contract be then fully performed, subject to the provisions of Article 16 of the General Conditions, the Owner shall publish a Notice of Final Settlement twice at least 10 days prior to the date of final settlement. The Owner shall withhold from final payments any amounts as required pursuant to C.R.S. 38-26-107.

ARTICLE 6

ENUMERATION OF CONTRACT DOCUMENTS:

The Contract Documents are indicated by a check or X in the boxes below:

- ☒ [X] Agreement including General Conditions
- ☒ [X] Funding Agency contract terms and conditions
- ☒ [X] Request for Bids and Instructions to Bidders
- ☒ [X] Bid Form
- ☒ [X] Measurement and Payment
- ☒ [X] Specifications
- ☒ [X] Drawings
- ☒ [X] Addenda – if any
- ☒ [X] Change Orders - if any
- ☒ [X] Written Interpretation of OR - if any
- ☒ [X] Performance Bond and Payment Bond (if required)
- ☒ [X] Notice of Award
- ☒ [X] Notice to Proceed

ARTICLE 7

CONTRACT DOCUMENTS:

7.1 The Contract Documents consist of this Agreement (which includes provisions commonly referred to as General Conditions), and the documents indicated in Article 6 by an "X". These form the Contract and what is required by any one shall be as binding as if required by all. The intention of the Contract Documents is to include all labor, materials, equipment and other items as provided in Paragraph 10.2 necessary for the proper execution and completion of the Work and the terms and conditions of payment therefore, and also to include all Work which may be reasonably inferable from the Contract Documents as being necessary to produce the intended results.

7.2 The Contract Documents shall be signed in not less than duplicate by the Owner and the Contractor. By executing the Contract, the Contractor represents that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed.

7.3 The term Work as used in the Contract Documents includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

ARTICLE 8

OWNER'S REPRESENTATIVE (OR)

8.1 The OR will provide general administration of the Contract and will be the Owner's representative during construction and until issuance of the final Certificate for Payment.

8.2 The OR shall at all times have access to the Work wherever it is in preparation and progress.

8.3 The OR will make periodic visits to the site to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of his on-site observations, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor. The OR will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The OR will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

8.4 Based on such observations and the Contractor's Applications for Payment, the OR will determine the amounts owing to the Contractor and will review Requests for Payment in accordance with Article 16.

8.5 The OR will be, in the first instance, the interpreter of the requirements of the Contract Documents. He will make decisions on all claims and disputes between the Owner and the Contractor.

8.6 The OR will have authority to reject Work which does not conform to the Contract Documents.

8.7 No act, representation, or instruction of OR or Engineer shall in any way relieve the Contractor from liability for damages or costs that result from activities of the Contractor.

ARTICLE 9

OWNER:

9.1 The Owner shall furnish control for the work as specified in paragraph 10.11 below.

9.2 The Owner shall secure any required permanent easements or real property necessary for the completed project and advise Contractor of the boundaries of Owner's easements or property.

9.3 The Owner shall issue all instructions to the Contractor through the OR.

ARTICLE 10

CONTRACTOR:

10.1 The Contractor shall supervise and direct the Work competently and efficiently, using his best skill, expertise, and attention in order to perform the work in accordance with the Contract Documents proceeding in an efficient sequence without delays. Contractor shall keep a competent superintendent of work on the premises at all times to receive instructions and to comply with them. Superintendent should be supervising, not operating equipment. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

10.2 Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials,

equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

10.3 The Contractor shall at all times enforce strict discipline and good order among his employees, and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

10.4 The Contractor warrants to the Owner and the OR that all materials and equipment incorporated in the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective.

10.5 The Contractor shall pay all sales, consumer, use and other similar taxes required by law and shall secure all permits, and licenses necessary for the execution of the Work at Contractor's expense except as provided in Article 24. The Owner is exempt from state and local sales and use taxes on construction and building materials for use in the project. Contractor shall take steps to obtain such exemption from the Colorado Department of Revenue pursuant to C.R.S. 39-26-708.

10.6 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the Work, and shall notify the OR if the Drawings and Specifications are at variance therewith.

10.7 The Contractor shall be responsible for the acts and omissions of all its employees and all Subcontractors, their agents and employees and all other persons performing any of the Work under a contract with the Contractor.

10.8 The Contractor shall review, stamp with his approval and submit all samples and shop drawings as directed for approval of the Engineer for conformance with the design concept and with the information given in the Contract Documents. The Work shall be in accordance with approved samples, submittals, and shop drawings. Work subject to submittal shall not commence until Engineer approval of submittal has been received.

10.9 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as his tools, construction equipment, machinery and surplus materials, and shall clean all surfaces and shall leave the Work "broom clean" or its equivalent, except as otherwise specified.

10.10 The Contractor shall contact Colorado Utility Notification Center (1 800 922 1987) at least three business days prior to any excavation work.

10.11 The Owner will furnish two horizontal control points and a reference to NAD 88 for vertical control which the contractor shall protect. Contractor shall provide all survey work necessary to construct the work to the line and grade in the contract documents and to confine its operations to the properties the Town owns and/or for which the Town has applicable easements. Where the Contractor's work and/or work area are in close proximity to the site boundaries and/or disturbance limits, the Contractor shall construct a temporary fence to ensure his work and materials stay within the designated boundaries. Prior to construction, Contractor's Surveyor shall verify the locations and provide the Engineer the field notes demonstrating the verification of coordinates and elevations. Should a bench mark or control point be disturbed after verification and before final project acceptance, the Contractor's Surveyor shall immediately notify the Engineer and re-establish the

monument prior to any further work providing the Engineer with the field notes. The Contractor shall bear all costs of the re-establishment of the disturbed monument.

ARTICLE 11

SUBCONTRACTS:

11.1 A Subcontractor is a person who has a contract with the Contractor to perform any of the Work at the site.

11.2 Unless otherwise specified in the Contract Documents or in the Instructions to Bidders, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Engineer a written list of the names of Subcontractors proposed for the principal portions of the Work. The Contractor shall not employ any Subcontractor to whom the Engineer, OR, or the Owner may have a reasonable objection. The Contractor shall not be required to employ any Subcontractor to whom he has a reasonable objection. Contracts between the Contractor and the Subcontractor shall be in accordance with the terms of this Agreement and shall include the General Conditions of this Agreement and the funding agency requirements insofar as applicable.

ARTICLE 12

SEPARATE CONTRACTS AND OWNER WORK:

12.1 The Owner reserves the right to award other contracts in connection with other portions of the Project or other work on the site or to perform such work itself.

12.2 The Contractor shall afford other contractors and/or Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate its Work with theirs.

12.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefore.

ARTICLE 13

ROYALTIES AND PATENTS:

The Contractor shall pay all royalties, patent, and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner and Engineer harmless from loss on account thereof.

ARTICLE 14

PERFORMANCE AND PAYMENT BONDS:

A Performance and a Payment Bond shall be submitted by Contractor for all contracts in excess of \$50,000 or if indicated in Article 6.

Each bond shall be in the amount of the contract sum and shall either be in the form supplied by Owner or shall be in such other form as approved by Owner. Each bond shall comply with the requirements of C.R.S. 38-26-105 and 106 and shall remain in effect no less than one year after final payment.

Warranties and guarantees for longer than one year required by the contract are excluded from the bonding requirements.

ARTICLE 15

Time and Liquidated Damages

15.1 All time limits stated in the Contract Documents are of the essence of the Contract. Contractor further agrees to pay as liquidated damage in the sum of \$400.00 for each day that expires after the deadlines in Contract Documents.

15.2 If the Contractor is delayed at any time in the progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in transportation, unavoidable casualties, causes beyond the Contractor's control, or by any cause which the OR may determine justifies the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the OR may determine.

15.3 Contractor waives any claim for damages due to delay unless caused in whole or in part by the acts or omissions within the control of the Owner or persons acting on behalf thereof.

ARTICLE 16

PAYMENTS:

16.1 Payments shall be made as provided in Article 4 of this Agreement.

16.2 Payments may be withheld on account of (1) defective Work not remedied, (2) claims asserted or evidence which indicates probable assertion of claims, (3) failure of the Contractor to make payments properly to Subcontractors or for labor, materials, or equipment, (4) damage to another contractor or Owner, or (5) unsatisfactory prosecution of the Work by the Contractor. No funds, payable under this Agreement or any part thereof, shall become due and payable, if the Owner so elects, until the Contractor shall satisfy the Owner that it has fully settled or paid for all materials and equipment used in or upon the work and labor done in connection therewith. The Owner may pay any or all such claims or bills, wholly or in part, and deduct the amount or amounts so paid from any funds due Contractor. In the event the surety on any contract, performance bond, payment bond, or warranty bond given by the Contractor becomes insolvent, or is placed in the hands of a receiver, or has its right to do business in the State revoked, the Owner may withhold payment of funds due Contractor until the Contractor has provided a bond or other security to the satisfaction of the Owner in lieu of the bond so executed by such surety.

16.3 Final payment shall not be due until (1) the Contractor has delivered to the Owner a bond, a clean irrevocable letter of credit, cash or other security satisfactory to the Owner indemnifying Owner against any claim which has been asserted by anyone for labor, materials, equipment or otherwise arising out of the contract or on account of any claim which either Owner or Contractor believes may be asserted, (2) the Owner has inspected and approved the Work as complying with the contract, (3) written consent of surety, (4) release of liens from subcontractors and/or suppliers when requested, and (5) any manufacturers or suppliers warranties and equipment literature, and any as built plans and O&M manuals required are delivered to Owner.

16.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from (1) unsettled claims, (2) faulty or defective Work appearing after final Payment, (3) failure of the Work to comply with the requirements of the Contract Documents, or (4) terms of any warranties or special guarantees required by the Contract Documents. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled as noted or referenced on the final payment form.

16.5 Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by Engineer, nor the issuance of a certificate of Completion, nor any payment by Owner to Contractor under the Contract Documents, nor any use or occupancy of the Work or any part thereof by Owner, nor any act of acceptance by Owner nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by Engineer pursuant to paragraphs regarding "Final Payment" above, nor any correction of defective Work by Owner will constitute an acceptance of Work not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents.

ARTICLE 17

PROTECTION OF PERSONS AND PROPERTY AND RISK OF LOSS:

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to (1) all employees on the Work and other persons who may be affected thereby, (2) all the Work and all materials and equipment to be incorporated therein, and (3) other property at the site or elsewhere. Contractor shall bear all risk of loss to the work, or materials or equipment for the work due to fire, theft, vandalism, or other casualty or cause, until the work is fully completed and accepted by the Owner. Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. All damage or loss to any property caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor. At no time shall any part of the work be left in an unsafe condition where it could cause injury to any employee or the public.

ARTICLE 18

INDEMNIFICATION AND INSURANCE:

18.1: Indemnification: The CONTRACTOR agrees to indemnify and hold harmless the STATE of COLORADO, OWNER, its officers, employees, consultants, insurers, and self-insurance pool, from and against all liability, claims, actions, and demands, on account of injury, loss, or damage, including without limitation claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, violation of statute, ordinance, or regulation or any other loss of any kind whatsoever, which arise out of or are in any manner connected with this contract, if such injury, loss, or damage is caused in whole or in part by, or is claimed to be caused in whole or in part by, the act, omission, error, contractor error, mistake, negligence, or other fault of the CONTRACTOR, any subcontractor of the CONTRACTOR, or any officer, employee, representative, or agent of the CONTRACTOR or of any subcontractor of the CONTRACTOR, or which arise out of any workmen's compensation claim of any employee of the CONTRACTOR or of any employee of any subcontractor of the CONTRACTOR. The CONTRACTOR agrees to investigate, handle, respond to, and to provide defense for and defend against, any such liability, claims or demands at the sole expense of the CONTRACTOR, or at the option of OWNER, agrees to pay OWNER or reimburse OWNER for the defense costs incurred by OWNER in connection with, any such liability, claims, or demands. The CONTRACTOR also agrees to bear all other costs and expenses related thereto, including court costs and attorney fees, whether or not any such liability, claims, or demands alleged are groundless, false, or fraudulent. The obligation of this Section 18.1 shall not extend to any injury, loss, or damage which is caused solely by the act, omission, or other fault of the OWNER, its officers, or its employees.

18.2 Insurance: The CONTRACTOR agrees to procure and maintain, at its own cost, a policy or policies of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the CONTRACTOR pursuant to Section 18.1. Such insurance shall be in addition to any other insurance requirements imposed by this contract or by law. The CONTRACTOR shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to Section 18.1 by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.

18.2.1 CONTRACTOR shall procure and maintain, and shall cause any subcontractor of the CONTRACTOR to procure and maintain, the minimum insurance coverages listed below. The Contractor shall not allow any subcontractor to commence work on this project until all similar insurance required of the subcontractor has been obtained and approved. For the duration of this Agreement, the Contractor must maintain the insurance coverage required in this section. Such coverages shall be procured and maintained with forms and insurers acceptable to OWNER. All coverages shall be continuously maintained from the date of commencement of work to cover all liability, claims, demands, and other obligations assumed by the CONTRACTOR pursuant to Section 18.1. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

18.2.1(A) Workers' Compensation insurance to cover obligations imposed by the Workers' Compensation Act of Colorado and any other applicable laws for any employee engaged in the performance of Work under this contract, and Employers' Liability insurance with minimum limits of FIVE HUNDRED THOUSAND DOLLARS (\$500,000) each accident, FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - policy limit, and FIVE HUNDRED THOUSAND DOLLARS (\$500,000) disease - each employee. Evidence of qualified self-insured status may be substituted for the Workmen's Compensation requirements of this paragraph.

18.2.1(B) Commercial General Liability insurance on ISO occurrence form CG 00 01 10/93 or equivalent covering bodily injury, premises operations, broad form property damage (including completed operations) fire damage, independent contractors, products and broad form property insurance including completed operations, blanket Grantual liability, personal injury (including coverage for contractual and employee acts), and advertising liability with minimum combined single limits of (a) ONE MILLION DOLLARS (\$1,000,000) each occurrence, (b) TWO MILLION DOLLARS (\$2,000,000) aggregate, (c) ONE MILLION (\$1,000,000) products and completed operations aggregate, and (d) FIFTY THOUSAND (\$50,000) any fire. The policy shall be applicable to all premises and operations. The policy shall include coverage for explosion, collapse, and underground hazards. The policy shall contain a severability of interests provision. If any aggregate limit is reduced below \$2,000,000 because of claims made or paid, CONTRACTOR shall immediately obtain additional insurance to restore the full aggregate limit and furnish to OWNER a certificate or other document satisfactory to OWNER showing compliance with this provision.

18.2.1(C) Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than ONE MILLION DOLLARS (\$1,000,000) each occurrence and ONE MILLION DOLLARS (\$1,000,000) aggregate with respect to each of CONTRACTOR's owned, hired and/or non-owned vehicles assigned to or used in performance of the services. The policy shall contain a severability of interests provision. If the CONTRACTOR has no owned automobiles, the requirements of this Paragraph (3) shall be met by each employee of the CONTRACTOR providing services to the OWNER under this contract.

18.2.2 The policy required by paragraphs 18.2.1(B) and (C) above shall be endorsed to include the State of Colorado, the OWNER (Town of Ridgway) and OWNER's officers and employees as additional insureds. Every policy required above shall be primary insurance and any insurance carried by OWNER, its officers, or its

employees, or carried by or provided through any insurance pool of OWNER, shall be excess and not contributory insurance to that provided by CONTRACTOR. No additional insured endorsement to any policy shall contain any exclusion for bodily injury or property damage arising from completed operations. The CONTRACTOR shall be solely responsible for any deductible losses under any policy required above. Additional insured coverage for completed operations shall be on endorsements CG 2010 11/85, CG 2037, or equivalent.

18.2.3 The certificates of insurance which are consistent with State requirements shall be completed by the CONTRACTOR's insurance agent as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect, and shall be reviewed and approved by OWNER prior to commencement of the contract. Each certificate shall identify this contract and shall provide that the coverages afforded under the policies shall not be cancelled, non renewed, terminated or materially changed until at least 30 days prior written notice has been given to OWNER. If the words "endeavor to" appear in the portion of the certificate addressing cancellation, those words shall be stricken from the certificate by the agent(s) completing the certificate. The completed certificate of insurance shall be sent to OWNER.

18.2.4 Failure on the part of the CONTRACTOR to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of contract upon which OWNER may immediately terminate this contract, or at its discretion OWNER may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all monies so paid by OWNER shall be repaid by CONTRACTOR to OWNER upon demand, or OWNER may offset the cost of the premiums against any monies due to CONTRACTOR from OWNER.

18.2.5 OWNER reserves the right to request and receive a certified copy of any policy and any endorsement thereto.

18.2.6 The parties hereto understand and agree that OWNER is relying on, and does not waive or intend to waive by any provision of this contract, the monetary limitations (presently \$350,000 per person and \$990,000 per occurrence) or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, { 24-10-101 et seq., 10 C.R.S., as from time to time amended, or otherwise available to OWNER, its officers, or its employees.

18.2.7 Subrogation Waiver – All insurance policies in any way related to the project and secured and maintained by the CONTRACTOR as required herein shall include clauses stating that each carrier shall waive all rights of recovery, under subrogation or otherwise, against OWNER or the State, its agencies, institutions, organizations, officers, agents, employees, and volunteers.

18.2.8 The Agreement shall not be executed, and no notice or authorization to proceed shall be given until the Certificates required above, are submitted and approved by the Owner.

18.2.9 In carrying out any of the provisions of this Agreement or in exercising any power or authority thereby, there shall be no personal liability of the Owner, its governing body, staff, consultants, officials, attorneys, representatives, agents, or employees.

ARTICLE 19

PROPERTY INSURANCE:

19.1 Unless otherwise provided, the Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interest of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils

of Fire, Theft, Extended Coverage, Vandalism and Malicious Mischief. Such policy shall be an "all-risk" Builders Risk policy.

19.2 Any insured loss is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of any mortgagee clause.

19.3 The Contractor shall file a copy of all such policies with the Owner prior to the commencement of the Work.

19.4 The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance provided under this paragraph. The Contractor shall require similar waivers by Subcontractors and Sub-subcontractors.

ARTICLE 20

CHANGES IN THE WORK:

20.1 The Owner without invalidating the Contract may order Changes in the Work consisting of additions, deletions, or modifications with the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by written Change Order signed by the Owner.

20.2 The Contract Sum and the Contract Time may be changed only by Change Order.

20.3 The cost or credit to the Owner, if any, from a Change in the Work shall be determined by unit prices if specified in the contract documents, or by mutual agreement using materials costs, and estimated labor and equipment times as a basis where practical.

ARTICLE 21

CORRECTION OF WORK:

21.1 The Contractor shall correct any Work that fails to conform to the requirements of the Contract Documents where such failure to conform appears during the progress of the Work and shall remedy any defects or deficiencies due to faulty materials, equipment or workmanship which appear within a period of one year from the Date of Final Settlement of the Contract or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee or warranty required by the Contract Documents. The provisions of this Article 21 apply to Work done by Subcontractors as well as to Work done by direct employees of the Contractor, and are in addition to any other remedies or warranties provided by law, or other provisions of the Contract Documents. Neither the payment of any estimate or progress payment nor the payment of any retained percentage shall relieve the Contractor of any obligations to correct any defective work or material.

ARTICLE 22

TERMINATION BY THE CONTRACTOR:

If the OR fails to process a request for payment for a period of thirty days through no fault of the Contractor, or if the Owner fails to make payment thereon for a period of thirty days from date of receipt of grant and/or loan funds, the Contractor may, upon seven days' written notice to the Owner and the OR, terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment tools, and construction equipment and machinery, including reasonable profit and damages.

ARTICLE 23

TERMINATION BY THE OWNER:

23.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or fails to perform any provision of the Contract, the Owner may, after seven days' written notice to the Contractor and without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor or, at his option, may terminate Contractor's work under the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient, and if the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, such excess shall be paid to the Contractor, but if such expense exceeds such unpaid balance, the Contractor shall pay the difference to the Owner. These rights and remedies are in addition to any right to damages or other rights and remedies allowed by law.

23.2 The Owner may terminate performance of work under this contract in whole or, from time to time, in part if the Owner determines that a termination is in the Owner's interest. The Owner shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date. The termination for convenience process will be as prescribed in 48 CFR 52-249-2.

ARTICLE 24

PERMITS:

Contractor shall be responsible for securing any necessary permits for the work that could include but is not limited to electrical, mechanical, dewatering and stormwater management. Contractor shall comply with conditions of all permits secured by the Town and those secured by the Contractor.

ARTICLE 25

MISCELLANEOUS PROVISIONS:

25.1 This contract is governed by the laws of the State of Colorado. The parties agree to the jurisdiction and venue of the courts of Ouray County in connection with any dispute arising out of or in any matter connected with this Agreement.

25.2 Contractor shall not assign this contract. The provisions of the contract are binding on the heirs, successors or assignees of the parties.

25.3 The rights and remedies available under this contract shall be in addition to any rights and remedies allowed by law.

25.4 No failure to enforce any provision of the contract on account of any breach thereof, shall be considered as a waiver of any right to enforce provisions of this contract concerning any subsequent or continuing breach.

25.5 The terms of this agreement shall remain in full force and effect following final payment.

25.6 No change order requiring additional payments for additional compensable work or otherwise shall be issued unless an appropriation is available therefore and the Contractor is so advised in writing.

ARTICLE 26

ADDITIONAL PROVISIONS:

26.1 PROJECT FUNDING AGENCY REQUIREMENTS

26.1a. This contract shall comply with all applicable federal and Colorado state laws and shall be governed by the applicable law of the State of Colorado notwithstanding provisions herein to the contrary.

26.1b. The project is funded in part by a grant from the Natural Resources Conservation Service, Emergency Watershed Protection Program (NRCS-EWP), Colorado, Department of Public Safety, Division of Homeland Security and Emergency Management (DHSEM) Disaster Emergency Fund, and a loan from the Colorado Water Conservation Board (CWCB). Contractor shall strictly adhere and implement requirements of the funding agencies and the requirements of the funding agency terms and conditions included with the contract documents Disadvantage Business Enterprise, Buy America, Build America requirements, Executive Order 11246, OSHA. Contractor shall comply with all applicable NRCS, DHSEM, and CDPHE requirements and applicable laws and regulations. Copies of each of the funding contracts is available for review at Town Hall.

26.1c. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract

26.1d. The State of Colorado, Federal Government, NRCS, DHSEM, the State Auditor, the Town, and/or any properly delegated or authorized representatives of these entities, including independent certified public accountants of their choosing, shall have the right to inspect, examine and audit the Contractor's records, books, accounts, and other relevant documents concerning this contract for a period of five years after final payment.

26.1.e. The Contractor must comply with all State Statutes including but not limited to the requirements HB 13-1292- and CRS 8-17.5-101.

26.2 Contractor hereby assigns all manufacturers' warranties to Owner and shall assist the Owner in enforcing such warranties. No limitation of any manufacturer's warranties, or additional warranties of Contractor, shall be construed to limit the obligations of the Contractor under any warranties or other provisions of the contract documents.

26.3 WORK HOURS - All work at the site shall be performed during regular working hours, and Contractor will not permit overtime work or performance of Work on Saturday, Sunday, or any State legal holiday (as enumerated in CDOT Standards #101.32 without Owner's written consent given after prior written notice to Engineer). Contractor shall reimburse Owner for all expenses of Owner including construction observation and testing, incurred as a result of working during non-regular hours. Regular hours shall not exceed 11 hours in a 24 hour period nor 40 hours in a seven day period, nor include Saturdays, Sundays, or legal holidays. Other work hours shall be considered non-regular. Working less than 2 consecutive days in a calendar week shall require consent of the Town. Work shall not commence prior to 7:30 am (including warming vehicles) and continue past 6:30 pm. Specific days and hours for work on certain dates are enumerated in the Additional General Requirements. The project plans and Town standards may include additional work hour restrictions. Concrete placement that requires testing shall not be placed on a Friday.

This Agreement is dated _____.

TOWN OF RIDGWAY, COLORADO

By _____

CONTRACTOR:

By _____

NOTICE OF AWARD

DATED:

TO: _____
Bidder

ADDRESS: _____

PROJECT NAME: Town of Ridgway – Beaver Creek Infiltration Gallery Project

CONTRACT FOR: Town of Ridgway – Beaver Creek Infiltration Gallery Project
Name of Contract as it appears in Bidding Documents

You are notified that your Bid dated _____ for the above Contract has been considered. You are the apparent successful bidder and have been awarded a contract for Town of Ridgway – Beaver Creek Infiltration Gallery Project with the following amended scope and pricing:

The Contract Price of your contract is _____ and 00/100 Dollars (\$.00). The Owner reserves the right to add or deleted work as the project progresses for the unit prices above to ensure the project stays within budget.

Actual payments will be based on the quantity and unit price for the work completed in accordance with the Contract Documents.

You must comply with the following conditions precedent within ten days of the date of this Notice of Award that is by_____.

1. You must deliver to the Owner three fully executed counterparts of the Agreement including required Contract Securities (Bonds) as specified in the Agreement.
2. Certificates of Insurance with the minimum limits and additional insurers listed in the Contract Documents.
3. (List other conditions precedent). (None)

Failure to comply with these conditions within the time specified will entitle Owner to consider you bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten days after you comply with those conditions, Owner will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

Town of Ridgway
Owner

BY: _____
Authorized Signature

Title

ACCEPTANCE OF NOTICE

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

_____ on _____, 20

BY: _____ Title: _____

Employer ID Number: _____

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and _____
(Corporation, Partnership, or Individual) (Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER in the total aggregate penal sum of _____
Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

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

Project Name: _____

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

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its

obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiaries hereunder.

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

ATTEST:

Principal

(Principal) Secretary

By _____(s)

(SEAL)

(Address)

Witness as to Principal

(Address)

ATTEST:

Surety

By _____

Witness as to Surety

Attorney-in-Fact

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is partnership, all partners should execute BOND.

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

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and _____
(Corporation, Partnership, or Individual) (Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER in the penal sum of _____ Dollars (\$_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

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

Project Name: _____

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, sub-contractors, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such Contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said Work whether by Sub-Contractor or otherwise then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its

obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

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

IN WITNESS WHEREOF, this instrument is executed in __ counterparts, each of which shall be deemed an original, this the ____ day of _____ 20__.

ATTEST:

Principal

(Principal) Secretary

(SEAL)

By _____(s)

(Address)

Witness as to Principal

(Address)

ATTEST:

Surety

By

Attorney-in-Fact

Witness as to Surety

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is partnership, all partners should execute BOND.

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

oOo

NOTICE TO PROCEED

DATED:

TO: _____
Bidder

ADDRESS: _____

PROJECT NAME: Town of Ridgway – Beaver Creek Infiltration Gallery Project

CONTRACT FOR: Town of Ridgway – Beaver Creek Infiltration Gallery Project
Name of Contract as it appears in Bidding Documents

You are notified that the Contract Time under the above contract will commence to run on _____. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 2 of the Agreement the date of Completion is _____.

Before you may start any Work at the site you must provide the Owner certificates of insurance which is required in the Agreement which is required to be purchased in maintained in accordance with the Contract Documents. You must also schedule with the Engineer and attend a pre-construction conference at the office of the Owner.

Also before you may start any Work at the site you must:

Town of Ridgway
Owner

BY: _____
Authorized Signature

Title _____

ACCEPTANCE OF NOTICE to Proceed

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

_____ on _____, 20__

BY: _____ Title:

Employer ID Number: _____

CHANGE ORDER No. _____

PROJECT: Town of Ridgway – Beaver Creek Access Infiltration Gallery

DATE OF ISSUANCE: _____

OWNER: Town of Ridgway
Address: P.O. Box 10, Ridgway CO 81432

CONTRACTOR: _____

You are directed to make the following changes in the Contract Documents:

Description: _____

Attachments: _____

CHANGE IN CONTRACT PRICE

CHANGE IN CONTRACT TIME

Original Contract Price

Original Contract Time

Previous Change Orders #_ to #_

Net Change From Previous Change Orders

Contract Price Prior to this Change Order

Contract Time Prior to this Change Order

Net Increase (Decrease) this Change Order

Net Increase (Decrease) this Change Order

Contract Price w/all approved Change Orders

Contract Time w/all appr'd Change Orders

RECOMMENDED:

APPROVED:

APPROVED:

Engineer

Contractor

Owner

FINAL PAYMENT REQUEST

Town of Ridgway – Beaver Creek Access Infiltration Gallery

TO: Town of Ridgway Application for Payment _____
P.O. Box 10
Ridgway CO 81432 Period Ending: _____

Original Contract Amount	\$
Change Order Amount	\$
Total Work Constructed (see attached list)	\$
Total Project	\$
Less Previous Payments	\$
TOTAL AMOUNT DUE - FINAL PAYMENT	\$

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief that all labor covered by the application has been paid including all sub-contractors and that title to all materials and equipment incorporated in the Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by Bond acceptable to Owner). This final payment represents final payment of all compensation due the Contractor for the Work in the Contract for the **Town of Ridgway – Beaver Creek Access Infiltration Gallery Project** between the Town of Ridgway and _____.

Engineer	Contractor	Town of Ridgway
_____ Engineer	_____ Contractor	_____ Owner
_____ Title	_____ Title	_____ Title
_____ Date	_____ Date	_____ Date

Contract Provisions for Non-Federal Entity Contracts Under Federal Awards

This project will be funded, in part, with an award of federal funds. The Contractor shall comply with the following:

1. Federal Compliance

Contractor shall comply with all applicable federal laws, regulations, and requirements. These include but are not limited to compliance with the following laws and regulations.

2. Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708).

If this Agreement is in excess of \$100,000 and involves the employment or mechanics or laborers, Contractor must comply with provisions of 40 U.S.C. 3702, as supplemented by Department of Labor regulations (29 CFR Part 5).

3. Rights of Inventions Made Under a Contract Agreement

If this Agreement is an agreement with a small business firm or nonprofit organization for performance of experimental, developmental, or research, Contractor must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any Implementing regulations issued by the awarding agency.

4. Clean Air Act (42 U.S.C. 7401 – 7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387).

If this Agreement is in excess of \$150,000, the Contractor is required to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act as amended (42 U.S.C. 7401- 7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency of the federal funds for this Agreement and the Regional Office of the Environmental Protection Agency (EPA).

5. Debarment and Suspension (Executive Orders 12549 and 12689).

The Town is prohibited from entering into this Agreement with a party listed on the government wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

6. Byrd Anti-Lobbying Amendment (31 U.S.C. 1352).

If this Agreement is for compensation in excess of \$100,000, Contractor must file the required certification with the Town that it will not and has not used Federal appropriated

funds received by the Contractor to pay any person or organization for influencing or attempting to influence an officer or employee or any agency, a member of Congress, officer or employee of Congress, or an employee or a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. The Contractor must also disclose to the Town any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award.

7. Procurement of Recovered Material (2 CFR CH. II §200.322).

Contractors must 1) comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; 2) procuring solid waste management services in a manner that maximizes energy and resource recovery; and 3) establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines. Contractors should, to the greatest extent practicable and consistent with law, purchase, acquire, or use products and services that can be reused, refurbished, or recycled; contain recycled content, are biobased, or are energy and water efficient; and are sustainable. This may include purchasing compostable items and other products and services that reduce the use of single-use plastic products. See Executive Order 14057, section 101, Policy.

8. Equal Employment Opportunity.

If this Agreement is a construction contract Contractor is required to comply with the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11246, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and Implementing regulations at 41 CFR part 60, "Office or Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

The Contractors and its subcontractors shall at all times strictly adhere to, and comply with, all applicable federal and State laws, and their implementing regulations, as they currently exist and may hereafter be amended. Applicable federal provisions are attached hereto as Exhibit I, Exhibit J, Exhibit K, and Exhibit M, are hereby incorporated.

9. Contracting with small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms.

When possible, the recipient or subrecipient should ensure that small businesses, minority businesses, women's business enterprises, veteran-owned businesses, and labor surplus area firms (See U.S. Department of Labor's list) are considered as set forth below. Such consideration means:

- i) These business types are included on solicitation lists;

- ii) These business types are solicited whenever they are deemed eligible as potential sources;
- iii) Dividing procurement transactions into separate procurements to permit maximum participation by these business types;
- iv) Establishing delivery schedules (for example, the percentage of an order to be delivered by a given date of each month) that encourage participation by these business types;
- v) Utilizing organizations such as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and
- vi) Requiring a contractor under a Federal award to apply this section to subcontracts.

10. Prohibition on certain telecommunications and video surveillance equipment or services.

- A. *Recipients and subrecipients are prohibited from obligating or expending loan or grant funds to:*
 - i) Procure or obtain covered telecommunications equipment or services;
 - ii) Extend or renew a contract to procure or obtain covered telecommunications equipment or services; or
 - iii) Enter into a contract (or extend or renew a contract) to procure or obtain covered telecommunications equipment or services.
- B. *As described in section 889 of [Public Law 115-232](#), “covered telecommunications equipment or services” means any of the following:*
 - i) Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities);
 - ii) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);
 - iii) Telecommunications or video surveillance services provided by such entities or using such equipment;
 - iv) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country;
- C. *For the purposes of this section, “covered telecommunications equipment or services” also include systems that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.*
- D. *In implementing the prohibition under section 889 of [Public Law 115-232](#), heads of executive agencies administering loan, grant, or subsidy programs must prioritize*

available funding and technical support to assist affected businesses, institutions, and organizations as is reasonably necessary for those affected entities to transition from covered telecommunications equipment or services, to procure replacement equipment or services, and to ensure that communications service to users and customers is sustained.

- E. (When the recipient or subrecipient accepts a loan or grant, it is certifying that it will comply with the prohibition on covered telecommunications equipment and services in this section. The recipient or subrecipient is not required to certify that funds will not be expended on covered telecommunications equipment or services beyond the certification provided upon accepting the loan or grant and those provided upon submitting payment requests and financial reports.*
- F. For additional information, see section 889 of [Public Law 115-232](#) and [§ 200.471](#)*

11. Williams-Steiger Occupational Safety and Health Act of 1970

A. Authority

- i) The contractor is subject to the provisions of the Williams-Steiger Occupational Safety and Health Act of 1970.
- ii) These construction documents and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of the Federal law(s), including but not limited to the latest amendment of the following:
 - 1) Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 94-596;
 - 2) art 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;
 - 3) Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

B. Safety and Health Program Requirements

- i) This project, its prime contractor and its subcontractors, shall at all times be governed by Chapter XVII of Title 29, Code of Federal Regulations, Part 1926 - Safety and Health Regulations for Construction (29 CFR 22801), as amended to date.
- ii) To implement the program and to provide safe and healthful working conditions for all persons, general project safety meetings will be conducted at the site at least once each month during the course of construction, by the construction superintendent or his/her designated safety officer. Notice of such meeting shall be issued not less than three (3) days prior, stating the exact time, location, and agenda to be included. Attendance by the owner, architect, general foreman, shop steward(s), and trades, or their designated representatives, witnessed in writing as such, shall be mandatory.
- iii) To further implement the program, each trade shall conduct a short gang meeting, not less than once a week, to review project safety requirements mandatory for all persons during the coming week. The gang foreman shall report the agenda and specific items covered to the project superintendent, who shall incorporate these items in his/her daily log or report.
- iv) The prime contractor and all subcontractors shall immediately report all accidents, injuries, or health hazards to the owner and architect, or their designated

representatives, in writing. This shall not obviate any mandatory reporting under the provisions of the Occupational Safety and Health Act of 1970.

- v) This program shall become a part of the contract documents and the contract between the owner and prime contractor, prime contractor and all subcontractors, as though fully written therein.

12. Discovery of Archaeological and Other Historical Items

A. *Construction Procedures*

In the event of an archaeological or more recent historical find (e.g., artifacts, housing sites) during any phase of construction, the following procedure should be followed:

- i) Construction shall be halted, with as little disruption to the archaeological site possible.
- ii) The Contractor shall notify the Owner who shall contact the State Historical Preservation Officer.
- iii) The State Historical Preservation Officer may decide to have an archaeologist inspect the site and make recommendations about the steps needed to protect the site, before construction is resumed.
- iv) The entire event should be handled as expediently as possible in order to hold the loss in construction time to a minimum while still protecting archaeological finds.

B. *National Register Status*

In the event archaeological/historical data are evaluated to meet National Register criteria, the Advisory Council on Historic Preservation may be notified and asked to comment by the Water Quality Control Division.

13. Buy American Preference

PART 184—BUY AMERICA PREFERENCES FOR INFRASTRUCTURE PROJECTS

§ 184.1 Purpose and policy.

(a) **Purpose.** This part provides guidance to Federal agencies on the implementation of the Buy America Preference applicable to Federal financial assistance set forth in part I of subtitle A, Buy America Sourcing Preferences, of the Build America, Buy America Act included in the Infrastructure Investment and Jobs Act ([Pub. L. 117-58](#)) at division G, title IX, subtitle A, part I, sections 70911 through 70917.

(b) **Policy.** The head of each Federal agency must ensure that none of the funds made available for a Federal award for an infrastructure project may be obligated unless all of the iron, steel,

manufactured products, and construction materials incorporated into the project are produced in the United States. *See* section 70914(a) of the Build America Buy America Act.

§ 184.2 Applicability, effective date, and severability.

(a) ***Non-applicability of this part to existing Buy America Preferences.*** This part does not apply to a Buy America Preference meeting or exceeding the requirements of section 70914 of the Build America, Buy America Act applied by a Federal agency to Federal awards for infrastructure projects before November 15, 2021.

(b) ***Effective date of this part.*** The effective date of this part is October 23, 2023. Except as provided in [paragraph \(c\)](#) of this section, this part applies to Federal awards obligated on or after its effective date. Awards obligated on or after May 14, 2022, the effective date of the Build America, Buy America Act, and before the effective date of this part, are instead subject to OMB Memorandum M-22-11.

(c) ***Modified effective date of this part for certain infrastructure projects.*** If an infrastructure project that has previously received a Federal award obligated on or after May 14, 2022, but before the effective date of this part receives an additional Federal award obligated within one year of the effective date of this part, the additional Federal award is subject to OMB Memorandum M-22-11. However, if significant design or planning changes are made to the infrastructure project, the Federal agency may apply this part to the additional Federal award. Federal awards for an infrastructure project obligated after one year from the effective date of this part are subject to this part, regardless of whether this part applied to previous awards for the project.

(d) ***Severability.*** The provisions of this part are separate and severable from one another. OMB intends that if a provision of this part is held to be invalid or unenforceable as applied to a particular person or circumstance, the provision should be construed so as to continue to give the maximum effect permitted by law as applied to other persons not similarly situated or to dissimilar circumstances. If any provision is determined to be wholly invalid and unenforceable, it should be severed from the remaining provisions of this part, which should remain in effect.

§ 184.3 Definitions.

Acronyms used in this part have the same meaning as provided in [2 CFR 200.0](#). Terms not defined in this part have the same meaning as provided in [2 CFR 200.1](#), except for the terms “equipment,” “expenditures,” and “supplies,” which are not specifically defined for this part. As used in this part:

Build America, Buy America Act means division G, title IX, subtitle A, parts I-II, sections 70901 through 70927 of the Infrastructure Investment and Jobs Act ([Pub. L. 117-58](#)).

Buy America Preference means the “domestic content procurement preference” set forth in section 70914 of the Build America, Buy America Act, which requires the head of each Federal agency to ensure that none of the funds made available for a Federal award for an infrastructure project may be obligated unless all of the iron, steel, manufactured products, and construction materials incorporated into the project are produced in the United States.

Component means an article, material, or supply, whether manufactured or unmanufactured, incorporated directly into: a manufactured product; or, where applicable, an iron or steel product.

Construction materials means articles, materials, or supplies that consist of only one of the items listed in paragraph (1) of this definition, except as provided in paragraph (2) of this definition. To the extent one of the items listed in paragraph (1) contains as inputs other items listed in paragraph (1), it is nonetheless a construction material.

(1) The listed items are:

- (i) Non-ferrous metals;
- (ii) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- (iii) Glass (including optic glass);
- (iv) Fiber optic cable (including drop cable);
- (v) Optical fiber;
- (vi) Lumber;
- (vii) Engineered wood; and
- (viii) Drywall.

(2) Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.

Infrastructure project means any activity related to the construction, alteration, maintenance, or repair of infrastructure in the United States regardless of whether infrastructure is the primary purpose of the project. *See also* [paragraphs \(c\) and \(d\) of § 184.4](#).

Iron or steel products means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.

Manufactured products means:

(1) Articles, materials, or supplies that have been:

(i) Processed into a specific form and shape; or

(ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.

(2) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under [§ 184.4\(e\)](#) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under [§ 184.4\(e\)](#) and paragraph (1) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.

Manufacturer means the entity that performs the final manufacturing process that produces a manufactured product.

Predominantly of iron or steel or a combination of both means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.

Produced in the United States means:

(1) In the case of iron or steel products, all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

(2) In the case of manufactured products:

(i) The product was manufactured in the United States; and

(ii) The cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product. *See* [§ 184.2\(a\)](#). The costs of components of a manufactured product are determined according to [§ 184.5](#).

(3) In the case of construction materials, all manufacturing processes for the construction material occurred in the United States. *See* [§ 184.6](#) for more information on the meaning of “all manufacturing processes” for specific construction materials.

Section 70917(c) materials means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. *See* section 70917(c) of the Build America, Buy America Act.

§ 184.4 Applying the Buy America Preference to a Federal award.

(a) ***Applicability of Buy America Preference to infrastructure projects.*** The Buy America Preference applies to Federal awards where funds are appropriated or otherwise made available for infrastructure projects in the United States, regardless of whether infrastructure is the primary purpose of the Federal award.

(b) ***Including the Buy America Preference in Federal awards.*** All Federal awards with infrastructure projects must include the Buy America Preference in the terms and conditions. The Buy America Preference must be included in all subawards, contracts, and purchase orders for the work performed, or products supplied under the Federal award. The terms and conditions of a Federal award flow down to subawards to subrecipients unless a particular section of the terms and conditions of the Federal award specifically indicate otherwise.

(c) ***Infrastructure in general.*** Infrastructure encompasses public infrastructure projects in the United States, which includes, at a minimum, the structures, facilities, and equipment for roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property; and structures, facilities, and equipment that generate, transport, and distribute energy including electric vehicle (EV) charging.

(d) ***Interpretation of infrastructure.*** The Federal agency should interpret the term “infrastructure” broadly and consider the description provided in [paragraph \(c\)](#) of this section as illustrative and not exhaustive. When determining if a particular project of a type not listed in the description in paragraph (c) constitutes “infrastructure,” the Federal agency should consider whether the project will serve a public function, including whether the project is publicly owned and operated, privately operated on behalf of the public, or is a place of public accommodation, as opposed to a project that is privately owned and not open to the public.

(e) ***Categorization of articles, materials, and supplies.***

(1) An article, material, or supply should only be classified into one of the following categories:

- (i) Iron or steel products;
- (ii) Manufactured products;
- (iii) Construction materials; or
- (iv) Section 70917(c) materials.

(2) An article, material, or supply should not be considered to fall into multiple categories. In some cases, an article, material, or supply may not fall under any of the categories listed in [paragraph \(e\)\(1\)](#) of this section. The classification of an article, material, or supply as falling into one of the categories listed in paragraph (e)(1) must be made based on its status at the time it is brought to the work site for incorporation into an infrastructure project. In general, the work site is the location of the infrastructure project at which the iron, steel, manufactured products, and construction materials will be incorporated.

(f) *Application of the Buy America Preference by category.* An article, material, or supply incorporated into an infrastructure project must meet the Buy America Preference for only the single category in which it is classified.

§ 184.5 Determining the cost of components for manufactured products.

In determining whether the cost of components for manufactured products is greater than 55 percent of the total cost of all components, use the following instructions:

(a) For components purchased by the manufacturer, the acquisition cost, including transportation costs to the place of incorporation into the manufactured product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(b) For components manufactured by the manufacturer, all costs associated with the manufacture of the component, including transportation costs as described in [paragraph \(a\)](#) of this section, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the manufactured product.

§ 184.6 Construction material standards.

(a) The Buy America Preference applies to the following construction materials incorporated into infrastructure projects. Each construction material is followed by a standard for the material to be considered “produced in the United States.”

(1) *Non-ferrous metals.* All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.

(2) *Plastic and polymer-based products.* All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.

(3) *Glass.* All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.

(4) **Fiber optic cable (including drop cable).** All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.

(5) **Optical fiber.** All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.

(6) **Lumber.** All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.

(7) **Drywall.** All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.

(8) **Engineered wood.** All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

(b) Except as specifically provided, only a single standard under [paragraph \(a\)](#) of this section should be applied to a single construction material.

§ 184.7 Federal agency's issuance of a Buy America Preference waiver.

(a) **Justification of waivers.** A Federal agency may waive the application of the Buy America Preference in any case in which it finds that:

(1) Applying the Buy America Preference would be inconsistent with the public interest (a “public interest waiver”);

(2) Types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality (a “nonavailability waiver”); or

(3) The inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall infrastructure project by more than 25 percent (an “unreasonable cost waiver”).

(b) **Requesting a waiver.** Recipients may request waivers from a Federal agency if the recipient reasonably believes a waiver is justified under [paragraph \(a\)](#) of this section. A request from a recipient to waive the application of the Buy America Preference must be provided to the Federal agency in writing. Federal agencies must provide waiver request submission instructions and guidance on the format, contents, and supporting materials required for waiver requests from recipients.

(c) ***Before issuing a proposed waiver.*** Before issuing a proposed waiver, the Federal agency must prepare a detailed written explanation for the proposed determination to issue the waiver based on a justification listed under [paragraph \(a\)](#) of this section, including for waivers requested by a recipient.

(d) ***Before issuing a final waiver.*** Before issuing a final waiver, the Federal agency must:

(1) Make the proposed waiver and the detailed written explanation publicly available in an easily accessible location on a website designated by the Federal agency and the Office of Management and Budget;

(2) Except as provided in [paragraph \(e\)](#) of this section, provide a period of not less than 15 calendar days for public comment on the proposed waiver; and

(3) Unless the Director of OMB provides otherwise, submit the waiver determination to the Made in America Office in OMB for final review pursuant to Executive Order 14005 and section 70923(b) of the Build America, Buy America Act.

(e) ***Waivers of general applicability.*** Waivers of general applicability mean waivers that apply generally across multiple Federal awards. A Federal agency must provide a period of not less than 30 days for public comment on a proposal to modify or renew a waiver of general applicability.

§ 184.8 Exemptions to the Buy America Preference.

(a) The Buy America Preference does not apply to expenditures for assistance authorized under section 402, 403, 404, 406, 408, or 502 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act ([42 U.S.C. 5170a](#), [5170b](#), [16 5170c](#), [5172](#), [5174](#), or [5192](#)) relating to a major disaster or emergency declared by the President under section 401 or 501, respectively, of such Act ([42 U.S.C. 5170](#), [5191](#)) or pre and post disaster or emergency response expenditures.

(b) “Pre and post disaster or emergency response expenditures” consist of expenditures for financial assistance that are:

(1) Authorized by statutes other than the Stafford Act, [42 U.S.C. 5121](#) *et seq.*; and

(2) Made in anticipation of or response to an event or events that qualify as an “emergency” or “major disaster” within the meaning of the Stafford Act, [42 U.S.C. 5122\(1\)](#), (2).

SECTION 01000 - GENERAL REQUIREMENTS

SCOPE OF GENERAL REQUIREMENTS

The requirements detailed in this section are as applicable to all of these Contract Documents as if the requirements were specifically stated in each section, unless the requirements are specifically superseded within a specific section.

CONFORMANCE WITH TOWN STANDARDS & SRF BID SPECIFICATIONS

In addition to conforming with these Contract Documents, all work shall be completed in conformance with the Town of Ridgway Standard Specifications and Typical Drawings for Infrastructure (Town Standards), latest revisions which are available at Town Hall and on the Town's website. Should there be a conflict between or within the documents, they should be brought to the Engineer's attention. Typically, the most stringent standard will apply. All work must also comply with the NRCS Standard terms and all applicable local, State and Federal requirements.

MATERIALS

The Contractor shall furnish all materials needed to complete the Work required under the terms of his Contract, except those materials specified to be furnished by Owner. Materials incorporated in the Work and not specifically covered in the Specifications shall be the best of their kind. Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract shall be new.

The Contractor shall submit satisfactory evidence of compliance with the specifications of such materials to be furnished by him and used in the Work as the OR may require to demonstrate that the materials meet the contract requirements. Documentation and certifications that materials are consistent with funding agency provisions comply with Buy America, Build America requirements must also be furnished.

DESIGN CRITERIA AND COORDINATION

Drawings and specifications are complementary; what is called for in either of these is binding as though called for in both. In cases of conflict between and within the plans and specifications, the Contractor shall notify the Engineer of the conflict and shall obtain a written interpretation or clarification from the OR. Except for some unusual circumstance, the most stringent requirement will apply.

References in these Contract Documents to Project Manager, Inspector, Architect, shall be read to refer to the Owner's Advisor (OA) and Owner's Representative (OR).

The Contractor is responsible for reviewing and understanding Contract Documents and documents incorporated by reference, a copy of which he shall have available on site. Contractor shall execute his work in accordance with the Contract Documents. Additional work and materials required to bring the work in conformance with the Contract Documents shall be provided at no additional cost to the Owner.

Contract Drawings are diagrammatic in character and do not necessarily indicate every required offset, etc. The Contract drawings shall not be scaled for roughing-in measurements nor be used as shop drawings. Where shop drawings are required for these purposes, or have to be made from field measurements, Contractor shall take the necessary measurements and prepare the drawings. Before beginning any installation work, Contractor shall carefully study all contract drawings and check for interference. If conflicts are discovered as work progresses, a set of prints marked with red pencil showing recommended resolution shall be submitted to the OR for approval.

prior to installation. Contractor should anticipate needing to adjust his work to fit with existing improvements as part of his scope of work and included in the cost of the applicable bid item.

CONTRACTOR'S USE OF PREMISES

Confine operations to areas permitted by law, ordinances, permits, easements, and the Contract Documents. Do not trespass onto private property. Do not unreasonably encumber the project with materials or equipment. Coordinate use of the authorized work area with the Owner and others who may need access at various times including other contractors and emergency officials. Assume full responsibility for protection and safekeeping of products stored on and off premises. Move any stored products which interfere with operations of Owner or others. Obtain and pay for use of additional storage or work areas needed for operations.

ADDITIONAL CONTRACTOR RESPONSIBILITIES

NUISANCES - Contractor shall take all necessary precautions to control noise, dust, water and air pollution, and damage from vibration of equipment used in construction both on and off site. Noise shall be reduced by proper use of mufflers and other appropriate means on motorized equipment. Noise levels during construction shall not be greater than permitted by OSHA regulations, any easement restrictions, and County and Town ordinances, both on site and along routes where the Contractor's operations are in progress. Take such measures as are required to keep dust and mud and all other nuisances controlled at the Work site and the surrounding areas impacted by the construction.

SITE SECURITY - Security of the site shall be the Contractor's responsibility from Notice to Proceed until Contract completion, final acceptance, and final payment including protecting and securing materials and equipment furnished by supplier(s) and the owner.

SUPERVISION - Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents and so that it will proceed in a regular sequence without delays including prompt cleanup. Contractor shall keep a competent superintendent of work on the premises at all times workers are on site to receive instructions and to comply with them. The superintendent shall have completed at least two projects of similar scope and complexity in the last 5 years. The superintendent shall have full authority to act on behalf of the Contractor and directions given to the superintendent shall be considered given to the Contractor. At most times the superintendent shall not be in engaged in operation of equipment.

WORK SEQUENCE - The sequence of construction will largely be left to the Contractor, but Contractor shall sequence his work in a manner that ensures at least 1 cfs can be transported through the Ridgway Ditch.

COMPLETION SCHEDULE - The contract time is very tight and it is likely the Contractor will need to be using at least two crews a portion of the time in order to complete the work in the timeframe specified.

EXISTING CONDITIONS - Prior to commencing construction, the Contractor shall be responsible for documenting the existing condition of the construction work zones, the access roads, and surrounding areas. Photographs and written descriptions of all substandard pre-existing conditions are recommended. Width and conditions of roads, driveways, vegetation, and existence of drainage should be noted for roadways, as should vegetation in sub standard condition, and broken fences and other private structures which may be in need of repair. Unless sub-standard conditions are adequately documented prior to commencing construction, the Contractor will be held responsible for restoring the site and accesses to conditions which the Owner considers to be those which are standard and/or were pre-existing. Since construction equipment tends to be destructive of gravel and paved

roads, particular attention should also be paid to recording conditions of roads which will be traversed by construction equipment especially if there will not be any construction along the specific roadway. This includes the length of CR 5. Roadways and other improvements damaged by Contractor's construction shall be repaired at Contractor's expense

PROJECT LAYOUT - Owner will provide a two points for a control line. The Contractor will be responsible for engaging a licensed surveyor for laying out of his work and the work limits and shall protect all staking and other controls as well all control for others working at the site. Prior to commencing construction, contractor shall have offset stakes for the earthwork, piping, and structures set. Provide a minimum of two offset stakes for all structures and appurtenances. Provide copies of survey notes to OA promptly.

CODE ISSUES - Contractor shall coordinate his work with building, electrical, and plumbing inspectors as applicable. Contractor shall secure and comply with any needed electrical, dewatering, and stormwater permits as well as any other permits and licenses needed to properly complete the work. Contractor shall notify Engineer promptly when Contractor notes that Contract Documents fail to comply with codes and regulations. If needed, changes will be made to Contract Documents to adjust to such requirements. Contractor shall assume responsibility for Work known to be contrary to such requirements if notice is not provided prior to award of the work.

NOTIFICATIONS - The Contractor shall notify the Town at least 3 working days before beginning any Work. If, for any reason, the Contractor should halt Work on a project during any stage of construction for more than one working day, it shall be the responsibility of the Contractor to notify the Town or its designated representative a day in advance of resuming construction. Notify the Owner at least one business day in advance of any testing and coordinate with the Town several days in advance when scheduling any training for Town staff taking into consideration staff's working schedule. Contractor shall notify customers as required below in "Public Safety and Convenience".

PROTECTION OF UTILITIES, FACILITIES, PROPERTY, AND IMPROVEMENTS

The Contractor shall contact the Utility Notification Service of Colorado at 1 (800) 922-1987 in minimum of 3 business days in advance of work. The Contractor shall notify all utility companies and interested parties prior to commencement of work in order to ensure that there will be no unnecessary or unplanned interruptions of services during construction. Contractor shall notify the Town at least two days in advance of when Contractor needs the Town to operate its valves and other town facilities to facilitate Contractor's work.

Contractor shall coordinate and cooperate with utility owner in their removal, adjustment, and relocation operations so that the utility work can be accomplished without impacting the construction schedule.

The Contractor shall be responsible for coordinating the adjustment of utilities on this project. The Contractor shall keep each utility company including but not limited to the Town advised of any work being performed in the vicinity of their facilities so that each utility company can coordinate any needed locates, adjustments or inspections. The Contractor shall provide the appropriate utility company ample notice, but not less than three (3) working days, prior to commencing activities in the vicinity of their facilities. Any work performed by the Contractor on behalf of the impacted utility company shall be paid by the utility company requiring the work, unless otherwise provided herein, or agreed to in writing by the Project Engineer and the Town.

The Contractor shall be required to verify the type and location of all utilities within close proximity to the work being performed. The Contractor shall take the necessary precautions to protect all utilities in place by considering adjusting the location of his work to avoid the conflict. Any adjustments made to avoid a utility conflict shall be pre-approved by the project engineer. In the event a utility cannot be protected in place, the

utility will be required to make adjustments to its facility to avoid the conflict. This work will be performed by the utility concurrent with project construction thereby creating restrictions on the Contractor's work progress. The Contractor is advised to plan for these contingencies when bidding this work as no additional payment will be made for delays associated with this work. Payment for utility relocation work will be handled via a separate agreement between the impacted utility and the Owner. The Contractor shall be responsible for coordinating this work.

The project plans do not address all details of construction around or near existing utilities. Contractor shall use due care and work with impacted utilities to ensure adequate protection of all utilities. The following contacts are provided for contractor convenience:

Ridgway - Water, Sewer, storm, drain	Randy Barnes	970 729 1389
San Miguel Power	Jeremy Fox	970 729 1547
Century Link - Phone	Kirby Bryant	970 259 0511
Black Hills Energy	Danny Weisling	970 729 1174

Pothole existing utilities sufficiently in advance of work to allow for gradual adjustment of work if needed and to ensure protection of existing utilities. Include potholing in the cost of the work to which it is related. Contractor shall notify Engineer of any conflicts before making adjustments.

Obstructions known to the Engineer are shown on the plans, however, the locations shown may prove inaccurate and other obstructions not shown may be encountered. In all cases, the Contractor at all times shall take proper precautions for the protection of and prevent damage to public and private property including utility lines and services, and appurtenances, ditches, manholes, valve boxes, survey monuments, fences, plantings, and other structures and improvements. Hand excavation and support of existing lines shall be used where necessary. Cutting utility lines to facilitate construction is **prohibited** unless approved for cause in writing by the Engineer at least 24 hours in advance of the work. Such approval may require special measures to ensure proper restoration of any cut lines. The Contractor shall be liable for all damages to existing utilities, structures and improvements, public or private caused by his activities or inactivities, and he shall hold the Town harmless from any liability or expense for injuries, damages, or repairs to such facilities. The Contractor shall at all times take proper precautions for the protection of and replacement or restoration of driveway culverts or pans, street intersection culverts, pans, or aprons, storm drains or inlets, fences, service lines, irrigation ditches and crossings and diversion boxes, mail boxes, shrubbery, flowers and ornamental trees, driveway approaches and all other public and private installations and improvements that may be encountered during construction.

The Contractor is required to provide any impacted property with access to and from the property during the time of construction. Existing roads and driveways shall be resurfaced with the presently existing type of surfacing whenever existing surface is damaged.

Utility Conflicts

Contractor should expect that he will need to cross under utility mains and services of buried utilities without cutting such lines. Contractor shall pothole and locate utilities that will need to be crossed well in advance of approaching them with his work. The need to pothole and to cross and to make adjustments to accommodate other utilities and improvements shall be anticipated and included in the cost of the work rather than paid separately. When during construction the Contractor finds an underground utility conduit (mains and services), including, but not limited to, water, sewer, gas, air, dry utilities, and drainage structures, and any above ground utility facilities that could potential interfere with Contractor's alignment, the Contractor shall notify the utility owner and the Engineer well in advance of Contractor's approach to such utility. Such owner and the Engineer

shall concur with Contractor's approach or may offer an alternate approach. Contractor shall anticipate needing to accommodate such conflicts rather than expecting the other utility to make adjustments.

Responsibility for Repair

Should any utility, improvement and/or vegetation be damaged in the construction operations, the Contractor shall immediately notify the owner of such utility, landowner, etc as well as the OR, and unless authorized by the owner of the utility, the Contractor shall not attempt to make repairs. The Contractor will be responsible for the cost of repair of ditches, underground pipes, wires or conduits, etc. damaged by them or their subcontractors.

The Contractor will be responsible for the repair of any damage or destruction of property resulting from his activities, or his neglect, misconduct, or omission or method of execution or non-execution of the work or caused by defective work or the use of unsatisfactory materials on and off site. The Contractor will restore such property to a condition equal to or better than that existing before such damage or injury was done by repairing, rebuilding, or replacing it as may be directed by the Town or the property owner, and they shall make good such damage or destruction in a manner acceptable to the Town and the property owner.

All survey monuments disturbed or removed by the Contractor, his employees, or sub-contractors will be replaced by a land surveyor registered in the State of Colorado, at the Contractor's expense.

Public Safety and Convenience

The Contractor is responsible to ensure that his work site and personnel are safe and are at all times complying with all OSHA requirements and good safety practices. The Contractor is responsible for ensuring the safety of the public at all times.

PROTECTION OF POTABLE WATER SUPPLY, STREAMS, LAKES, AND RESERVOIRS

The Contractor shall be sure that waters used for cleaning, testing, flushing, etc are disposed of in a manner which will not create a health, safety, water quality, or nuisance problem. He shall furnish all needed backflow devices to ensure sanitary protection of the Town's water supply. The Town reserves the right to curtail the Contractor's use of water during periods of shortage in its collection, transmission, and distribution system.

The Contractor will take all necessary precautions to prevent pollution of ditches, seeps, streams, lakes, and reservoirs by sediment, fuels, oils, bitumens, calcium chloride, fertilizers, insecticides, sewage, or other harmful materials. Contractor shall conduct and schedule their operations to avoid or minimize runoff and/or siltation of ditches, seeps, streams, lakes, and reservoirs. All work must conform to all applicable local, state, and federal regulations. Additional protections for the municipal water supply are included in Division 2.

TRAFFIC CONTROL

The Contractor is required to provide adequate construction signage, flagmen, barricades, etc. to warn vehicular and pedestrian traffic of work in progress, obstacles, transport of loads, etc., and divert traffic as may be required in the course of construction both on and off site. All signing and traffic control shall be subject to approval of the jurisdiction impacted and generally in accordance with the Manual of Uniform Traffic Control, and where applicable, a CDOT permit. When specifically authorized portions of a road or access be allowed to be partially closed to traffic for construction. Contractor shall make every attempt to minimize time of such closures. It shall be the responsibility of the Contractor to notify the applicable emergency services at least 48 hours prior to such closures. The Contractor shall not have construction equipment or materials in lanes open to traffic at any time

unless directed by the Engineer. Unless otherwise approved by the Town during non-working hours, the roadways shall be restored to safe, pre-construction travel conditions for the free flow of traffic for vehicles and pedestrians. Any maintenance required to restore the roadway or access to this condition, shall be done prior to opening the areas to traffic or completing the work for the day. There is no pay item for traffic control and notice. Contractor shall include these costs in the costs of the work to which traffic control and notice are incidental.

SITE INFORMATION

There may be buried, surface, and overhead improvements and drainages in the project area that could create conflicts. The Contractor should anticipate such conflicts and be careful to not harm improvements. See additional information above in "Utility Conflicts". The information on the construction plans is based on what was observed during design survey and the record plans of previous construction at in the area. If unexpected improvements are encountered which require relocation or disconnection, make written request to Engineer for decision on proper resolution of any interferences. Such conflicts shall not be an unanticipated site condition. It is expressly understood and agreed that the Owner assumes no responsibility whatsoever for the unexpected items and that it is necessary to keep existing or bypass lines operational until new facilities and appurtenances are ready for use.

Access to the site

The work area is quite remote. It is accessed from Ouray County Road 5 (CR5). From the intersection of CR5 and CR5A, CR5 is a narrow limited access road with steep side slopes in many stretches. Just before CR5 enters US Forest Service land one turns off on a private primitive ranch road on private property. It's about a mile from the entry to the ranch road and the work area.

Property Limits and Access

The proposed Work is mostly within easements of the Town from private land owners and property owned by the federal government. The Contractor is reminded that he is to stay within the limits of the easements and permit for work area for all construction including staging, storage of materials, etc., unless additional easement is obtained for use of other property by the Contractor at Contractor's expense. A copy of any written agreement(s) between the Contractor and the property owner(s) shall be provided to the Town should Contractor arrange to use private property. In addition to the Contractor's space requirements, space will be needed for storage of materials and equipment of other contractors and the Town as well as other users' work or otherwise present in the area. Contractor should carefully examine the work site and limited spaces available, access challenges, the steep slopes, encroachments, weather conditions, and other factors when evaluating the costs of the work and include those costs in his bid.

Surface water, Groundwater, & River Flows

The Contractor is responsible for directing surface waters away from the construction area and for handling creek flows and groundwater encountered.

The Contractor is reminded that groundwater levels fluctuate and that actual field conditions can not be accurately predicted. It shall be the responsibility of the Contractor to control surface and groundwater level as needed for construction. One should expect the need to dewater, stabilize, and provide gravels as bedding and partial backfill and fabric for isolation of such materials and include those costs in the costs of the work with which is it associated.

Coordination

Construction of the Work in this contract is may be going on at the same time other work is being constructed in the work area. Contractor shall coordinate his operations with others working in the area including the Town, allowing multiple projects to proceed without interferences.

Additional Site Information

Should the Bidder feel additional information is needed to accurately bid the work, he shall make arrangements with the Owner to conduct such additional studies as he sees fit, with minimum disruption to the site and at the Contractor's expense.

Limited Use of Site Information

The Contractor is advised that the data discussed above, and any site or utility information made available by the Owner is NOT a part of the Contract and is solely for the convenience of the Contractor. It is expressly understood and agreed that the Owner assumes no responsibility whatsoever with respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein.

REQUIRED PERMITS

The Contractor shall determine what permits will be needed to complete the Work and secure and comply with all needed permits. Costs for securing and complying with needed permits shall be included in the bid items to which they are incidental.

Dewatering Permits

The Contractor will need to determine whether he will need a dewater permit and if so, Contractor shall apply for and comply with such permit(s).

If dewatering is anticipated, the Contractor will be required to submit a Notice of Intent to Construct Dewatering Well(s) (Form GWS-62) available at <https://dwr.state.co.us/eforms> at least 3 days prior to construction of a dewatering well and pay any applicable permit fees. A copy of the CDPHE general permit and fact sheet to be able to discharge the water are available at: <https://cdphe.colorado.gov/dewatering-general-permit-program>. Refer to these websites for information about the requirements of these permits. The CDPHE permit can take 60 days to be issued.

Note that the State Engineer's Office and/or CDPHE may add some additional conditions, which will be binding on the Contractor. For the dewatering activity to be a temporary activity and not need an augmentation plan, it is necessary that there be no consumptive use of the water. This will likely require piping the outflow from any dewatering well(s) directly to a water of the State. The discharge pipe etc shall be sized, furnished and installed by the Contractor exclusively for his purposes.

Colorado Department of Public Health and Environment Stormwater Permit

CDPHE regulations require that any construction larger than 1 acre have a storm water permit and a storm water management plan. Information and forms regarding the storm water permit is available at (303) 692-3517 and at:

<https://cdphe.colorado.gov/cor400000-stormwater-discharge>

The Contractor will be required to secure a storm water permit and develop and implement a storm water management plan. Contractor shall provide Engineer and Owner with copies of the storm water permit and the storm water management plan. Contractor shall be solely responsible for correctly implementing the storm water plan including closing out the permit.

Colorado Department of Transportation (CDOT) Permit

Overweight or Oversized loads will require a CDOT permit. Contractor shall secure and comply with any needed CDOT permits.

404 Permit

The Engineering team has applied for a 404 permit. Work in the creek area cannot begin until the permit has been issued. The Contractor is expected to comply with all the applicable terms of the permit(s).

TEMPORARY FACILITIES

The Contractor shall make arrangements for any utilities and/or facilities he may need to accomplish the Work. Any temporary facilities and conveyances for use at the desired locations will be the responsibility of the Contractor. All such facilities shall be placed in locations that have been approved by the landowner for use during the project.

The Contractor shall provide the necessary fire protection facilities to prevent and, if needed, abate any fire damage that may be created because of his operation in the area. Any damage resulting from fire caused by his operation will be the responsibility of the Contractor to replace or repair to original condition as approved by the underlying land owner at his cost.

The Contractor will be required to provide sanitary facilities for his crews. Contractor shall provide and maintain adequate water service for drinking and sanitation purposes, as well as for construction purposes at the job site throughout the duration of this Contract.

The Owner will furnish non potable water for the Contractor's use, only in quantities available at the time for reasonable dust and moisture control, flushing, and testing at locations designated by and at times convenient for the Owner. It shall be the Contractor's responsibility to transport the water to where it is needed and to furnish any additional water he needs to complete the work. Unless otherwise authorized in writing, only Town employees shall operate the Town's water system. The Contractor shall conserve water and shall not waste or let streams flow unused and shall be sure that waters used for cleaning and flushing are disposed of in a manner which will not create a health, environmental, safety, or nuisance problem. The Owner reserves the right to curtail the Contractor's use of water during periods of shortage in its transmission and distribution system.

All costs of temporary facilities shall be paid for by the Contractor. There is no pay item for such facilities and their costs should be included in the work to which they are incidental.

REFERENCE STANDARDS

Reference in the specifications to standard specifications or publications of technical societies or governmental agencies such as ASTM, AASHTO, CDOT, NEC and the like, shall refer to the latest edition adopted and published at the time of receiving bids. It shall be understood that all manufacturers, producers, and their agents shall have such reference standards available for reference and be fully familiar with their requirements as pertains to their product, material, or equipment and have copies available for review on the project. In case of conflict between reference standard and codes, the one having the more stringent requirements shall govern.

MANUFACTURER'S INSTRUCTIONS

Handle, store, install, connect, clean or condition specified products in strict accordance with manufacturer's instructions and in conformity with project requirements to produce best results obtainable unless they conflict with the Contract Documents or where applicable regulations take precedence. Contractor shall obtain, have on site, and distribute necessary copies of such instructions, including one hard copy and one pdf to OR.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver materials, products and equipment to the project site in undamaged condition in manufacturer's original, unopened containers or packaging, with identifying labels intact and legible. Unload and handle materials in accordance with project specifications and manufacturer recommendations. Upon receipt, make overall inspection that equipment and materials have been received in good condition. All materials should be inspected for any damage or imperfections and problem materials should be marked rejected and handled as described below. Store and handle products as prescribed by manufacturer and as specified in the specifications in a manner to protect from damage by moisture, weather, abuse or construction operations, etc. Products may be stored on site where space and security constraints allow, or off-site in a bonded and insured warehouse approved by the OR. Contractor shall pay all costs incurred for storage costs including any off-site storage facilities. PVC pipe stored for a prolonged period of time shall be protected from sunlight. Pipe discolored by UV light shall be rejected.

REJECTED MATERIALS AND WORK

All materials shall be free of any defects or damage. The Contractor shall notify the Town in writing if any of the Town furnished material is found to be damaged or defective at the time the Contractor picks up the materials from the Town. Anything defective or damaged found in the construction or on the construction site shall be marked and removed from the site and replaced with undamaged materials or work at no cost to the Owner. In the event the Contractor fails to remove rejected materials from the construction site within a reasonable length of time, the Owner may arrange for such removal at the expense of the Contractor. No extension of time will be allowed for replacing damage materials or equipment or correcting faulty work except the damage is to materials furnished by the town prior to pick up by the Contractor. .

REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

Unacceptable work is work, which includes but is not limited to faulty materials, equipment or workmanship, which does not conform to the requirements of the Contract, whether work has been performed by the Contractor or his sub-contractors or suppliers.

Unacceptable work, resulting from any cause, found to exist prior to the final acceptance of the work or within one year of final settlement, shall be removed and replaced in an acceptable manner at the Contractor's expense. The fact that the Engineer, OR, or other Town personnel may have overlooked the unacceptable work shall not constitute an acceptance of any part of the work. Nor shall payment of any estimate or progress payment nor the payment of any retained percentage shall relieve the Contractor of any obligations to correct any defective work or material.

Unauthorized work includes work that was done with improper materials or without adequate lines and grades having been established, work done contrary to the instructions of the Engineer, work done beyond the lines shown on the plans, or extra work done without the Engineer's authorization. Unauthorized work

will not be paid for under the provisions of the Contract, or if paid for in error deducted from a future pay application, and may be ordered removed or replaced at the Contractor's expense.

If the Contractor fails to comply with any order of the Engineer made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced, and unauthorized work to be removed. The Engineer will deduct the costs for accomplishing such work from any monies previously paid, monies due, or to become due to the Contractor.

Prior to correcting any defective or unacceptable materials, equipment, or work, the Contractor shall provide a method statement for Engineer and possible approval of the proposed corrective actions.

LANDSCAPE & PROPERTY PRESERVATION

Movement of crews and equipment within the rights of way and over routes providing for access to the Work shall be performed in a manner to prevent hazards to others using the route and damage to vegetation, landscaping, pavement, base, or property. All destruction, scarring, damage, or defacing of landscaping or property resulting from the Contractor's operations shall be repaired, replanted, reseeded, or otherwise corrected at the Contractor's expense before final payment. The adjoining property owner and the Engineer shall be the judges of satisfaction of the restoration work.

It shall be the responsibility of the Contractor to document any sub-standard conditions before his operations commence.

SUBMITTALS

After Notice to Award, the Contractor shall submit samples, drawings and data for the Engineer's approval which will demonstrate fully that all the materials and equipment to be furnished will comply with the provisions and intent of these Specifications as well as funding agency requirements.

Construction Schedule

Contractor shall provide a projected construction schedule for the entire Work. The Contractor will meet with the Engineer and OR to coordinate the development of the schedule. The Construction Schedule shall be a graphic summary (Gantt chart or bar chart) of the schedule the Contractor proposes to follow in the execution of the Work, and provide complete sequence of construction by activity and how his schedule is coordinated with others and with the need to keep the Town in water. A narrative of the schedule shall also be provided. The schedule shall show any phasing planned to accomplish the work. It shall also show any critical path and critical deadlines. The schedule for submittals shall show preparation and delivery of the submittals, review of submittal, and re-submittals and re-reviews if necessary. An updated project schedule shall be provided with each application for payment and a two week look ahead schedule provided weekly.

If, at any time during the course of the Work, the necessary progress is not being maintained, the Contractor shall make such changes in the work force employed as may be necessary to meet the Construction Schedule and contract milestones and time lines. An updated overall project schedule shall be provided with each pay application and at least monthly and shall be accompanied by a summary report. The report shall include work completed or if partially completed the percent completed, include major changes in scope, activities modified since the previous update, problem areas, anticipated delay factors and their impacts, the cause for such delays and corrective actions taken or proposed and their impacts.

Sub-Contractors and Suppliers

If not provided earlier, a list of sub-contractors and suppliers shall be submitted at the preconstruction conference which includes the scope of work for each and value of that work. Note that all sub-contractors and suppliers providing more than 10% of the work shall provide a qualification statement prior to commencing work on the project.

Schedule of Values

A schedule of values shall be provided prior to award of the contract. The schedule shall be a detailed breakdown of the quantities and prices of work and materials required to perform and complete the Contract subdividing the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. The schedule of values shall allocate the entire contract sum among the various portions of the work. For lump sum items, itemize the materials and work in the item that represent 10% or more of the lump sum price. The total of the price breakdown shall not be unbalanced and each item shall contain the appropriate amount of overhead and profit applicable to that item. The schedule shall be reviewed by the Engineer who is entitled to request additional detail to support the schedule and/or to request changes to the schedule based on information gathered by the Engineer from the Contractor and other sources. An acceptable schedule of values must be provided to the Engineer in advance of the Contractor submitting the first request for payment. Acceptance of the Schedule of Values by the Engineer shall not relieve the Contractor of the responsibility of performing all the Work needed to complete the project at the price bid.

Operation and Maintenance Manuals

Submit operating and maintenance manuals for all operating apparatus and equipment furnished under the Contract to the Engineer following final approval of applicable submittals and before 50% completion. Provide a draft copy for review. After approval of the draft, furnish one searchable electronic copy (from which other electronic copies can be made) and 3 hard copies. Hard copies shall be bound in durable covers with: front cover stating general nature of the manual, clearly indexed or provided with thumb tabs for each item or product, and include a directory of all subcontractors and maintenance contractors with names, addresses and phone numbers, indicating the area of responsibility for each. Prepare all such manuals in approximately 8-1/2" X 11" format except where large format is needed for clarity. Emergency data shall be clearly marked and tabbed. Electronic copies shall include electronic bookmarks and hot links for the items listed above.

Manuals shall contain full information for each item of operating equipment including:

- A general description of the operation of the entire system and explanation of the function of each piece of equipment and a detailed description of the operation.

- Schematic diagrams and as-built wiring of control, mechanical, and electrical systems, circuit directories for each electrical, control, and communication panel which correspond to the labeling of same,

- List of all valves with the location, function, and their normal and emergency operating position,

- For every pump and motor provide make, model, and serial number, nameplate information, voltage amperage and power factor for motors, suction and discharge pressures for pumps and pump curves.

- Instructions for installation, start-up and shut down operations, normal and emergency operations, including positions of all equipment, switches, valves, levers, pressures, temperatures, etc. during start-up, shut down, summer, winter operating conditions,

Inspection and maintenance requirements, procedures, schedules, safety precautions, and manufacturer's literature for all pieces of equipment. Include information on regular maintenance with schedules, troubleshooting guides, lubrication schedules, data sheets and complete nomenclature of all replaceable parts, and name and address of nearest vendor of parts,

For each item, list the manufacturer and supplier including: addresses, phone numbers, name of local representative. Mark the correct model number and data for the model number where the literature covers more than one model, and delete, or otherwise clearly indicate, all manufacturers' data with which this installation is not concerned. Catalog cuts alone are not acceptable unless they contain complete O & M and other instructional data and cross out any information not relevant to this project.

Any additional requirements included in the technical specifications

Include copies of all guarantees and warranties issued and copies of all approved submittals and shop drawings with all data concerning changes made during construction.

Record Documents

Maintain field record documents in clean, legible condition. Keep current, at project site one copy of all drawings, specifications, addenda, approved submittals, shop drawings and engineering data, field test results, change orders, field orders and other Contract Documents.

If survey data will not be collected continuous, mark the locations and depths of installed work in a way that will preserve the data for the surveyor such as tracer wire and setting, labeling, and protecting PVC conduits or survey hubs at the locations. Hub or other engineer approved logging system shall log description, depth, swing ties to all the buried improvements. Wire and hub shall be protected until they can be surveyed by Contractor's surveyor typically at least on a monthly basis before submitting for each pay application. Contractor shall keep a written record of the information on each hub in case the hub is damaged. Installation will not be considered completed until the record data is furnished.

The Contractor shall deliver to the Engineer one complete set of final as-constructed drawings that clearly show the location of all piping, fittings, appurtenances, structures, other improvements to scale and with detail drawings of the system of all work completed. The dimensional scale of such drawings shall be sufficiently large to clearly depict all aspects of the construction with detail drawings as needed to clearly show the Work. Also submit all information required in CAD (ACAD 2020 format dwg) and geo referenced shape files.

Such information shall at a minimum include:

1. Provide Northing, Easting, Elevation using survey quality GPS or conventional survey equipment for horizontal and vertical location of all underground appurtenances and utilities, found or installed, referenced to at least 3 permanent surface improvements (property pin, power pole, street sign, fence corner, etc.) for each appurtenance. Provide coordinates for each manhole, fittings, valves,. etc. Also submit coordinate data as txt file containing Pt #, N, E, El, and description of point.
2. Location of internal utilities and appurtenances concealed in construction, reference to visible and accessible features of the structure including but not limited to infrastructure concealed under or within the building. Document with photos and dimensions as well.
3. Changes made by Change Order or Field Order.

4. Details not on original Contract Drawings.

5. Shop Drawings - Maintain as record drawings and submit copies of same as part of the Record Drawing package.

Submission of acceptable project record documents is prerequisite to final payment.

CLEANING & SITE MAINTENANCE

Throughout the construction period, the Contractor shall provide all required personnel, equipment, and materials needed to maintain the site in a reasonable standard of cleanliness and in accordance with this sub-section. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws. Do not burn or bury rubbish or waste materials on project site. Do not dispose of volatile wastes in a manner which might cause ignition. Do not dispose of wastes into streams, ponds, or waterways.

Cleaning During Construction

Maintain work site, rights of way, and surrounding properties free from accumulations of waste, rubble, debris, and rubbish caused by construction operations and legally dispose of them at public or private facilities off the project site.. Wet down, as frequently as necessary, dry materials and rubbish to lay dust down and prevent blowing dust and debris both on and off site. Keep all work areas and other Contractor impacted areas in good usable condition. Provide on-site trash receptacles for collection and storage of waste materials in an orderly manner.

Final Cleaning

At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed and visible surfaces. Leave project clean and ready for use. Restore all disturbed areas to original condition. Clean specific equipment, products, and work as specified in the technical specification section for that work and in accordance with manufacturer's recommendations.

PROJECT CLOSEOUT

Instruction

Instruct Owner's personnel in operation of all systems and equipment, as required by specifications and for optimum operation. Contractor shall coordinate with the supplier to ensure that start up and training are provided in a timely fashion at times that work for the Town.

Final Adjustment of Accounts

In coordination with the Engineer, Contractor shall submit final application for payment to Engineer in accordance with requirements of the Contract Documents (subject to the provisions of C.R.S. 38-26-107). Statement shall reflect all adjustments, including Original Contract Sum, additions and deductions resulting from previous change orders, changes in quantities, other adjustments, deductions for uncorrected work, penalties and bonuses, if any, liquidated damages; Total Contract Sum, as adjusted; previous payments; and sum remaining due. Contractor will then prepare final statement, reflecting approved adjustments to Contract Sum not previously made by change orders.

Closeout Submittals

Once the Engineer determined the Work is complete, he shall request the Contractor submit the following closeout submittals for review and approval by the Engineer and Owner:

Request for Final Payment
Consent of Surety
Release of liens from sub contractors and suppliers due more than 5% of Contract value
Executed extended Warranties required in the Contract Documents

Closeout submittals shall be duly executed before delivery to Engineer.

SECTION 02200 - SITE PREPARATION, EXCAVATION, BACKFILL, COMPACTION, AND RESTORATION

PART I - GENERAL

These specifications are general in nature and are designed to cover excavation and backfill for trench, embankment, roadways, pipe line, manholes, fittings, service connections, appurtenances and structures. Additional requirements for a particular type of construction or use may also be covered in the specification for the specific application e.g. "Pipe Line Construction".

Where requirements for structures, embankments, piping, etc are more stringent in other sections of these technical specifications than the requirements herein, these requirements shall be deemed to be superseded.

A Contractor shall comply with all applicable laws and regulations including "Rules and Regulations Governing Excavation Work" of the State of Colorado.

DESCRIPTION

Work under this section includes clearing and grubbing, excavation, controlling surface flow, seep, and groundwater, dewatering and stabilization, embankment, bedding and backfilling, with moisture control, and grading, and compaction to specified density and elevations needed for construction of this project as well as complete site restoration. Also included are stockpiling excavated material to be used as fill and removal of unsuitable and excess soils from site and furnishing and installing flowable fill.

RELATED WORK SPECIFIED ELSEWHERE

Section 02713 - Piping

Section 03000 – Concrete

SITE INFORMATION

Site information is presented in Section 01000.

MEASUREMENTS AND LEVELS

Contractor shall verify all drawing measurements and levels in relation to existing elevations, grades, and adjacent structures, and determine conditions and requirements for excavations, fill, backfill, and all sheeting, shoring, bracing, and protection of the premises and buildings. Contractor shall carefully and accurately lay out all lines and levels of the new construction before proceeding with any Work.

CONFORMANCE TESTING

All testing shall be performed by an independent testing lab acceptable to the Owner and arranged and paid for by the Contractor to demonstrate his work is consistent with the contract requirements and

for all testing for his convenience and to establish methodology for his work. OR will determine location and frequency of such tests to ensure that minimum requirements are met at all locations. Each lift shall be tested for compaction and moisture content at one OR designated locations per 100 lf of trench, one test per 500 sf of embankment per lift and proof rolled. Tests must be observed and results approved by the OR. If tests fail to meet the specified density or moisture content, or to pass proof rolling tests, additional tests will be required in the vicinity of the failed test to determine the extent of the inadequate compaction, then corrective actions shall be taken by the Contractor. After the deficiencies have been corrected, additional tests will be taken in approximately the same location and number as was used to determine the extent of the failed area to demonstrate conformance with the specifications. The cost of all testing required due to failed tests and as needed to determine adequacy of compaction methods shall also be paid by the Contractor. Given the remote location of the work, the Town will allow for density testing to be reduced to every other day with the understanding that the Contractor may be asked to expose work already covered to allow for testing of lifts that were completed and covered when testing was not available. In addition, Town reserves the right to contract directly for any quality assurance testing it elects to have completed. The Contractor will be responsible to reimburse the Town for any quality assurance tests that fail to meet the contract requirements.

Tests for density control to verify the compaction of the materials in any area of backfill will be in accordance with the requirements of ASTM D 2922 - Density of Soil and Soil Aggregate In-Place by Nuclear Methods, or ASTM D 1556 - Density of Soil In-Place by the Sand-Cone Method. The Engineer will also use visual observations of deflection (proof-rolling) to determine the adequacy of moisture control and compaction. Contractor shall provide advance notice of when testing will be conducted. Testing conducted when the OR or Engineer is not present will be deemed to have been for the Contractor's convenience and shall be repeated when OR or Engineer is present.

PART II - PRODUCTS

MATERIALS

Submittals

Contractor shall furnish preliminary representative test samples of native and base materials to an approved independent testing laboratory and shall pay for testing to determine that the materials conform with the Contract Documents and to determine proctor and optimum moisture values for each earthen and base material proposed for use on the project. Appropriately labeled samples of each material tested shall be kept on site in a one gallon zip lock bag for comparison with materials being placed. All fill and backfill material must be tested and proctor curves, and other required lab test results shall be available on site and approved by the Engineer before fill and backfill is started. These test results will be used as basis for density control of compaction operations.

Submittal information for materials specified by CDOT tables or maximum gradation requirements will require sieve analysis and other test results to demonstrate conformance with CDOT table data and notes. Submittal shall include optimum moisture density curve for each type of material or combination of materials encountered or utilized and Atterberg limits for each clayey materials. Owner will use test results as basis for density control of compaction operations.

Materials for foundation(s) shall meet the requirements in the approved foundation submittal.

Conduct tests for determination of maximum density and optimum moisture in accordance with the requirements of ASTM 698 - Moisture density relations of soils using a 5.5 lb. hammer and 12-inch drop for native materials and ASTM 1557 Modified Proctor for structural and road base materials. With ASTM 698 use method A, B, C, or D as appropriate, based on soil condition and judgment of the qualified party conducting tests. When appropriate, determine the correct rock correction. Samples tested shall be representative of materials to be placed.

Organic content test results shall represent organics by percent of volume and by weight.

General Use Materials

General use materials are intended to be used in trenches above the pipe zone, and for embankment fill to sub-grade elevations.

On site materials obtained from excavation, free of any unsuitable materials (defined below), shall be deemed acceptable for general use. On site materials encountered during excavations which are appropriate for specific uses shall be separated and stockpiled for their later intended use (i.e. topsoil, fine bedding, etc.).

Imported and on site material for general use shall be non-expansive soil, pit run, or bank run sands and gravels with 4" maximum rock size (up to 6" for gross embankment where lifts are 8" or more), adequate binders, capable of being compacted and tested as specified herein unless other material is specified for the particular structure or work.

Imported materials for general use shall be taken from borrow areas acceptable to the Engineer. All borrow materials shall meet the same quality criteria as is required herein for on site materials to be used as fill.

Engineer reserves right to reject any material he finds to be unacceptable.

Bedding and Pipe Zone Materials Classification

Pipe zone area is defined as the backfill placed within twelve (12) inches of the pipes, fittings, and appurtenances. All pipe zone materials must be free of sharp edges and other matter which could damage the pipe.

Class A Flowable fill having one half sack of cement per cubic yard of concrete. Aggregates and sands for flowable fill shall meet the requirements for concrete in in the CDOT standards.

Class B Well graded crushed stone or crushed gravel meeting the requirements of Class 6 specified below for "Road Construction Materials" that are free of sharp edges.

Class C	Selected soil of low permeability free from clods and stones greater than 3/4 inch in maximum dimension and free of all unsuitable materials as defined below.
Class D	Screened or Washed Rock, of single grade 1-1/2" or less, free of sharp edges, clay and fine particles (for gravity sewer and process lines use only).
Class E	Bedding sand passing #4 screen or less (for pressurized lines only)

Materials for bedding the infiltration gallery screens are called out in the Infiltration Gallery specification.

Road Construction Materials

Road construction materials are those used for road sub-base, base and finished road surfaces. Class 2 materials shall be well graded natural or crushed aggregate with sufficient filler or binding materials which when placed and compacted result in a firm, dense, unyielding foundation. Class 6 materials shall consist of crushed gravel or crushed stone base course material of hard, durable particles or fragments of stone or gravel crushed to required size and a filler of sand or other finely divided mineral matter. Not less than 60% by weight of the aggregate particles shall be particles having at least one fractured face. The composite base course material shall be free from vegetable matter, expansive materials, and lumps or balls of clay. The class 2 and 6 materials shall meet the following requirements:

Gradation (% Passing)	Class 2	Class 6
4"	100%	-----
3"	95-100%	-----
2"	-----	-----
1"	-----	-----
3/4"	-----	100%
No. 4	-----	30-65%
No. 8	-----	25-55%
No. 200	3-15%	3-12%
Liquid Limit	35 Max.	30 Max. (nonplastic)
Plasticity Index	6 Max.	6 Max.
Resistance Value	75 Min.	78 Min.

Inclusion of fractured concrete and/or recycled asphalt pavement is prohibited.

Structural Subgrade and Backfill Materials

Structural subgrade and backfill materials outside the pipe zone are defined as those materials used to prepare for structural construction.

Class 6	Meeting the requirements of Class 6 specified above for "Road Construction Materials."
Class D	Washed Rock, of single grade interlocking 1-1/2" or less, free of clay and fine particles.

On site and borrow area sand and gravels if available, may be used for structural backfill material except where special foundation material is otherwise specified.

Unsuitable Materials

Expansive materials and material that contain sharp stones, trash, debris, roots, organics, sludge, other deleterious substances, or frozen materials, stone having a maximum dimension larger than 4" (6" where specifically allowed) or materials that are otherwise unsuitable for providing fill, backfill, foundation or subgrade material for pipes, structures, or surfaces shall be classified as unsuitable. Materials with insufficient fines to prevent nesting of rocks and/or with more than 25% rock and those which cannot be compacted to the required density shall also be considered unsuitable (unless graded clean rock is specified). Otherwise suitable material which is unsuitable due to excess moisture content will not be classified as unsuitable unless it cannot be dried by manipulation, aeration, or blending with other materials satisfactorily to meet moisture limits for proper compaction.

Topsoil

Topsoil shall consist of loose friable loam with minimum 15% organic matter, reasonably free of admixtures of subsoil, refuse, stumps, roots, rocks, brush, weeds and weed seed, heavy clay, hard clods, toxic substances or other material which would be detrimental to the proper development of vegetative growth, including construction debris.

Riprap

Material for riprap shall come from rock stockpiled while excavating or imported. Material used for riprap shall be dense, sound rock fragments which are resistant to abrasion and shall be free from cracks, seams, and other defects that would decrease its durability and to resist destruction by water and/or frost action. Unless otherwise called for on the plans riprap shall have a D-50 of 12".

Spot Subgrade Reinforcement and Sub-Grade Stabilization

Material includes sound, tough, durable crushed stone, or gravel, consisting of angular pieces varying from 1 inch to 4 inches in maximum diameter or other engineer approved material, with necessary filler in dry conditions, and when a geotextile is used. In wet conditions, and without geotextile, rock shall be without fines. When a smaller material is necessary for filler, screened gravel, or sand may be used to completely fill all voids.

Geotextiles

Geotextiles and geogrids used for stabilization shall be designed specifically for stabilization and/or soil reinforcement and a type recommended by the manufacturer for the application. Geotextiles for stabilization shall be a woven material Mirafi RS380i, or approved equal. Geogrids shall be at least equal to Miragrid or Tensar SS with a tensile strength of 200 x 134 psi. The grid shall have sufficiently large openings which are capable of interlocking with the on-site soils. Geotextile used to separate rock and gravel from native materials and for drains shall be non woven 12 oz/sy filter fabric, Mirafi 1120N or approved equal.

Capillary Water Barrier Material (CWB)

Clean, crushed stone, crushed or uncrushed gravel composed of hard, durable particles, uniformly graded with 1-1/2 inch maximum particle size and not more than three percent (3%) of minimum particle size passing a No. 4 sieve.

Seed, Mulch, and Tackifier

All seed shall be furnished in sealed bags or containers showing the name and address of the supplier, the seed name or mix, the lot number, net weight, % of weed seed content, and the guaranteed percentage of purity and germination. All seed furnished must be certified as free from noxious weeds as defined by local, state, BLM and USFS. Seed shall be harvested from a location of not more than 200 mile radius of the site. Seed which has become wet, moldy, old, or otherwise damaged or not labeled will be rejected. The Contractor shall furnish a signed statement certifying that the seed furnished is from a lot that has been tested by a recognized laboratory for seed testing within six months prior to the date of delivery and shall be certified weed free. Seed mix shall be a mix approved by BLM or CSU for the micro-climate where the seed is being placed.

Materials for straw mulching shall consist of straw from native grasses and shall be certified noxious weed free in accordance with State and Federal requirements for weed free straw. Straw in such an advanced stage of decomposition as to smother or retard the normal growth of grass will not be accepted. Old, dry straw, which breaks instead of bending will not be accepted. Mulch tackifier shall be consistent with CDOT section 213.

PART III - EXECUTION

PREPARATION AND LAYOUT

Engineer will provide horizontal and vertical control as provided for in Paragraph 10.11 of the Section 00500. Contractor shall protect and or maintain benchmarks and monuments and establish all lines and grades required for construction.

TOLERANCES

Complete excavations and fills with suitable equipment to line and grades as shown on the plans within a horizontal tolerance of ± 0.20 ft and a vertical tolerance of ± 0.04 ft unless otherwise noted on the plans or specified for a specific location or application.

Subgrade excavations for structures shall be within a horizontal tolerance of ± 0.10 ft and a vertical tolerance of ± 0.05 ft unless otherwise noted on the plans or in an approved submittal.

Pipelines shall be installed to within a horizontal tolerance of ± 0.25 ft and a vertical tolerance of ± 0.02 ft and structures shall be installed to within a horizontal tolerance of ± 0.05 ft and a vertical tolerance of ± 0.01 ft unless otherwise noted on the plans or required by an approved foundation and/or structures submittal.

CLEARING AND GRUBBING

The area to be occupied by permanent construction, including earthwork, shall be cleared and grubbed of trees, stumps, roots, brush, miscellaneous organics, rubbish, and other objectionable matter only to the extent necessary for orderly performance of the work and to a depth sufficient to remove organics

and other materials unsuitable for the intended purpose. Unstable saturated materials shall be removed or stabilized. All clearing limits shall be staked by the Contractor and approved by the Engineer prior to any construction. The Contractor is responsible for and shall exercise care in his work area. If there is disturbance to improvements or vegetation outside the clearing limits, the Contractor shall take remedial action at his own expense. No trees shall be removed or injured without the prior approval of the property owner and the Engineer.

Where present, strip existing topsoil prior to excavating operations. Depth of stripping shall be determined by the Engineer based on depth of the topsoil and roots. Stockpile topsoil material for replacement after all backfilling and compacting operations are completed.

Removal of Cleared and Unsuitable Materials

Unneeded materials from the clearing and excavation operations shall become the property of the Contractor and shall be removed from the site of the work and disposed of in a manner satisfactory to the Owner, and in accordance with state and local regulations at the expense of the Contractor. The Contractor shall make an effort to channel materials of value from the clearing and grubbing to beneficial use.

During the process of clearing or excavating, saturated soils, soils such as peat, soft clay, quicksand, cobble, large rock, or other materials which are unsuitable for project use may be encountered. Unless there is a use for these materials elsewhere on the project, these materials shall be removed from the site and disposed of by the Contractor at his expense. If removal of unsuitable materials results in excavation below the grade required, the area shall be backfilled to grade with suitable bedding or fill materials complying with the provisions of applicable specifications for the work being constructed. This shall not entitle the Contractor to additional payment unless otherwise specified in these Documents and then only when agreed to in writing by the parties prior to over-excavation. Saturated or soft conditions, and/or pit run or rock in the excavation shall NOT be considered unanticipated site condition and over-excavation and stabilization for such conditions shall be expected and be included in the cost of the work.

ACCESS ROADS AND BYPASSES

The Contractor shall be responsible for providing all additional access roads required to get materials and equipment to the work areas. When required, the Contractor shall construct and maintain detours or bypasses around portions of the work that conflict with traffic, including Town's access to their existing facilities and infrastructure. When necessary, the Contractor shall provide suitable bridges (or steel plates) at crossings where traffic must cross open trenches or other obstructions. Construction of access ways on private or government property must have written approval of the effected property owner prior to commencing construction. Such access and construction shall be included in the cost of the work to which it is associated.

No road or access easement will be completely closed unless expressly approved by the Town where there is minimal traffic impact. If a detour around the construction is not feasible, then the installation across the road will be made one-half at a time to allow through traffic around the construction. Adequate traffic control and signage must be provided by the Contractor.

DUST CONTROL

The Contractor will be required to furnish and apply an environmentally acceptable dust palliative to control dust on the project site and along haul routes. Dust control may consist of water or other substances found not to be detrimental to the work or the surroundings as approved in writing by the Engineer. Spreading of water or water mixture shall be done with acceptable sprinkling equipment. Such equipment shall be a type which ensures uniform and controlled distribution of the palliative without ponding, washing, or adverse impacts to the public, private property, or the environment.

DRAINAGE

Maintain the excavations, borrow areas, and site free from water throughout the work. Shape excavations and surrounding areas to minimize the entrance of water. Drain surface water or seepage by gravity or temporary pumps or other approved means. Discharge such waters in a manner which conforms with all federal, state, and local requirements. Use drainage methods which will prevent softening or undercutting of foundation bottoms, or other conditions detrimental to proper construction procedures. Accomplish the foregoing in accordance with the approved dewatering plan by the use of sumps and gravel blankets, well points, drain lines, or other means approved by the Engineer. Remove any water encountered to the extent necessary to provide firm subgrade. If the trench or foundation bottom or other excavation becomes unstable due to the entrance of water into the open excavation or water running below the excavation the saturated soil shall be removed and suitable backfill placed and compacted to grade at Contractor's expense. Handling of drainage, live flow, seepage, groundwater, runoff, discharges, and other water shall be included in the scope of Contractor's unit costs for the work to which it is associated. **Do we want a bid item for water control??**

EXCAVATION

Perform excavation of every description to lines and grades indicated regardless of material encountered within the grading limits of the project. The Owner makes no representation as to the materials to be encountered. All trenching and excavation, regardless of materials encountered or equipment or methods required, shall be unclassified and included in the cost of the applicable work.

Utilize all suitable materials removed from the required excavation in the formation of embankments, and/or for bedding or backfill. Care shall be taken to not excavate below the indicated grade, except when approved by Engineer to remove unsuitable material. Foundation and structure subgrade materials are intended to be placed on undisturbed ground whenever topographically and geotechnically possible unless otherwise specified or called for on the plans.

All necessary precautions shall be taken to preserve the material below and beyond the established lines for all excavation in the soundest possible condition. Material removed below depths indicated without specific direction of the Engineer is to be replaced, at no additional cost to the Owner, to the indicated excavation grade with suitable material and compacted as specified, except that foundations and footings may be increased in depth to the bottom of the overdepth excavations (to make depth and bearing surface uniform) at no additional cost to Owner.

Make excavations for footings, foundations, and similar work of adequate size to allow for placing, inspection and removal of forms, installation of any piping, and observations of the work. Contractor shall form sides of foundation footings unless depositing concrete directly against earth has been approved by Engineer or is called for on the plans. For direct-deposited concrete, trim banks to one inch wider on each side than dimensions indicated on the plans and so there is 3" clearance for rebar.

Contractor shall protect the bottom and sides of excavations and soils around and beneath foundations from frost.

The Engineer must be allowed to inspect all foundation material after excavation and review all test results before the Contractor shall pour footings, foundations, and slabs.

If pumping, low density, or saturated pockets are encountered in excavations, they shall be removed. The type of fill to be placed in such pockets shall be based on the location and must be approved by the Engineer in advance of any construction (see also "Stabilization" below).

Do not exceed the angle of repose for the materials without providing necessary support.

Materials unsuitable for fill or other uses on the project shall be disposed of by the Contractor to the satisfaction of the Engineer at the Contractor's expense.

Stock Piling Material

Where material is excavated from the trenches and piled adjacent thereto, it shall be piled sufficiently away from the edge of the trench to prevent caving of the trench wall and to permit safe access along the excavation. In unsupported trenches the minimum distance from the edge of the trench to the toe of the spoil bank should not be less than one half the total depth of the excavation, nor less than three feet if soil conditions allow. Greater distances shall be required where soil conditions are not adequate. With sheeted trenches, the toe of the spoil bank should be at least 3 feet from the edge of the trench.

Sheeting, Bracing, and Shoring

Where necessary or called for on the excavation stabilization plan, or needed to control the width of the excavation, excavation shall be braced and sheeted to provide complete safety to persons working in or around the trenches and minimize the width of the trenches and shall comply with applicable federal (OSHA), state, and local laws, regulations, and ordinances. The Contractor shall be fully responsible for sufficiency and adequacy of bracing excavations with respect to work under construction and to adjacent utility lines and public and private property. Remove sheeting and shoring as excavations are backfilled in a manner to protect the material, construction, and compaction and/or other structures, utilities or property. No such sheeting will be permitted to remain in the trench or excavation except when, in the opinion of the Contractor, field conditions or the type of sheeting or methods of construction used by the Contractor are such as to make the removal of sheeting unsafe. In such cases, with Engineer approval, portions of the sheeting shall be cut off to such depth as Engineer may approve and permit lower portions thereof to remain in the trench.

Ground Water

Groundwater and seep water will likely be encountered in some excavations. Information regarding groundwater is presented in "Site Information" in Section 01000. Groundwater should be anticipated and handling of it shall be included in the cost of the work.

Keep ground and seep water level below final pipe and foundation grades, and prevent entrance of water into excavation and/or utility lines. Water shall not be permitted to run through lengths of pipe already or being laid nor enter through the well screens. Ends of pipes shall be capped or plugged to ensure that water, dirt, animals, etc., does not enter the pipe. Should any groundwater, dirt, mud, etc., enter the pipe or screens during or after installation, the Contractor shall flush the pipe thoroughly in the presence of the Engineer to ensure complete removal of all foreign objects prior to connection to the existing system. Engineer may require Contractor at Contractor's expense to hydrojet and/or video inspect lines where mud, debris, etc have been allowed to enter lines to ensure that lines have been adequately cleaned.

When groundwater or other sources of water are encountered provide necessary pumps and other equipment necessary to completely remove the water so that work can be performed in dry conditions. Maintain dry excavations throughout construction. Dewatering activities should be controlled to avoid damage to surrounding property as well as protecting the work site and to comply with state and federal regulations. Costs for controlling water shall be included in the cost of the work to which it is associated.

Use of Explosives

Use of explosives is prohibited.

Stabilization

If ground pumping is a problem, track equipment rather than rubber tired equipment shall be utilized in the access and work area. Use of rubber tired equipment that results in yielding subgrade shall be remedied at the Contractor's expense. Saturated materials and groundwater shall be expected in some locations and need for dewatering and stabilization shall be included in the scope of the applicable work.

When authorized by the Engineer, stabilize the subgrade material with the use of sub-grade stabilization material or a stabilization fabric depending on the type and location of the instability. Remove as much of the unstable material as authorized by the Engineer and directed by the OR. Earthen stabilization material, when used, shall be sized based on the type of instability and shall generally conform with the stabilization material specification listed above. The material shall be placed in uniform lifts at proper moisture and compacted in a manner which will not make the surrounding area unstable. Cover stabilization materials with a filtering geotextile fabric as directed. Stabilization geotextiles shall meet the materials specifications listed above. Fabric shall extend sufficiently beyond the unstable area to act as a bridge; the additional distance will depend on the type of instability and the type of fabric, but should not be less than 1 foot in any direction and will typically be 2' or more. Fabrics shall be placed on a smooth level surface and shall have at least 12" of cover between the fabric and finished grade unless otherwise approved by the Engineer.

If piping will be placed at an elevation below the elevation of the fabric, install piping before placing fabric. If fabric is cut for any reason, a patch of fabric which extends at least 2 feet past the cut in each direction shall be placed over the cut and proper fill placed over the patch.

Contractor should anticipate that the existing materials in the excavation may be incompetent, wet, and / or rocky and require over excavation and/or reworking and should include that in his costs for the work. Rocky and/or soft saturated conditions will not constitute an unanticipated site condition.

BEDDING, BACKFILL, AND COMPACTION OF EMBANKMENT, PIPE LINES, AND STRUCTURES

Bedding Preparation

The bottom of excavations shall be accurately graded to provide uniform bearing and support for the structure or pipe. Point loading will not be permitted. For pipes dig bell holes and depressions only of the size needed to accommodate the pipe joint. Use of earth mounds will not be permitted. Earthen materials for bedding shall be consistent with pipe zone or structural fill requirement as appropriate.

Bedding Placement

The bottom of trenches must be dry or well drained before bedding is placed. Place bedding below and around the pipe by hand to prevent damage or displacement of the pipe in 3" compacted lifts. Bedding for structures shall be structural fill materials placed on a firm foundation. It is anticipated that subgrade below the work will be saturated and or rocky and that subgrade spot stabilization will be required. Contractor shall install and compact the subgrade reinforcement, foundation materials, and structural bedding in accordance with the approved submittal for the structure and its installation.

Backfill

The Contractor shall proceed with backfilling as soon as practicable, but not until Work is inspected by Engineer and any necessary tests satisfactorily completed. Unless unsuitable, materials from excavation may be used for backfill above the pipe zone. Do not begin backfilling until forms and any debris and trash have been removed, and where applicable, concrete has cured sufficiently to prevent displacement or damage to restraints, footings, foundations, or walls (typically 7 days unless field cured test cylinders indicated adequate strength has been achieved sooner). Maintain optimum moisture content of backfill materials and compact to required density. Whenever practical, materials shall be brought to the specified moisture content in the borrow area rather than while being placed. Unless otherwise specified, unprocessed materials shall be compacted to 95% standard proctor at +/- 2% of optimum moisture and processed materials (e.g. base materials) compacted to 95% modified proctor +/- 2% of optimum. Compaction or consolidation shall follow as soon after the placing as is practical.

Construct fills and embankments to the lines and grades indicated on the drawings. Immediately prior to placing fill material, scarify the entire area upon which fill is to be placed to a depth of 12 inches. The foundation for earthen fill shall also be prepared by disking or scarifying parallel to the axis of the fill. Once thoroughly scarified and moisture conditioned to between +/-2% of optimum, compact to 93% modified proctor unless higher density is called for the application elsewhere in the Contract

Document. Compact such that the surface materials of the foundation will bond well with the first layer of fill as is specified for the subsequent layers of earthen materials.

Ensure areas on which embankment is to be place and areas to be backfilled and backfill materials are free from debris, large and/or sharp stones, loose materials, snow, ice, and water, other objectionable material that will cause interference with compaction, and that ground surfaces are not in a frozen condition. Do not allow the nesting of rocks. Do not backfill over existing subgrade surfaces which are frozen, porous, wet or spongy. Cut out soft areas of existing subgrade and stabilize (see Stabilization requirements above and below).

Compact existing subgrade surfaces if densities are not equal to that required for backfill materials. Plow, step, or bench sloped surfaces steeper than 4 to 1 on which backfill is to be placed in such a manner that fill material will adequately bond with existing surfaces. Scarify where necessary to ensure uniform compaction and good bonding between lifts.

Backfill areas to grades, contours, levels, and elevations required. Place approved excavated or imported material in successive horizontal layers of 8 inches or less loose depth for full width of cross section, bring to optimum moisture content for compaction, and compact each layer to the required density with equipment designed for compaction purposes for the type of material. Backfill systematically in continuous level layers for the full width of the cross section. Uniformly place each layer to the specified maximum lift (or less) and thoroughly blade mix or otherwise blend during the spreading to ensure uniformity of material in each layer. The distribution and gradation of the materials throughout the earthen fill shall be such that the fills will be free from lenses, pockets, streaks, or layers of material differing substantially in texture, gradation, or moisture from the surrounding materials. The materials, when compacted in the earthen fill, shall be blended sufficiently to secure the best practicable degree of compaction and stability. If there is a varying degree of permeability in the material the most impervious materials shall be placed in the central portion of the earthen fill and the more pervious materials shall be placed so that the permeability of the fill will be gradually increased toward the upstream and downstream slopes of the earthen fill. Testing of each lift shall be performed prior to placing the next lift in accordance with the specified testing requirements.

Structure and Appurtenance Backfill and Compaction

Backfill around structures and appurtenances such as vaults, manholes, foundations, buildings, valves, valve boxes, cleanouts, miscellaneous structures once they have achieved adequate strength with care to prevent damage to the work. Materials shall be compacted to 95% modified proctor at +/-2% optimum, unless otherwise noted on the plans for a particular use, using equipment which will not damage the structures, appurtenances or surrounding construction.

Compact each layer continuously over its entire area or around a structure and make sufficient trips with the compaction equipment to ensure that the required density has been obtained uniformly. Backfill simultaneously on each side of foundation walls and other structures to equalize soil pressures. Do not backfill against or operate heavy equipment adjacent to walls until all structural elements are constructed, cured, properly braced, and approved by the Engineer. Do not operate heavy equipment closer to foundations than a horizontal distance equal to height of backfill above bottom of foundation. Compact remaining area with hand tampers suitable for material being compacted. Where needed,

the hand work (e.g. compaction with a whacker) for a lift should be done in advance of and blended into the work of the larger equipment.

Perform all compaction with approved equipment well suited to location, structure, and materials being compacted. Do not begin compaction until structures are properly secured and have adequate strength. Perform compaction while the material is at the specified moisture content. Maintain optimum moisture content during final rolling and until compacted material is covered by subsequent construction. Remove loose material and protect material until covered.

Roadway Construction.

Roadway construction shall follow the same construction requirements as for structures except that the roadway materials shall be consistent with that called out on the typical road section on the plans.

Installation of the geo-synthetic materials at the base of the road structure shall be placed on the native material after the native materials have been scarified and compacted in accordance with the installation recommendations of material fabricator.

Pipe Zone Compaction

After the pipeline has been installed, suitable bedding material (Class C, D, or E as appropriate) shall be hand placed in up to 3" lifts to the pipe centerline (springline) and hand tamped with appropriate tamping equipment and compacted to provide firm uniform support for the pipe. Take care to ensure that sufficient material has been worked and compacted under the haunch of the pipe to provide adequate side support. Compact haunching material to a minimum Standard Proctor density of 95% at +/-2% of optimum moisture. Additional backfill shall then be hand placed and hand compacted in 3" lifts to provide at least six inches of suitable cover over the top of the pipe before any material is placed or compacted with machinery. Where screened rock is allowed, compact with vibratory equipment before covering with geotextile. Take care to avoid contact between the pipe and compaction equipment to avoid damage or displacement. Where specified or called for on the plans, pipe zone shall be backfilled with flowable fill.

Compaction of backfill materials shall be done in such a way that sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe or its installation yet ensure proper compaction through the depth of the trench and around the pipe. Any damage resulting from the backfilling or compaction of the backfill shall be repaired by the Contractor in a timely manner at his expense. At all times precautions should be taken to prevent flotation of the pipeline due to entry of water into the trench. Compaction in the pipe zone shall be to 95% Proctor ("standard" for unprocessed and "modified" for processed materials) +/- 2% of optimum moisture unless authorized or noted on the plans.

Upper Trench Compaction

Minimum compaction through the entire depth shall be 95% of maximum dry density as measured by Standard Proctor tests for native materials. Structural materials such as road base shall be compacted to 95% of maximum dry modified Proctor. Moisture control at -1 to +2 % of optimum of all fill will be required to facilitate achieving acceptable densities. Top soil need not be compacted.

In general, backfill shall be mechanically compacted by means of tamping rollers, sheep foot rollers, pneumatic tire rollers, vibrating plate or roller or other mechanical tampers which are appropriate for the material being compacted. Compaction by jetting or flooding shall not be permitted. The trench shall be filled to provide a minimum of 3 feet of cover over the pipe before rolling equipment is used and 50 inches before utilizing a hydrohammer during compaction.

In the trench fill area above the pipe zone, pipe backfill material shall not exceed four (4) inches in largest dimension. Rocks shall be distributed through the fill to prevent nesting. All excess/unsuitable material shall be removed from the work area and disposed of at Contractor's expense.

SURFACE RESTORATION

On completion of backfill operations and other work, the entire site shall be cleared of all debris, and ground surfaces shall be finished to smooth, uniform slopes and shall present a neat and workman-like appearance. The final grade will be graded to match existing grades without producing drainage or maintenance problems. Areas which are to receive base, pavements, surfacing, topsoil, or landscaping shall be graded as required to allow installation of the specific surface treatment. Restoration, or as needed replacement, of grass, shrubs, and other plants shall be done to the extent required to restore the damaged and disturbed areas to a condition as close as practical to that which existed prior to construction using at least 2x the plants removed. Replace in accordance with the topsoiling subsection below. Tree and other vegetative damage shall be repaired in accordance with good horticultural practice.

The finished surface of roads impacted directly or indirectly by the project will be restored to their original or better condition as determined by the owner(s) involved. Asphalt damage shall be repaired with hot mix asphalt (4" minimum depth, and not less than the thickness of asphalt removed), and damaged concrete, repaired with concrete by cutting and replacing to the closest control joints. The Town, County, or State Road Department as applicable, shall be notified two working days prior to repair so that inspection can be provided. The Contractor shall be responsible for returning all roadways traversed with his equipment to conditions at least as good as existed prior to commencing construction.

The respective property owner shall be the final judge of the acceptance of restoration work. Again, in cases where sub-standard conditions existed prior to beginning construction, it shall be the Contractor's responsibility to have documented such conditions or to restore the site to standard conditions acceptable to the respective Owner, Engineer, and Town.

TOPSOILING

Conservation

When excavating, stockpile on site topsoil for future placement. Topsoil material is subject to approval. Conserve, or import if necessary, sufficient topsoil to cover a depth of 6" all disturbed areas which are not covered by riprap, roadbase, hard surface, or a structure.

Clearing

Prior to placing topsoil remove vegetation and clear ground surface of all other materials that would hinder proper grading, tillage or subsequent maintenance operations.

Placing Topsoil

Place topsoil on all disturbed areas which are not access or road ways, or designated to be covered by other materials. Prior to placing topsoil, prepare previously constructed grades as required such that when topsoiling is completed the proper grade will be achieved. After grading, scarify areas to be topsoiled to a depth of at least six inches. Perform work only during periods when beneficial results are likely to be obtained.

Perform spreading so that planting can proceed with little additional soil preparation or tillage.

Do not place topsoil when subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to proper grading or proposed planting.

REVEGETATION

Prior to commencing construction it will be necessary to determine the amount and type of vegetation which naturally occurred on the areas to be disturbed. This will be done by counting the quantity of each type of vegetation in randomly selected representative quadrants of the site to be disturbed. Quadrants shall be either a square foot or a square yard depending on the density of the vegetation. Assessment shall be completed in accordance with the Contractor's Storm Water Management Plan.

Disturbed areas that are to be revegetated shall be left in a roughened condition. Roughen vertical depth shall be approximately 4". Roughening shall be completed with undulations running parallel to contouring. Use erosion control logs, silt berms, silt fence, steps, or other suitable means to limit erosion prior to revegetation.

Preparatory to seeding, the top 4" of the topsoil shall be tilled into an even and loose seed bed 4" deep, free of clods, in excess of 1" diameter and brought to desired line and grade. Reseeding shall be done in accordance with specifications, requirements of the landowner, the recommendations from CSU Extension, BLM, and good horticultural practice for the areas being revegetated. Seed mix on private property shall be selected by the land owner. Where lawn and in other grassy areas are disturbed sod shall be provided for restoration. Furnish and install sod in accordance with CDOT standard 212.05. Contractor shall make arrangements to keep it moist until it is established.

In all areas where the slope is 3:1 or flatter, seeding will be accomplished in general conformance with CDOT Section 213. In larger areas use an approved mechanical power drawn drill followed by packer wheels or drag chains. The drill shall be operated in a direction generally perpendicular to the direction of the slope. Drill seed 1/2" deep with rows spaced no more than 4" apart. Seed that is extremely small shall be sowed from a separate hopper adjusted to the proper rate of application. Hydromulching will be allowed only if adequate water will be applied to the seed to keep the mulch continuously moist until the seedlings are established.

On all slopes steeper than 3:1, and smaller areas seed shall be applied by means of a mechanical broadcaster at double the rate required for drill seeding. The surface shall be cat tracked up and down

the side slope prior to, or just after, seeding to create depressions to help hold seed and moisture. All seed sown by mechanical broadcasters shall be raked into the soil to a depth of 1/2" prior to cat tracking.

Seed shall not be placed in windy weather or when the ground is frozen or likely to freeze in the next 48 hours. Seeding shall only take place in the fall or early spring. Hand broadcasting of seed will only be permitted for small areas which are not accessible to machine methods.

Unless more stringent requirements are specified in the storm water management plan, weed free native grass straw shall be applied at the rate of two tons per acre in areas that have native vegetation. It shall be uniformly crimped in with a crimper or other approved method to a minimum depth of 3". The seeded areas shall be mulched and crimped within 24 hours after seeding. Alternately a mulch with tackifier (200#/Ac) may be used. Jute, soils blanket, or other suitable covering shall be secured to all slopes steeper than 3:1 as soon after mulching as practical. The material shall be applied smoothly but loosely on the soil surface without stretching. Workers shall minimize the amount of walking of the seedbed even after the jute is applied. The upslope end of each piece of jute mesh shall be buried in a narrow trench about 6" deep. The jute shall be secured in the trench with compacted dirt fill. Where one roll of jute ends and a second begins, the upslope piece should be brought over the buried end of the second roll with a 12" overlap to form a junction slot. Where two or more widths are side by side the overlap shall be at least 6".

Seeded areas that have been disturbed prior to or during mulching operations shall be reseeded. Areas not properly mulched or that are damaged shall be repaired or remulched to meet the standards specified herein. Mulching activities shall not occur during windy weather. The Contractor shall keep the seedlings moist until they become established.

Where shrubs or trees were present prior to the disturbance, it is recommended that the same type shrubs and trees be re-planted at approximately the same density as originally present, unless the slope prohibits such plantings. Where trees in excess of 3" caliber are damaged or removed during project, replace trees with trees of similar species at twice the density. Protect such plantings from wildlife damage and keep them moist until established.

SECTION 02713 – PIPE CONSTRUCTION

PART I - GENERAL

The pipe line and appurtenances shall be constructed according to standard accepted practices, and as specified herein. Reference to standard specifications e.g. AWWA, ASTM, etc. made in a portion of these specifications by reference shall be the latest edition and revision thereof. All pipe line improvements and additions must also comply with the Minimum Standards portion of the Town Standards, Section 9.1 of the Ridgway Municipal Code, and all applicable Colorado Department of Public Health and Environment (CDPHE) and EPA regulations.

Description

This section covers the furnishing, installing, disinfecting (if applicable), and testing of pipe and the necessary appurtenances. Contractor shall furnish all equipment necessary for said Work and testing.

Contractor shall follow manufacturer's recommended procedures in all handling and installation operations and these contract documents.

Contractor shall engage the services of a licensed surveyor to layout the boundaries of the work area and the control the line and grade of the pipe and appurtenances in accordance with the project plans.

Related Work Specified Elsewhere

Section 02000 - Excavation, Backfill, and Compaction

Cross Connections

There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminated materials may be discharged or drawn into the Town potable water system. Any interconnections between potable water supplies shall have prior written approval of the Town.

Contractor Required Experience

In addition to requirements elsewhere in the contract documents, the Contractor's on site superintendent assigned to the project shall have experience in water distribution system construction having completed at least 3 water line projects of similar complexity and possess a Class 1 Distribution licenses or have Owner approved equivalent training and experience.

PART II - PRODUCTS

All materials shall be new, unused, and of the best standard quality available for the purpose intended. All materials in contact or potential contact with potable water shall be NSF 61 certified and meet all current EPA and CDPHE requirements including the lead-free requirements. All materials shall meet BABA requirements. All brass shall meet AWWA C-800. Where materials are specified by brand names, materials of equal quality may be substituted if the Contractor submits adequate technical and descriptive data and secures the approval of the Town. The Town or its designated representative shall be the sole judge of the suitability and acceptance

of materials. The Town in some instances may insist on a particular brand or model (to match materials in use) to minimize the parts inventory and/or O and M requirements.

A list of materials to be provided by the Owner are listed on the bid form. All other materials needed to complete the work and furnishing a functioning system shall be furnished by the Contractor.

Certificates of Compliance

Certificate of Compliance shall be submitted to the Engineer stating all pipe and materials furnished under these specifications do in fact comply with all referenced specifications and meet the Safe Drinking Water Act, CDPHE, NSF 61, and BABA requirements.

Ductile Iron Pipe

Conformance	AWWA C151
Thickness	Class 50
Pressure Rating	150 PSI
Joints	Neoprene Gasket AWWA C111/ with Conductivity Straps
Fittings	ANSI/AWWA C153 when available or C110, epoxy lined
Corrosion Protection	Wrap pipe in polyethylene tubes and sealed

Plastic Pipe (PVC) - Water

Conformance	AWWA C900
Thickness	Class 150
Pressure Rating	DR-18 to line pressures of 100 psi DR-15 when typical line pressures are expected to exceed 100 psi
Joints	Rubber Gasket, bell and spigot Certa-lok or equal when restrained joint pipe called for the plans
Fittings	Ductile Iron AWWA C153 when available or C110, epoxy lined Under 4", PVC with 200 PSI rating allowable
Marking	10 ga color coded tracer wire taped to pipe (blue for potable water and purple for non-potable. Metallic 6" wide color coded marking tape, located 12" above water line

HDPE Pipe – Water

Conformance	ASTM F714
Outside Dimension	Ductile Iron Pipe size
Pressure Rating	DR-7 (333 psi)
Joints	Fused joints
Fittings	Ductile Iron AWWA C153 when available or C110, epoxy lined Under 4", PVC with 200 PSI rating allowable
Marking	10 ga color coded tracer wire taped to pipe (blue for potable water and purple for non-potable. Metallic 6" wide color coded marking tape, located 12" above the line

Gate Valves

Conformance	AWWA C515
Material	Epoxy coated ductile

Body Type	Resilient seat, non-rising stem
Pressure Rating	150 PSI, minimum
Joints	Flange or Mechanical Joint end as required typically flanged to fitting, mechanical joint to pipe
Coating	Epoxy inside
Operating Nut	2" Square, open counterclockwise (buried) Handwheel (non-buried service)
Acceptable Models	Mueller (Only this product will be accepted by Town)

Valve Box

Location	All buried valves not in vaults
Type	Slip type, two or three piece 5 1/4" as req'd, traffic rated
Base	Suitable for valve size, depth, and operating mechanism
Material	Cast Iron, 1/4" minimum wall thickness
Coating	Bituminous varnish, plastic wrapped
Cover	Cast Iron, traffic type, marked "WATER"
Location	All buried gate valves
Operator Extension	1" minimum diameter cold rolled steel rod (where depth greater than 5 feet)

Butterfly 3-inch and Larger

Conformance	AWWA C504
Material	Iron Body, bronze mounted
Type	Resilient seat
Pressure Rating	150 PSI
Coating	Epoxy inside
Seat	Rubber
Joints	Flange
Operator	Electric Actuator (see below for details)
Operation	Open by turning counterclockwise
Acceptable Models	Bray, Mueller

Butterfly Valve Electric Actuator

Actuator shall be UL listed, designed to be located in a wet environment, NEMA 4 rated. It shall include adjustable speed control for both opening and closing speeds such that operating the valve will not create water hammer in the line. Wiring shall go to a terminal strip. Actuator shall include a simple manual override handwheel system. Actuator shall be designed to function with the butterfly valve furnished. Actuator shall be Bray Series 70 or approved equal.

PLUG VALVES

Plug valves shall be eccentric, non-lubricated type.

Non-Lubricated Plug Valves

Type	Non-lubricated eccentric
Class	175 lb. WOG (minimum)

Service	Drains
Port Area	95% of full pipe (minimum) - 100% 4" and smaller
Connections	125 lb. ANSI flanged
Materials	Semi steel body. Valves not having a round port shall have welded overlay of high nickel content on surfaces contacting the plug face. Upper and lower plug stem journals shall have stainless steel bearings, stem packing shall be adjustable or self adjusting.
Plugs	Faced with Buna-N or Neoprene
Operator	Wrench on valves smaller 6" (except where noted otherwise) Enclosed worm and gear on valves 6" and larger
Acceptable Model	Dezurik or approved equal

Yard Hydrants

Service	Potable water, frost free, with vacuum breaker
Size	3/4" NPT inlet, 3/4" hose bib lockable, 5' bury
Valve	Woodford Y34-4 or approved equal

Repair Clamps

Conformance	AWWA C230, NSF 61
Body Material	304 Stainless Steel
Bolts	UNC Rolled Thread 304 Stainless
Washers	Plastic lubricated, 304 Stainless
Nuts	ASTM A194, Coated, Stainless
Gaskets	SBR per ASTM D2000 MAA 610
Pressure Rating	150 PSI, minimum
Length	12" OD or less 12" long, over 12" OD, 16" long
Size	6" w/ 6" mechanical joint inlet, 5' minimum bury
Number of sections	One
Acceptable Models	Romac SS1 or equal

Air Valves

At high points and other locations in water mains where air can accumulate, provisions shall be made to remove air by means of air relief valves or other means approved by the Town. Air relief valves shall be placed in manholes / vaults which allow convenient service of the relief valve and provide for adequate drainage.

Material	Cast iron body, ASTM approved materials
Pressure Rating	150 PSI
Size	3/4" minimum, sized by air flow requirements
Connection	3/4" tapping saddle, tap at high point in line
Main Shut off	Corporation stop
Support	Support weight so not transferred to water line
Vent	12" above ground, pointed downward, covered with #24 mesh
Acceptable Models	APCO or Valmatic automatic valves or approved equal

Miscellaneous Valves

Plans for all large valves, control valves, pressure reducing valves, and other specialized valves shall be submitted to the Town for review and approval. In all cases such valves shall be installed in vaults or pits that are sufficiently large to accommodate all operation and maintenance required. Bypass lines are required.

Bolts and Hardware

All bolts, nuts, and small miscellaneous hardware shall be Cor-Blu or other durable corrosion resistant material approved by the Engineer unless specifically noted.

Tracer Wire and Marking Tape

Tracer wire shall be fastened to all pipes and shall be fastened to and brought to the surface at all valves and other metallic structures along the line. Tracer wire shall be 10 gauge.

Marking tape at least 6" wide labeled "water" shall be placed 12" above pipes of all materials.

Manholes

Manholes shall meet the requirements for manholes in the Town Standards Section 02722 – Sewer of the Town Standards.

PART III - EXECUTION

FIELD LOCATIONS

The Contractor shall make such advanced excavations as are necessary to determine the exact location of existing utilities which affect new construction. Where practical, new lines shall be routed to facilitate installation, allow for future maintenance, minimize existing utility conflicts and to minimize construction problems. Notify the Town if existing utilities present conflicts for the new infrastructure.

RECEIVING, HANDLING, AND STORAGE

Upon receipt, make overall inspection that all Contractor furnished materials have been received in good condition. Contractor shall pick up, transport, and deliver all Owner furnished materials at the Public Work site to the project site ensuring they arrive in good condition. Pipe and appurtenances should be inspected for any damage or imperfections and problem materials should be so marked set aside until removed from the job site. Town reserves the right to inspect all materials received and reject any which does not meet the requirements of Town specifications and standards.

Pipe, valves, fitting, and other appurtenances should be unloaded, handled, and stored in accordance with manufacturer's recommendations. Materials shall be handled during all phases of construction in a manner that will provide the maximum protection of the materials and any coating or lining and will prevent the intrusion of dirt or other foreign materials into the pipe. All slings, hooks, and other lifting or handling equipment which comes in contact with pipe and appurtenances shall be padded. Dropping the pipe during unloading or placing in the trench is prohibited and will be cause for rejecting that material. Do not dragging pipe spigot rings on the ground and do prevent damage to the ring from contact with abrasive or hard objects.

Extreme care shall be used in the handling, storage, and installation of valves and other appurtenances to prevent damage or distortion to the equipment and to ensure proper performance and assure cleanliness. Valves shall not be lifted by operating stems.

Only the amount of pipe and fittings necessary to ensure efficient installation progress shall be strung along the trenches. All other pipe and fittings shall be stored in the staging area unless otherwise agreed between the Contractor and the Owner. Piping strung or stored shall be protected at all times from damage by traffic, workmen, weather, construction operations, and other hazards. PVC pipe stored for a prolonged period of time shall be protected from sunlight.

ALIGNMENT AND GRADE

Pipe shall be laid and maintained to the required line and/or grade shown on the approved plans with fittings, valves, and appurtenances at the required locations. Pipe and appurtenances shall be installed within the tolerances listed in Section 02000 of these contract documents.

Changes in horizontal or vertical alignment of the pipe at a joint shall not exceed the manufacturer's recommended deflection for the type and size pipe being laid. When the change required is more than that recommended, a fitting or several short joints of pipe shall be used. All changes in direction in excess of eight (8) degrees or the maximum deflection recommended by the manufacturer, shall require a fitting unless otherwise approved by the Town.

When new pipe is to be connected to an existing pipe or when crossing existing pipe line, the Contractor shall excavate the existing lines well in advance of the laying of the new line to enable the Contractor and OR to verify their elevation and placement and to make any adjustments in grade and/or alignment of the new pipe line that may be required.

The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined, and he shall be held responsible for the repair or replacement of such structures when broken or otherwise damaged. Temporary support, adequate protection, and maintenance of all underground and surface utility structures, drains, sewers, and other structures encountered in the progress of the Work shall be furnished by the Contractor at his expense.

Whenever obstructions are encountered during the progress of the Work and interfere to such an extent that an alteration in the approved plans is required, the Contractor shall notify the OR and the Engineer shall have the opportunity to change the plans and order a deviation from the line and/or grade or arrange with the owners of the structures for the removal, relocation, or reconstruction of the obstructions.

All pipe shall be laid to the depth or profile shown on the approved plans or pipeline typical drawing. The depth of cover shall be measured from the top of the barrel of the pipe to the established finished grade of the road. Construction staking is required at minimum 50 ft intervals for line and grade control, at fittings, and at all changes in direction.

EXCAVATION AND TRENCH PREPARATION

Excavation shall be in accordance with Section 02000 Excavation, Compaction, and Backfilling Standard Specifications except as more stringent requirements are outlined herein.

Bedding

Bedding for water lines shall be in accordance with Section 02000 and manufacturer's recommendations including that select bedding shall be a low permeability material.

PIPE LAYING

Lowering pipe into trench - Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient performance of the Work. All pipe and appurtenances shall be carefully lowered into the trench piece by piece by means of a derrick, straps, or other suitable tools or equipment, in such a manner as to prevent damage to the materials. Under no circumstances shall the pipe or accessories be dropped or dumped into the trench. Dropped or dumped materials will be cause for rejection of same.

Inspection before installation - The pipe and accessories shall be carefully inspected for cracks and other damage before installation in the final position. Defective or unsound material shall be set aside for inspection by the Town who will determine if the material shall be repaired or rejected. Rejected materials shall be removed by the Contractor from the job.

Keeping pipe clean - Every effort shall be made to keep the interior of pipe and fittings clean during all phases of construction. The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during operations by plugging or other approved means. Fittings shall be thoroughly cleaned, with a wire brush if necessary, taking care to not damage the internal coating. If the pipe laying crew cannot keep pipe clean while placing the pipe in the trench, Town may require that the ends of the pipe be covered before placing it in the trench and that the covers only be removed as the joints are assembled. If cleanliness is in question, the Town may require the line be swabbed and/or hydrojetted and video inspected at contractor's expense to confirm that it is clean. Providing access to all sections which are required to be videoed, then cleaning and reassembling pipe, shall be the responsibility of the Contractor.

Laying of Pipe - The full length of each section of pipe shall rest solidly upon the bed, with recesses excavated to accommodate bells and joints. Bell and spigot pipe shall be laid with bell ends facing the direction of laying unless directed otherwise by the Engineer. Pipe laid on slopes 10% and steeper shall be laid from the bottom and proceed upward and have restraints approved by the Engineer. Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the Work unless expressly permitted by the Town.

The subgrade upon which the pipe is placed shall consist of materials suitable for supporting the pipe without excessive settlement or stress development. Low permeability, fine earthen materials shall be carefully placed and compacted around the pipe and up to a depth of six inches over the top of the pipe. Care shall be taken in backfilling to see that the pipe is not displaced, crushed, cracked, or otherwise injured. In the event that rock or excessively spongy materials are encountered, they shall be removed to a depth of not less than 6" below the bottom of the proposed lines and replaced with an approved material and mechanically compacted to grade. If no suitable subgrade material is available from the upper portion of the excavation, approved material shall be imported to the job site.

For bell and spigot pipe, the sealing surface of the pipe, the bell to be joined, and the elastomeric gaskets shall be cleaned immediately before assembly. Assembly shall be made as recommended by the manufacturer. Unless otherwise directed, the gasket and the bell or the plain end of the pipe to be jointed shall both be lubricated with a suitable soft vegetable soap compound meeting NSF 61. The spigot end shall be centered in

the bell and the pipe forced home and brought to correct line and grade. Pipe that is not furnished with a depth mark shall be marked before assembly to assure that the spigot end is inserted to the full marked depth of the joint and no deeper. Care shall be taken to ensure that no damage is done to the pipe, collar, gasket, or bell when the pipe is being homed. Use of excessive force will not be permitted. Any pipe that has had the grade or joint disturbed during or after laying shall be taken out and relayed. Restrained joint pipe shall be assembled in accordance with manufacturer's recommendations.

Any pipe line material already laid and found to be defective shall be taken out and replaced without additional expense to the Town.

HDPE pipe shall be installed in strict accordance with manufacturer's recommendation. All workers welding HDPE pipe must be trained and approved by the manufacturer for welding pipe of the size and dimension ratio being used on this project. At the beginning of welding each day, each worker who will be welding pipe shall demonstrate his qualifications by successfully completing a bend back test prior to welding any pipe for use on the project. All welds shall be full depth and shall have a uniform bead around the joint. The interior bead shall be trimmed smooth with the pipe.

When work is not in progress, open ends of pipe shall be securely closed by a watertight plug to prevent entry of foreign materials and/or water. If there is water in the trench, the seal shall remain in place until the trench is pumped completely dry. Whenever water is in the trench, enough backfill shall be placed on the pipe to prevent floating. Should any foreign material be allowed to enter the line or to remain in the line after installation, the Contractor shall remove such accumulation with a pipeline scraper or other approved means. Should the Contractor repeatedly fail to prevent water, dirt, or other material from entering the line, he will be required to clean each section of pipe with a pipeline scraper or swab as it is installed.

All iron materials shall be wrapped in 10 mil plastic covering all the iron parts and appurtenances and taped closed.

Sequencing – Unless otherwise approved as part of an Engineer approved method statement, pipeline installation shall follow trench excavation within 100 lineal feet. Trench backfill shall follow pipe installation within 100 lineal feet. Approved cleanup shall follow trench excavation within 100 lineal feet. The Town may allow changes in these requirements if field conditions warrant.

Cutting of Pipe - The pipe shall be cut in a neat and workmanlike manner in accordance with manufacturer recommendations. No damage shall be done to the pipe or any lining or coating and the cut shall leave a smooth end at right angles to the axis of the pipe. Flame cutting of iron pipe by means of an oxyacetylene torch shall not be allowed.

AIR VALVES

Air valves shall be installed in all locations where air is likely to accumulate in the water line, most often at high spots in the line. A tap shall be made in the top of the line and a corporation stop installed in the tap. The stop shall then be connected to an air valve either directly or via a service line as called for on the plans and installed in a manhole or vault that meets the requirements of the material specifications above and shall be installed in accordance the standard drawing adopted by the Town. The valve shall be installed at least 4 feet below finished grade. An aluminum frost-free lid shall be provided. Adequate insulation shall be installed around the valve to protect it from freezing. A vent from the vault shall have a continuous positive slope to where the vent line is out of the travelled way and brought up above the potential snow line.

VAULTS AND MANHOLES

Vaults where needed or required they shall be of concrete with minimum wall thickness of 8 inches or the minimum required to properly encase the re-enforcing steel required by the structure. The vault shall be of such size as to allow easy operation and maintenance of the equipment contained therein. A 24" minimum frost protected access hatch shall be provided over the manway steps to allow access to the vault. Vaults shall include either a floor drain or sump depending on groundwater conditions. Manholes shall be installed in accordance with the Town Sewer Standards and typical drawings.

Any temporary taps installed to facilitate construction, testing, etc. shall be removed at the pipe and a full wrap around repair clamp installed over the hole and extending a minimum of 6" in each direction from the hole.

BEDDING AND COMPACTION

Bedding, backfilling, and compaction shall be in accordance, with Section 02000 of these contract documents and pipe manufacturer's specification. Special attention shall be given to placing and compacting select bedding material in the pipe zone. The haunching on HDPE and PVC pipe shall be compacted to 95% Standard Proctor. Bedding and pipe zone backfill of water lines shall be fine grained and relatively impermeable rather than a graded material. Backfill shall not be wheel compacted until there is a minimum of 36" of compacted cover over the top of the pipe.

TESTING

Hydrostatic Testing – Pressurized lines

In advance of hydrostatic testing the Contractor shall furnish a method statement detailing how he intends to satisfactorily test the new work without impacting existing infrastructure. Temporary blowoffs in the new line must be kept to a minimal and any penetrations in the pipe that are permitted shall be removed and covered with a repair clamp. The method statement shall address phasing of the work as well the methods of accomplishing the work.

The Contractor shall be required to perform hydrostatic tests on all work installed as part of the project in accordance with AWWA specifications C600. Prior to making the test the Contractor shall advise the Town of the time and place of the test so that adequate inspection can be provided. Prior to performance of the test the pipeline shall be completely filled with water for a period of 24 hours.

The test shall be conducted in the presence of the Town or its authorized representative. The testing of the lines shall be done without being connected to existing lines unless approved by the Town. All necessary apparatus for pressure testing including the pump, pipe connection, gauges, and measuring devices shall be furnished by the Contractor at no cost to the Town. If connections to the existing lines are allowed by the Town, it is with the understanding that the Contractor assumes any and all responsibility in case of damage or failure of the existing system. Leakage through connections to the existing system, leaks in the existing lines, or leaking valves under the test pressure will invalidate the test and required the Contractor to find another means to test the line.

Prior to testing, all air shall be bled from the lines. If permanent air vents are not located at all high points, the Contractor shall install corporation stops at such high points so the air can be expelled as the line is filled then

the corps closed. The lines shall be tested at 30 psi. Test pressure shall be measured at the high point in the line. All taps, gauges (3" face, 0-100 psi, at least 5 psi gradations), and necessary equipment shall be provided by the Contractor as approved by the Town; however, the Town may utilize its own gauges if it so elects. Each section of the new line, between valves shall be tested to demonstrate that each valve will hold the test pressure. No pipe installed will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{N * D * \sqrt{P}}{7400}$$

Where:

L = Allowable leakage (gal/ 2 hours)

N = Length of Pipe divided by 18

D = Nominal Pipe Diameter (in)

P = Testing pressure (psig)

During the test, the test pressure shall not lose more than 5 psig without being pumped back up to the test pressure. The total gallons of water required to return the line to the test pressure at the end of the test period is the total leakage. If the total leakage is less than the allowable, the line can be given preliminary acceptance. All visible leaks will be repaired regardless of the amount of leakage. If leakage exceeds that allowed based on the above formula, Contractor shall identify problems, make repairs, and repeat the test until the leakage is less than or equal to the allowable leakage.

When separate pressure and leakage tests are to be performed, test procedures shall conform with the procedures detailed in AWWA C600. The duration of the pressure test shall be a minimum of one (1) hour and the duration of the leakage test shall be a minimum of four (4) hours.

Each gate valve shall be tested to ensure that it operates properly and provides watertight seal under the test pressure in the closed position.

Air Test - Gravity Flow Lines

Conduct an air test on all gravity lines including service lines in conformance with UniBell publication B-6-90 and ASTM F1417. Special attention shall be paid the safety admonishments provided in that publication.

Preparation for tests: Flush and clean the line prior to testing in order to wet the pipe surfaces and produce more consistent results. Plug and brace all openings in the line and the upper end of any connections. Check all pipe plugs with a soap solution to detect any air leakage. If leaks are found, release the air pressure, eliminate the leaks and start the test procedure over again.

Procedure of Test: Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 5.0 psig greater than the average backpressure of any groundwater above the pipe, but not greater than 8.0 psig. Allow sufficient time for the air temperature to come to equilibrium with the temperature of the pipe and the pressure to stabilize. Refer to the UniBell publication for adjustments of required pressures due to groundwater.

After the temperature has stabilized, and the pressure is stabilized at 5.0 psig greater than the average groundwater back pressure, the air hose from the control panel to the air supply shall be shut off or disconnected. Continuously monitor the pressure gauge. Once the reading has stabilized, begin the test. The

pressure reading shall be observed and the timing shall commence with a stop watch or other timing device that is at least 99.8% accurate.

If the time lapse (in seconds) for the allowable pressure drop exceeds that shown in at the end of this section, the pipe shall be presumed to be within the acceptable limits for leakage.

If the time lapse is less than that shown in the table, the Contractor shall make the necessary corrections to reduce the leakage to acceptable limits. All visible or audible leaks shall be fixed even if leakage is within acceptable limits.

Safety: The air test may be dangerous if proper precautions are not taken. All plugs must be sufficiently braced to prevent blowouts and the pipeline must be completely vented before attempting to remove the plugs. As a safety precaution, pressurizing equipment shall be provided with a regulator set at 8 psi to avoid over-pressurizing and damaging an otherwise acceptable line.

TABLE I
MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

1 Pipe Diameter (in.)	2 Minimum Time (min: sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

Manhole Tests

Vacuum Test - Vacuum Tests shall be performed in accordance with test methods in ASTM C 1244 following good safety practices. Do not pressurize manhole nor exceed the manufacturer's vacuum rating on vacuum disc or flat plate. Follow the manufacturer's instructions for the safe use of test plugs. Minimum test times shall conform Table 1 in ASTM C1244 which is partially quoted below:

Depth

4' Dia

5' Dia

6' Dia

8'	20 sec	26 sec	33 sec
10'	25	33	41
12'	30	39	49
14'	35	48	57
16'	40	52	67

Test vacuum shall start at 10 in Hg and not drop to less than 9 in. Hg during the test period.

Smoothness of inverts shall be checked for roughness by rubbing a hand in a latex glove over the full surface of the invert. If the glove is torn or snags, the surface will need to be smoothed. In addition, if Owner's representative has concerns about solids in sewage becoming snagged on roughness in the flow line, suitable materials shall be mixed with water and observed flowing through the manhole. Manholes with rough inverts or inverts which do not encourage smooth flow through the manhole will not be accepted by the Town.

INSPECTION CLEANING AND LAMPING

Final acceptance of the sewer line shall be based on an inspection for compliance with all items in these specifications. No pipe spalls, rocks, dirt, joint compounds, cement mortar, and other trash and obstructions shall be left in a sewer pipeline of any size or type. If this debris is removed by flushing, the manhole outlet shall be bagged or plugged before construction so that this debris will not be carried into or contaminate the existing lines.

Flow of any kind into the existing sewer system shall not be allowed until the sewer has been satisfactorily completed and such a connection is approved by the Town.

TOWN OF RIDGWAY
BEAVER CREEK DIVERSION RESTORATION
INFILTRATION GALLERY
PROJECT SPECIFIC SPECIFICATIONS

Prepared for:
Town of Ridgway, Colorado

Prepared by:
RESPEC COMPANY, LLC.
March 20, 2026

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Where required by the SPECIFICATIONS, CONTRACTOR shall submit descriptive information that will enable ENGINEER to determine whether CONTRACTOR's proposed materials, equipment, and WORK methods are in general conformance to the design concept and in accordance with the DRAWINGS and SPECIFICATIONS. The information submitted may consist of drawings, specifications, descriptive data, certificates, samples, test results, product data, and such other information, all as specifically required in the DRAWINGS and SPECIFICATIONS. In some instances, specified submittal information describes some, but not all features of the material, equipment, or WORK method.

1.02 PROCEDURES

- A. Direct all submittals to ENGINEER unless specified otherwise.
- B. Transmittal of Submittal:
 - 1. CONTRACTOR shall be responsible for the accuracy and completeness of the information contained in each submittal and shall ensure that the material, equipment, or WORK method shall be as described in the submittal.
 - a. CONTRACTOR shall verify that all features of all products conform to the requirements of the DRAWINGS and SPECIFICATIONS.
 - b. CONTRACTOR shall ensure that there is no conflict with other submittals and notify ENGINEER in each case where its submittal may affect the work of OWNER or others.
 - c. CONTRACTOR shall ensure coordination of submittals among the SUBCONTRACTOR(s).
 - 2. Unless a different number is called for in the individual SPECIFICATION sections, six (6) copies of each submittal are required.
 - a. Four (4) will be retained by ENGINEER.
 - b. CONTRACTOR will receive two (2) copies in return.
 - c. Faxed submittals will not be accepted.
 - 3. CONTRACTOR shall complete, sign, and transmit with each submittal package, one Transmittal of CONTRACTOR's Submittal form in format approved by ENGINEER.



4. Submittal Identification shall include the following:
 - a. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted.
 - b. Original submittal numbers shall have the following format: "XXX-Y;" where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals (for example, A, B, or C being the first, second, and third resubmittals, respectively). Submittal 25B, for example, is the second resubmittal of Submittal 25.
 - c. SPECIFICATION section and paragraph to which submittal applies.
 - d. PROJECT name and PROJECT number, and references to applicable DRAWINGS and SPECIFICATIONS.
 - e. Date of transmittal.
 - f. Names of CONTRACTOR, SUBCONTRACTOR, or supplier, and manufacturer as appropriate.
5. If CONTRACTOR proposes to provide materials, equipments, or WORK methods that deviate from the DRAWINGS and SPECIFICATIONS, it shall be indicated under "deviations" on the transmittal form accompanying the submittal copies.

C. Format:

1. Submittals regarding material and equipment shall be presented directly to ENGINEER and be accompanied by a transmittal form.
 - a. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate SPECIFICATIONS for which the submittal is required.
 - b. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
2. Submittals that are related to or affect each other shall be forwarded simultaneously as a package to facilitate coordinated review. Uncoordinated submittals will be rejected.
3. Any comments by CONTRACTOR shall be duplicated on all copies submitted.
4. When catalog pages are submitted, applicable items must be clearly identified.
5. Submittals that do not have all the information required, including deviations, are not acceptable and will be returned without review.

D. Timelines: Schedule and submit in accordance with the Construction Schedule, and requirements of individual SPECIFICATION sections.

- E. Resubmittals: Clearly identify each correction or change made.
- F. Review Procedure:
 - 1. Submittals are required for those materials, equipment, and WORK methods that can be selected based on CONTRACTOR's judgment of their conformance to the DRAWINGS and SPECIFICATIONS.
 - a. Other materials, equipment, and WORK methods are specified in a manner that enables CONTRACTOR to determine acceptable options without submittals.
 - 2. The review procedure is based on CONTRACTOR's guarantee that all materials, equipment, and WORK methods not requiring submittals conform to the DRAWINGS and SPECIFICATIONS.
 - 3. Review will not extend to means, methods, techniques, sequences, or procedures of construction or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the DRAWINGS and SPECIFICATIONS) of separate items, and as such, will not indicate approval of the assembly in which the item functions.
 - 4. ENGINEER will review submittals for overall design intent and returned to CONTRACTOR with suggested or necessary revisions.
 - 5. Deviations from CONTRACT requirements:
 - a. Deviations from CONTRACT requirements will be reviewed by ENGINEER.
 - b. CONTRACTOR shall describe such variations in writing, separate from the appropriate submittal at time of submission.
 - c. If ENGINEER approves any such variations, an appropriate CONTRACT MODIFICATION may be issued unless the variation is minor and does not involve a change in price or in time of performance.
 - 6. If the items or system proposed are acceptable, but the major part of the individual drawings or documents are incomplete or require revision, the submittal will be returned with requirements for completion.
 - 7. The right is reserved for ENGINEER to require submittals in addition to those called for in individual SPECIFICATION sections.
 - 8. The returned submittal will indicate one of the following:
 - a. If the review determines that the material, equipment, or WORK method complies with the DRAWINGS and SPECIFICATIONS, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, CONTRACTOR may begin to implement the WORK method or incorporate the material or equipment covered by the submittal.



- b. If the review determines limited corrections are required, copies will be marked "FURNISH AS NOTED." CONTRACTOR may begin implementing the WORK method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in Operation and Maintenance data, a corrected copy shall be provided.
 - c. If the review indicates that the submittal is insufficient or contains incorrect data, copies will be marked "REVISE AND RESUBMIT." Except at its own risk, CONTRACTOR shall not undertake WORK covered by this submittal until it has been revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "FURNISH AS NOTED."
 - d. If the review indicates that the material, equipment, or WORK method does not comply with the SPECIFICATIONS, copies of the submittal will be marked "REJECTED." Submittals with deviations that have not been identified clearly may be rejected. Except at its own risk, CONTRACTOR shall not undertake the WORK covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "FURNISH AS NOTED."
- 9. It shall be CONTRACTOR's responsibility to ensure that required items are corrected and resubmitted. Any WORK done before approval shall be at CONTRACTOR's own risk.
- 10. Processing Time: Unless otherwise specified, ENGINEER will review the submittal and return copies with comments/required actions within fourteen (14) calendar days after receipt of the submittal.
- G. Certificates: For those items called for in individual SPECIFICATION sections, CONTRACTOR shall furnish six (6) certificates of compliance from manufacturers or suppliers certifying that materials or equipment being furnished comply with the requirements of these DRAWINGS and SPECIFICATIONS.
- H. Samples: Unless a different number is called for in the individual SPECIFICATION sections, six (6) copies of each are required; four (4) of which will be retained by ENGINEER. CONTRACTOR will receive two (2) copies in return. Samples shall be sufficient in size to clearly illustrate functional characteristics and full range of color, texture, and pattern.
- I. Effect of Review of CONTRACTOR's Submittals:
 - 1. Review of SHOP DRAWINGS, data, WORK methods, or information regarding materials or equipment CONTRACTOR proposes to provide shall not relieve CONTRACTOR of the responsibility for errors therein and will not be regarded as an assumption of risks or liability by ENGINEER or OWNER, or by any officer or employee thereof; and CONTRACTOR shall have no claim under the CONTRACT on account of the failure or partial failure of the WORK methods, materials, or equipment so reviewed.
 - 2. A mark of "NO EXCEPTIONS TAKEN" or "FURNISH AS NOTED" will mean that OWNER has no objection to CONTRACTOR, upon its own

responsibility, using the WORK method proposed, or providing the materials or equipment proposed.

1.03 SHOP DRAWINGS

- A. CONTRACTOR shall coordinate all SHOP DRAWINGS and review them for legibility, accuracy, completeness, and compliance with CONTRACT requirements and shall indicate this approval thereon as evidence of such coordination and review.
 - 1. SHOP DRAWINGS submitted to ENGINEER without evidence of CONTRACTOR's approval will be returned for resubmission.
- B. CONTRACTOR shall stamp approval on SHOP DRAWINGS prior to submission to ENGINEER as an indication that dimensions and coordination with interrelated items have been checked and verified. Stamp shall read:
 - 1. "(CONTRACTOR's Name) represents that we have determined and verified all field dimensions and measurements, field construction criteria, materials, catalog numbers and similar data, and that we have checked with the requirements of the DRAWINGS and SPECIFICATIONS, the CONTRACT DOCUMENTS, and GENERAL CONDITIONS."
- C. CONTRACTOR's comments on SHOP DRAWINGS shall not be in red ink.
- D. Should CONTRACTOR propose any item on the SHOP DRAWINGS or incorporate an item into the WORK which subsequently proves to be defective or otherwise unsatisfactory, (regardless of ENGINEER's preliminary review) CONTRACTOR shall, at CONTRACTOR's own expense, replace the item with another item that will perform satisfactorily.

1.04 PROJECT SITE LAYOUT

- A. In accordance with Section 01 71 13, Mobilization, CONTRACTOR shall submit within seven (7) days after the effective date of the NOTICE TO PROCEED, a layout of the PROJECT site including fences, roads, parking, buildings, storage areas, drainage plans, temporary building layouts, and temporary utility locations.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

**SECTION 01 55 00
BEAVER CREEK CHANNEL ACCESS**

PART 1 GENERAL

1.01 DESCRIPTION

- A. The WORK under this section consists of the construction and removal of access to the Beaver Creek channel needed for both construction of the proposed improvements and for future maintenance of improvements after construction is completed.
- B. CONTRACTOR shall furnish all labor, materials, equipment, tools, and transportation required to complete the WORK, and shall perform all operations in connection with and reasonably incidental to providing the temporary and permanent access
- C. All WORK shall be completed in accordance with these SPECIFICATIONS, the DRAWINGS and CONTRACT DOCUMENTS, and in a manner consistent with normally accepted construction practices.
- D. All construction access shall be coordinated with the Owners Representative or Engineer prior to initiation of construction of the access.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:
 - 1. Applicable articles of the Standard General Conditions
 - 2. Applicable articles of the Standard Specifications
 - 3. Section 31 25 00 Erosion and Sedimentation Controls
 - 4. Section 32 93 00 Restoration Plantings

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 GENERAL

The Contractor shall use the location(s) designated by the Owners Representative or Engineer

to provide temporary access to the Beaver Creek channel for construction of the proposed improvements and sourcing of boulders and trees. The temporary access shall be restored to existing conditions upon completion of the project, except to the extent that the same location is used for permanent access to the Beaver Creek channel. The contractor shall construct permanent access to the Beaver Creek channel at the locations designated by the Owners Representative or Engineer at grades suitable for use by tracked equipment to access the banks of Beaver Creek on both sides of the channel. The Contractor shall take care to minimize the disturbance of existing trees and vegetation in constructing such access. All such access locations outside of the Beaver Creek channel shall be seeded and mulched upon use of the access for construction.

END OF SECTION

SECTION 01 71 13

MOBILIZATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. CONTRACTOR shall be responsible for all preparatory work and operations required prior to beginning WORK.

1.02 GENERAL

- A. Mobilization shall include, but not limited to, the following:
 - 1. Movement of personnel, tools, equipment, materials, supplies, and incidentals to the PROJECT site and all preparatory work, including installation of PROJECT sign.
 - 2. Establishment of all necessary facilities, including acquisition of easements for the CONTRACTOR's convenience.
 - 3. Obtaining permits necessary for the execution of the WORK.
 - 4. Providing required bonds and proof of insurance.
 - 5. Upon completion of the WORK, CONTRACTOR shall remove tools, equipment, and unused materials and supplies from the PROJECT site and restore all disturbed areas outside the PROJECT area to their pre-construction condition.
- B. OWNER has the right to reject construction tools, equipment, materials, and supplies which are, in OWNER's opinion, unsafe, improper, or inadequate.
 - 1. CONTRACTOR shall bring rejected construction tools, equipment, materials, and supplies to an acceptable condition as approved by OWNER or remove from the PROJECT site.

1.03 SUBMITTALS

- A. Refer to Section 01 33 00, Submittal Procedures, for submittal procedures.
- B. In accordance with Section 01 33 00, Submittal Procedures, CONTRACTOR shall submit within seven (7) days after the effective date of the NOTICE TO PROCEED, a layout of the PROJECT site including fences, roads, parking, buildings, storage areas, drainage plans, temporary building layouts, and temporary utility locations.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This WORK consists of the removal and disposal of trees, abandoned diversion structures, and any other obstructions that are not designated or permitted to remain. It shall also include salvaging, stockpiling and loading salvable materials, and sorting boulder and sediment materials, and sawing and cutting of trees salvaged for wood structures.
- B. Materials removed and not designated to be salvaged or incorporated into the WORK shall become the property of CONTRACTOR.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:
 - 1. Applicable articles of the Standard Specifications
 - 2. Section 31 11 00, Clearing and Grubbing.
 - 3. Section 31 37 00, Riprap Boulders Soil Riprap and Bedding
 - 4. Section 32 77 00, Wood Structures

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

4.01 GENERAL

- A. CONTRACTOR shall raze, remove, and dispose of all structures and obstructions which are identified on the DRAWINGS, except obstructions removed under other contractual agreements or as otherwise provided for in the CONTRACT DOCUMENTS AND ACCESS AGREEMENTS, and salvable material designed to remain the property of OWNER.
- B. Salvable Material:
 - 1. All salvable material designated in the CONTRACT or by ENGINEER to remain the property of OWNER shall be removed without damage, in sections or pieces which may be readily transported, and shall be stockpiled by CONTRACTOR at specified locations within the PROJECT limits.
 - 2. CONTRACTOR shall safeguard salvable materials and shall be responsible for the expense of repairing or replacing damaged or missing material until it is incorporated into the work or is loaded onto OWNER's equipment by CONTRACTOR.

C. Tree Removal, Salvage and Disposal:

1. Removal of trees shall be in excavation areas as designated on the DRAWINGS.
2. Trees selected for harvest for WOOD STRUCTURES shall be marked by the ENGINEER and/or OWNER and approved by the landowner.
3. CONTRACTOR shall follow all requirements and special provisions to protect trees, selective harvest and other pertinent approvals set forth in the temporary construction access and use agreements.
4. Tree removal in areas outside of disturbance areas shall be done with hand tools, such as the use of chainsaws and grappler with approval from landowner.
5. Trees removed for WOOD STRUCTURES shall be of sizes specified on the DRAWINGS and be hardwood, not decaying, and free of limbs and branches.
6. Brush materials for packing between Bank Structures shall be limbs and branches trimmed from harvested wood. Brush materials shall not be greater than 4" diameter and 5' lengths.
7. CONTRACTOR shall warranty the survival rate of all damaged trees for one year after final inspection.

D. Boulder and Sediment Materials

1. Boulders and sediment materials harvested on site shall be limited to the extents shown on the DRAWINGS.
2. The project will require sorting, stockpiling and sieving materials to meet the specifications shown on the project DRAWINGS and referenced in specification 31 37 00.

E. Abandonment of Existing Diversion Facilities:

1. All existing diversion facilities to be plugged and abandoned in place are specifically shown on the DRAWINGS.
2. Unless otherwise specified on the DRAWINGS, the procedures and methods for the abandonment of said facilities shall conform to the requirements set forth in the CONTRACT DOCUMENTS for that specific item.
3. Abandonment of existing diversion facilities shall be included in this item of work unless otherwise provided for under other WORK items in the CONTRACT DOCUMENTS.

END OF SECTION

SECTION 31 05 19.16
REINFORCED LINEAR LOW DENSITY POLYETHYLENE GEOMEMBRANE

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The Work covered in this section includes requirements for furnishing and installing a reinforced linear low-density polyethylene (LLDPE-R) geomembrane liner as shown on the DRAWINGS.
- B. Sufficient material shall be furnished to cover the areas to be lined as shown on the DRAWINGS including seam areas, anchor trenches, structures and appurtenances as required and allow for any anticipated or planned shrinkage or wrinkles in the field panels, installing the membrane free of stress or tension.

1.2 REFERENCES

- A. American Society for Testing and Materials International (ASTM)
 - 1. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))
 - 2. ASTM D792 Specific Gravity (Relative Density) and Density of Plastics by Displacement.
 - 3. ASTM C 881 Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete
 - 4. ASTM D1505 Standard Test Method for Density of Plastics by the Density-Gradient Technique.
 - 5. ASTM D3895 Standard Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis.
 - 6. ASTM D4437 Standard Practice for Nondestructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
 - 7. ASTM D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.
 - 8. ASTM D4873 Guide for Identification, Storage and Handling of Geosynthetics.
 - 9. ASTM D5199 Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
 - 10. ASTM D5261 Test Method for Measuring Mass per Unit Area of Geotextiles.
 - 11. ASTM D5641 Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
 - 12. ASTM D5721 Standard Practice for Air-Oven Aging of Polyolefin Geomembranes.
 - 13. ASTM D5884 Standard Test Method for Determining Tearing Strength of Internally Reinforced Geomembranes.
 - 14. ASTM D5885 Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry.
 - 15. ASTM D6636 Standard Test Method for Determination of Ply Adhesion Strength of Reinforced Geomembranes.
 - 16. ASTM D7004 Standard Test Method for Grab Tensile Properties of Reinforced Geomembranes.

17. ASTM D7238 Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus.
18. ASTM D7747 Standard Test Method for Determining Integrity of Seams Produced Using Thermo-Fusion Methods for Reinforced Geomembranes by the Strip Tensile Method
19. ASTM D7982 Standard Practice for Testing of Factory Thermo-Fusion Seams for Fabricated Geomembrane Panels
20. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
21. ASTM F594 Standard Specification for Stainless Steel Nuts

B. Geosynthetic Research Institute (GRI)

1. GRI-GM19b Standard Specification for Seam Strength and Related Properties of Thermally Bonded Reinforced Polyolefin Geomembranes/Barriers.
2. GRI-GM25 Test Methods, Test Properties and Testing Frequency for Reinforced Linear Low-Density Polyethylene (LLDPE-R) Geomembranes.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00: Submittal Procedures.

1. Product data and materials
2. Geomembrane specifications.
3. Geomembrane Manufacturer's Manufacturing QA/QC Program, including frequency of testing for specified geomembrane properties.

1.4 DELIVERY, STORAGE AND HANDLING

A. Comply with ASTM D4873 and this Section for identification, storage, and handling.

B. Packing and Shipping:

1. Package and ship geomembrane by appropriate means to prevent damage to the material and to facilitate off-loading.
2. Each factory fabricated panel shall be rolled and/or accordion folded. Until needed, packaged factory fabricated panels shall be stored in their original unopened containers in a dry area, and protected from the direct heat of the sun, where possible. Pallets should not be stacked.

C. Storage and Protection:

1. Provide on-site storage area for geomembrane from time of delivery until installation.
2. Store and protect geomembrane from dirt, vandalism, excessive moisture, ultraviolet light exposure, and other sources of damage.
3. Cover geomembrane with plastic sheeting.
4. Preserve integrity and readability of geomembrane labels.

D. On-site Handling

1. Use appropriate handling equipment when unloading or moving geomembrane rolls from one place to another. Follow the Manufacturer's recommendations for handling geomembrane rolls so as not to cause damage.
2. Report any observed damage to the Engineer.

1.5 WARRANTY

- A. Provide warranty, issued by Manufacturer, that protects Owner from defects in materials for a period of 20 years following geomembrane acceptance. The Geomembrane Manufacturer shall confirm in writing that the material to be furnished will be free of defects in materials and workmanship at the time of sale, and against deterioration due to the effects of ozone, ultraviolet or other normal weathering on a pro-rata basis. The LLDPE-R Geomembrane Manufacturer shall furnish a sample warranty during the submittal process for review and approval prior to shipment.

PART 2 PRODUCTS

2.1 REINFORCED POLYETHYLENE GEOMEMBRANE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Raven Industries.
 - 2. Engineered Polymer Technologies.
 - 3. GeoCHEM Incorporated.
- B. 45 mil thick, LLDPE-R, black or tan color geomembrane liner. Manufactured of first quality ingredients, suitably compounded of which LLDPE is the principal resin.
- C. Certified to NSF/ANSI Standard 61, Drinking Water System Components – Health Effects.
- D. LLDPE resin shall be an ethylene/alpha-olefin copolymer having a linear molecular structure with a density of 0.915 to 0.926 g/ml as determined by ASTM D1505 or D792 and may include 1-butene, 1-hexene, 1-octene, or 4-methyl-1-pentene. Resin shall be virgin with no more than 10% rework using the same formulation as the parent material. No post-consumer resin shall be used or added to the resin formulation. Low density polyethylene (LDPE) shall not be permitted. Any resins or materials originating from India shall not be permitted.
- E. The finished membrane shall consist of two piles of LLDPE laminated over one ply of reinforcing scrim consisting of a polyester fabric to create an open-type weave that permits strike-through of the LLDPE.
- F. The LLDPE shall fully encapsulate the scrim and shall extend 0.375 ± 0.25 -inch beyond the edge on each side a minimum of 1/8" beyond the reinforcing scrim roll edges. Exposed fabric along the longitudinal edges of the roll stock shall not be permitted. It shall be essentially free from irregular yarns, yarns that are bunched together, yarns crossing over one another, and such defects that mechanically affect the specified properties of the geomembrane. Strictly cosmetic flaws that do not affect specified properties are generally acceptable.
- G. Uniform in color and thickness, free of holes, blisters, striations, undispersed raw materials, or any sign of contamination by foreign matter and free from any defects that would affect the specified properties of the geomembrane.
- H. The finished membrane shall meet or exceed GRI-GM-25 physical properties listed in the following Table 1, or the manufacturer's specification if more stringent.

TABLE 1
45 MIL REINFORCED LINEAR LOW DENSITY POLYETHYLENE (LLDPE-R)
GEOMEMBRANE MATERIAL PROPERTIES

Property	Test Method ASTM or GRI	LLDPE-R 45 mils
Thickness – Nominal (mils) – min. ave. (mils)	D5199	45 40
Weight – Nominal (lb/1000 ft ²) – min. ave. (lb/1000 ft ²)	D751	213 185
Grab Tensile – Strength (lb), min. ave. – Elongation (%), min. ave.	D7004 (each direction)	275 22
Tongue Tear (lb), min. ave.	D5884 (each direction)	100
Index Puncture (lb), min. ave.	D4833	90
Ply Adhesion (lb), min. ave. ⁽¹⁾	D6636	20
Oxidative Induction Time (OIT) ⁽²⁾ (a) Standard OIT — or — (b) High Pressure OIT	D3895 D5885	100 400
UV Resistance ⁽³⁾⁽⁴⁾ High Pressure OIT - % retained after 1600 hours	D7238 D5885	35
Minimum Static Use Temperature		-70 Degrees Fahrenheit

(1) Alternatively, an acceptable ply adhesion is to have a film tearing bond occur within the sheet material.

(2) The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant effectiveness in the geomembrane.

(3) UV resistance is based on percent retained value regardless of the original HP-OIT value.

(4) The condition of the test should be 20 hr. UV cycle at 75degC followed by 4 hr. condensation at 60degC.

2.2 LLDPE-R PANEL FABRICATION

- A. The LLDPE-R roll goods shall be factory fabricated into large panels.
- B. All sheets and seams shall be 100% visually inspected during fabrication. No defective seams or exposed scrim will be allowed. All exposed scrim edges shall be sealed with an approved LLDPE edge caulk or capped with a strip of LLDPE material or welding rod. All indicated repairs shall be made by the geomembrane fabricator before the panels are packaged for shipment.

PART 3 EXECUTION

3.1 GENERAL

- A. Geomembrane shall be placed over geotextile and suitable subgrade surfaces in such a manner that ensures minimum handling and is in accordance with the approved shop DRAWINGS. The geomembrane liner shall be placed in a relaxed condition and shall be free of tension or stress upon completion of installation. Seal geomembrane liner to all concrete structures and other openings in accordance with details shown on the plans and

approved shop DRAWINGS details. The geomembrane liner shall be closely fitted and sealed around all inlets, outlets and other projections through the liner, using prefabricated fittings where possible.

- B. Placement of the geomembrane liner shall be done such that good fit (thermal expansion or contraction shall be considered), without bridging or excessive contraction, is provided in all corners and grade changes. Excessive slack shall be avoided to minimize rippling.

3.2 SUBGRADE PREPARATION AND ACCEPTANCE

- A. The subgrade must be approved by the ENGINEER or OWNERS REPRESENTATIVE before installation of the geomembrane liner. No geomembrane liner shall be placed over unsuitable or unapproved subgrade. Subgrade preparation is the responsibility of the General Contractor and will be required to meet the following conditions:
 - 1. All surfaces to be lined shall be free of rocks greater than 3/8" diameter in size, angular rock, roots, vegetation, gravel, grade stakes or debris that may puncture the geomembrane.
 - 2. Surfaces shall be smooth graded with anchor trenches provided by the General Contractor as required and shown on the DRAWINGS. Soil subgrade at all anchor trench and slope transitions shall be rounded to create a smooth transition between grades.
 - 3. The liner subgrade surface shall not be tracked and rutted by equipment and shall be free from pockets, holes, and discontinuities, which will cause bridging which would, in the judgment of the Engineer, overstress the geomembrane liner.
 - 4. Except as otherwise specified, the subgrade shall be meet a minimum 95% of the dry density as determined by ASTM D698 Standard Proctor Method.
 - 5. The surfaces on which the lining is to be placed shall be maintained in a firm, clean, dry and smooth condition during the lining installation. Surface moisture shall not be excessively wet or dry or in any condition which will impede proper installation. Under no condition shall the geomembrane liner be placed over standing water, mud, snow, frost, or frozen soil, on the subgrade.

3.3 PLACEMENT

- A. General:
 - 1. Personnel working on geomembrane shall not smoke, wear damaging shoes, or engage in other activities that could damage geomembrane.
 - 2. Deploy geomembrane using methods that do not cause scratches or crimps in geomembrane and shall not damage supporting soil.
 - 3. Materials, equipment, or other items shall not be dragged across the surface of the geomembrane or be allowed to slide down slopes on the lining.
 - 4. Allow geomembrane to relax at least 30 minutes before seaming or attaching to structures.
 - 5. Minimize wrinkles (especially differential wrinkles between adjacent panels).
 - 6. Place adequate ballast not likely to damage geomembrane (e.g., sandbags), to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind uplift of panels).
 - 7. Sandbags used for ballast shall be made from sandy materials, non-damaging to the geomembrane, and carefully placed to prevent damage to geomembrane liner.

B. Weather Conditions:

1. Do not place panels at ambient temperature below or above the manufacturer's suggested ambient temperature range for installation.
2. Do not place during precipitation, in presence of excessive moisture (e.g., fog, dew), in area of ponded water, or during excessive winds.

C. Damage:

1. Any panel which, in judgment of the Engineer, becomes seriously damaged by wind or other damage (such as torn or twisted permanently) shall be replaced at no cost to Owner. Less serious damage shall be repaired.
2. Remove rejected damaged panels or portions of rejected damaged panels from work area.

D. Materials in Contact with Geomembrane:

1. Carefully install materials in contact with geomembrane surfaces to minimize damage potential.
2. Pipes and Other Appurtenances:
 - a. Install geomembrane around appurtenances, such as pipes, protruding through geomembrane as shown in DRAWINGS.
 - b. After material is placed and seamed, complete final field seam connection between appurtenance boot or apron and geomembrane. Maintain sufficient initial overlap of appurtenance sleeve so shifts in location of geomembrane can be accommodated.

E. Defects and Repairs:

1. Broom or wash geomembrane if amount of dust or mud inhibits inspection.
2. Visually inspect geomembrane surface for damage and repair. Nondestructively test any suspect location in seam and non-seam areas. Repair each location that fails visual inspection or nondestructive testing.
3. Repair Procedures:
 - a. Patching: to repair holes, tears, and contamination by foreign matter.
 - b. Seams used in repairs may be subjected to same destructive test procedure as outlined for other seams.
 - c. Patches shall be round or oval in shape, made of same geomembrane, extend a minimum of 6 in. beyond edge of defects, and applied using approved seaming methods only.
 - d. Coat cut edges of the LLDPE-R repair patch with an approved LLDPE edge sealant such as LLDPE caulking or welding rod.
 - e. Cut the geomembrane below large caps/patches to avoid water or gas collection between the two sheets.
4. Verification of Repairs:
 - a. Test each repair nondestructively.
 - b. Failed tests indicate repair shall be redone and retested until a passing test result is achieved.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The WORK of this section consists of controlling groundwater, site drainage, and storm flows during construction. CONTRACTOR is cautioned that the WORK involves construction in and around drainage channels, local rivers, and areas of local drainage. These areas are subject to frequent periodic inundation.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:
 - 1. Applicable articles of the Standard General Conditions.
 - 2. Applicable articles of the Standard Specifications
 - 3. Section 31 35 00, Erosion and Sedimentation Control

1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).

1.04 SUBMITTALS

- A. CONTRACTOR shall submit to the ENGINEER a Water Control Plan 2 weeks prior to execution of the PROJECT. At a minimum, the Water Control Plan shall include:
 - 1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment, methods, standby equipment and power supply, means of measuring inflow to excavations, pollution control facilities, discharge locations to be utilized, and provisions for immediate temporary water supply as required by this section.
 - 2. Drawings showing locations, dimensions, and relationships of elements of each system.
 - 3. Design calculations demonstrating adequacy of proposed dewatering systems and components.
 - 4. If system is modified during installation or operation, revise or amend and resubmit Water Control Plan.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Onsite materials may be used within the limits of construction to construct temporary dams and berms. Materials such as plastic sheeting, sand bags, and storm sewer pipe may also be used if desired by CONTRACTOR as long as they are not damaging to the environment.

PART 3 EXECUTION

3.01 GENERAL

- A. For all excavation, CONTRACTOR shall provide suitable equipment and labor to remove water, and keep the excavation dewatered so that construction can be carried on under dewatered conditions.
 - 1. Water control shall be accomplished such that no damage is done to adjacent channel banks or structures.
 - 2. Continuously control water during course of construction, including weekends and holidays and during periods of work stoppages, and provide adequate backup systems to maintain control of water.
- B. CONTRACTOR is responsible for investigating and becoming familiar with all site conditions that may affect the WORK including surface water, potential flooding conditions, level of groundwater and the time of year the work is to be done.
- C. CONTRACTOR shall conduct operations in such a manner that storm or other waters may proceed uninterrupted along their existing drainage courses.
 - 1. By submitting a BID, CONTRACTOR acknowledges that CONTRACTOR has investigated the risk arising from such waters and has prepared BID accordingly and assumes all of said risk.
- D. At no time during construction shall CONTRACTOR affect existing surface or subsurface drainage patterns of adjacent property.
 - 1. Any damage to adjacent property resulting from CONTRACTOR's alteration of surface or subsurface drainage patterns shall be repaired by CONTRACTOR at no additional cost to OWNER.
- E. Pumps and generators used for dewatering and water control shall be quiet equipment enclosed in sound deadening devices. The OWNER requests pumps and generators be quiet models.
- F. CONTRACTOR shall remove all temporary water control facilities when they are no longer needed or at the completion of the PROJECT.
- G. All excavations made as part of dewatering operations shall be backfilled with the same type material as was removed and compacted to ninety-five percent (95%) of Maximum Standard Proctor Density (ASTM D698) except where replacement by other materials and/or methods are required or by ENGINEER's approval.

3.02 CONSTRUCTION

A. Surface Water Control:

1. Surface water control generally falls into the following categories:
 - a. Normal low flows along the channel.
 - b. Storm/flood flows along the channel.
 - c. Flows from existing storm drain pipelines.
 - d. Local surface inflows not conveyed by pipelines.
2. CONTRACTOR shall coordinate, evaluate, design, construct, and maintain temporary water conveyance systems.
 - a. These systems shall not worsen flooding, alter major flow paths, or worsen flow characteristics during construction. CONTRACTOR is responsible to ensure that any such worsening of flooding does not occur.
 - b. CONTRACTOR is solely responsible for determining the methods and adequacy of water control measures.
3. At a minimum, CONTRACTOR shall be responsible for diverting the quantity of surface flow around the construction area so that the excavations will remain free of surface water for the time it takes to install these materials, and the time required for curing of any concrete or grout.
 - a. It shall be CONTRACTOR's responsibility to determine the quantity of water which shall be diverted to protect the WORK from damage caused by stormwater.
4. CONTRACTOR shall, at all times, maintain a flow path for all channels.
 - a. Temporary structures such as berms, sandbags, pipeline diversions, etc., may be permitted for the control of channel flow, as long as such measures are not a major obstruction to flood flows, do not worsen flooding, or alter historic flow routes.

B. Groundwater Control:

1. CONTRACTOR shall install adequate measures to maintain the level of groundwater below the foundation subgrade elevation and maintain sufficient bearing capacity for all structures, pipelines, earthwork, and rockwork.
 - a. Such measures may include, but are not limited to, installation of perimeter subdrains, pumping from drilled holes or by pumping from sumps excavated below the subgrade elevation.
 - b. Dewatering from within the foundation excavations shall not be allowed.

2. The foundation bearing surfaces are to be kept dewatered and stable until the structures or other types of work are complete and backfilled.
 - a. Disturbance of foundation subgrade by CONTRACTOR operations shall not be considered as originally unsuitable foundation subgrade and shall be repaired at CONTRACTOR's expense.
3. Contractor shall dispose of groundwater as follows:
 - a. Obtain discharge permit for water disposal from authorities having jurisdiction.
 - b. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.
 - c. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
 - d. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.
4. Any temporary dewatering trenches or well points shall be restored following dewatering operations to reduce permeability in those areas as approved by ENGINEER.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This WORK shall consist of temporary measures needed to control erosion and water pollution. These temporary measures shall include, but not be limited to, berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. These temporary measures shall be installed at the locations where needed to control erosion and water pollution during the construction of the PROJECT, and as directed by ENGINEER, and as shown on the DRAWINGS.
- B. The Erosion Control Plan presented in the DRAWINGS serves as a minimum for the requirements of erosion control during construction. CONTRACTOR has the ultimate responsibility for providing adequate erosion control and water quality throughout the duration of the PROJECT. Therefore, if the provided plan is not working sufficiently to protect the PROJECT areas, then CONTRACTOR shall provide additional measures as required to obtain the required protection. CONTRACTOR shall include in the BID price for erosion control a minimum of all items shown on the Erosion Control Plan and any additional items that may be needed to control erosion and water pollution.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:
 - 1. Applicable articles of the Standard General Conditions and Standard Specifications.
 - 2. Section 31 11 00, Clearing and Grubbing.
 - 3. Section 32 92 19, Seeding.

1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. Colorado Department of Public Health and Environment (CDPHE).

1.04 SUBMITTALS

- A. Submit the following information:
 - 1. Erosion Control Plan.
 - 2. Construction schedule for Erosion Control per Article 1.06 Scheduling below.
 - 3. Sequencing Plan per Article 1.06 Scheduling below.

4. Plan for disposal of waste material per Article 1.06 Scheduling below.
5. Product data for materials proposed for use.
6. All applicable permits for Erosion Control.

1.05 REGULATORY REQUIREMENTS

- A. 401 Construction Dewatering Industrial Wastewater Permit (Construction Dewatering Permit 401):
 1. CONTRACTOR shall apply for and obtain a Construction Dewatering Permit 401 from the Colorado Department of Public Health and Environment.
 2. All costs for this permit shall be the responsibility of CONTRACTOR.
 3. This permit requires that specific actions be performed at designated times.
 4. CONTRACTOR is legally obligated to comply with all terms and conditions of the permit including testing for effluent limitations.
 5. CONTRACTOR shall allow the Colorado Department of Public Health and Environment or other representatives to enter the site to test for compliance with the permit.
 6. Non-compliance with the permit can result in stoppage of all WORK.
- B. In the event of conflict between these requirements and erosion and pollution control laws, rules, or regulations of other Federal, State, or local agencies, the more restrictive laws, rules, or regulations shall apply.

1.06 SCHEDULING

- A. Sequencing Plan:
 1. CONTRACTOR shall submit a sequencing plan for approval for erosion control in conformance with CONTRACTOR's overall Construction Plan for approval by OWNER.
 2. Changes to the Erosion Control Sequencing Plan may be considered by OWNER only if presented in writing by the CONTRACTOR.
- B. Temporary Erosion Control:
 1. When so indicated in the CONTRACT DOCUMENTS, or when directed by ENGINEER, CONTRACTOR shall prepare construction schedules for accomplishing temporary erosion control WORK including all maintenance procedures.
 2. These schedules shall be applicable to clearing and grubbing, grading, structural WORK, construction, etc.
- C. CONTRACTOR shall submit for acceptance the proposed method of erosion control on haul roads and borrow pits and a plan for disposal of waste material.

- D. CONTRACTOR shall be required to incorporate all permanent erosion control features into the PROJECT at the earliest practicable time as outlined in the accepted schedule. Temporary erosion control measures shall then be used to correct conditions that develop during construction.
- E. WORK shall not be started until the erosion control schedules and methods of operations have been accepted.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be submitted for approval prior to installation.
- B. Materials may include hay bales, straw, fiber mats, fiber netting, wood cellulose, fiber fabric, gravel, and other suitable materials, and shall be reasonably clean, free of deleterious materials, and certified weed free.
- C. Grass Seed:
 - 1. Temporary grass cover (if required) shall be a quick growing species, suitable to the area, in accordance with local criteria and permit requirements, which will provide temporary cover, and not compete with the grasses sown for permanent cover.
 - 2. All grass seed shall be approved by ENGINEER and in accordance with local regulations prior to installation.
- D. Fertilizer and soil conditioners shall be approved by ENGINEER and in accordance with local regulations prior to installation.

PART 3 EXECUTION

3.01 GENERAL

- A. All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to ensure continued performance of their intended function.
- B. OWNER will monitor CONTRACTOR's erosion control and WORK methods.
 - 1. If the overall function and intent of erosion control is not being met, OWNER will require CONTRACTOR to provide additional measures as required to obtain the desired results.
 - 2. Costs for any additional erosion control measures shall be paid for in accordance with the contingency or change order procedure set forth in the contract.
- C. The erosion control features installed by CONTRACTOR shall be adequately maintained by CONTRACTOR until the PROJECT is accepted.
- D. Working In or Crossing Watercourses and Wetlands:
 - 1. Construction vehicles shall be kept out of watercourses to the extent possible.

2. Where in-channel WORK is necessary, precautions shall be taken to stabilize the WORK area during construction to minimize erosion.
 - a. The channel (including bed and banks) shall always be restabilized immediately after in-channel WORK is completed.
3. Where a live (wet) watercourse must be crossed by construction vehicles during construction, a Temporary Stream Crossing shall be provided for this purpose.

3.02 PROTECTION OF ADJACENT PROPERTIES

- A. Properties adjacent to the site of a land disturbance shall be protected from sediment deposition.
- B. In addition to the erosion control measures required on the DRAWINGS, perimeter controls may be required if damage to adjacent properties is likely, and may include, but is not limited to:
 1. Vegetated buffer strip around the lower perimeter of the land disturbance.
 - a. Vegetated buffer strips may be used only where runoff in sheet flow is expected and should be at least twenty (20) feet in width.
 2. Sediment barriers such as straw bales, erosion logs, and silt fences.
 3. Sediment basins and porous landscape detention ponds.
 4. Combination of above measures.

3.03 CONSTRUCTION

- A. Stabilization of Disturbed Areas:
 1. Temporary sediment control measures shall be established within five (5) days from time of exposure/disturbance.
 2. Permanent erosion protection measures shall be established within five (5) days after final grading of areas.
- B. Stabilization of Sediment and Erosion Control Measures:
 1. Sediment barriers, perimeter dikes, and other measures intended to either trap sediment or prevent runoff from flowing over disturbed areas shall be constructed as a first step in grading and be made functional before land disturbance takes place.
 2. Earthen structures such as dams, dikes, and diversions shall be stabilized within five (5) days of installation.
 3. Stormwater outlets shall also be stabilized prior to any upstream land disturbing activities.

- C. Stabilization of Waterways and Outlets:
 - 1. All onsite stormwater conveyance channels used by CONTRACTOR for temporary erosion control purposes shall be designed and constructed with adequate capacity and protection to prevent erosion during storm and runoff events.
 - 2. Stabilization adequate to prevent erosion shall also be provided at the outlets of all pipes and channels.
- D. Storm Sewer Inlet Protection: All storm sewer inlets which are made operable during construction or which drain stormwater runoff from a construction site shall be protected from sediment deposition by the use of filters.
- E. Construction Access Routes:
 - 1. Wherever construction vehicles enter or leave a construction site, a Stabilized Construction Entrance is required.
 - 2. Where sediment is transported onto a public road surface, the roads shall be cleaned thoroughly at the end of each day.
 - 3. Sediment shall be removed from roads by shoveling or sweeping and be transported to a sediment controlled disposal area.
 - 4. Street washing shall be allowed only after sediment is removed in this manner.

3.04 DISPOSITION OF TEMPORARY MEASURES

- A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed as determined by OWNER.
- B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.
- C. Substantial Completion of Erosion Control Measures:
 - 1. At the time specified in the CONTRACT DOCUMENTS, and subject to compliance with specified materials and installation requirements, CONTRACTOR shall receive a Substantial Completion Certificate for temporary erosion control measures.
 - 2. Maintenance of Erosion Control Measures after Substantial Completion: CONTRACTOR shall be responsible for maintaining temporary erosion control measures as specified in the DRAWINGS and CONTRACT DOCUMENTS until such time as WORK has been accepted by OWNER as specified in Section 01 77 00, Closeout Procedures.

D. Final Completion and Acceptance of Erosion Control Measures:

1. After ENGINEER and OWNER have determined that the drainage area has stabilized, CONTRACTOR shall remove all remaining temporary erosion control measures.
2. Any damage to the site shall be repaired to the satisfaction of ENGINEER and at no cost to OWNER.

END OF SECTION

SECTION 31 37 00

RIPRAP, BOULDERS, SOIL RIPRAP, AND BEDDING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. The WORK includes onsite harvesting, excavation, grading, and installation of boulders, special project gradation mixes and bedding placed at the locations shown on the DRAWINGS. The materials to be used and the construction of such structures shall be as specified herein.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS, which may be related to this section:
 - 1. Applicable articles of the Standard General Conditions
 - 2. Applicable articles of the Standard Specifications
 - 3. Section 31 23 19, Dewatering
 - 4. Section 31 25 00, Erosion and Sedimentation Controls
 - 5. Section 02 41 13, Selective Site Demolition

1.03 SUBMITTALS

- A. CONTRACTOR shall cooperate with ENGINEER in obtaining and providing documentation of all harvested and sorted materials and onsite mix gradations.

PART 2 PRODUCTS

2.01 MATERIALS

A. BOULDERS

- 1. Boulders shall be harvested on site and meet the sizes specified on the project DRAWINGS.
- 2. Boulders available on site are rounded and glacial outwash materials. CONTRACTOR shall select boulders that are more angular and easier to stack.

B. SPECIAL PROJECT MIXES

- 1. Armor mix for use of foundation for boulder structures are shown on the DRAWINGS
- 2. The total thickness of Armor layer shall be a minimum 2 feet thick and keyed down to the grade shown on the DRAWINGS. The maximum stone size shall not be larger than the thickness of the riprap

3. Gradation:

- a. Each load of riprap shall be reasonably well graded from the smallest to the largest size specified.
 - b. Stones smaller than the two to ten percent (2 to 10%) size will not be permitted in an amount exceeding ten percent (10%) by weight of each load.
 - c. Control of gradation shall be by visual inspection. However, in the event ENGINEER determines the ARMOR to be unacceptable, CONTRACTOR shall sort, sieve and mix an acceptable ARMOR gradation.
1. Mechanical equipment and labor needed to assist in checking gradation shall be provided by CONTRACTOR at no additional cost

PART 3 EXECUTION

3.01 PLACEMENT

A. BOULDERS AND ARMOR FOUNDATION

1. Following acceptable sorting, stockpiling, and grading special project mixes of armor layer and boulders work shall commence as follows:
 - a. Machine Placed:
 - 1) Armor layer shall be placed on the prepared subgrade in a manner which will produce a reasonably flat surface to place subsequent boulder walls with the minimum practicable percentage of voids.
 - 2) Boulders shall be harvested and placed with heavy equipment that has an articulated thumb to rotate and stack boulder walls in accordance to the DRAWINGS.
 - 3) Following excavation and acceptance of subgrade by ENGINEER Boulder placement shall commence as follows:
 - b. Chinking and Wash Sieving:
 - 1) Boulder structures shall be backfilled with native streambed materials with gradation specified on the project DRAWINGS.
 - 2) Chinking of boulders will be required to be done by wash sieving materials in 8'' lifts behind the boulders and compacting with a tamper bar.
 - 3) Chinking and wash sieving may be required for the AROMOR layer prior to compaction.
 - 4) Boulders shall have intimate contact with the ARMOR layer or subsequent stacked boulders. Voids shall be less than 3'' and chinked solid with streambed materials.

END OF SECTION

SECTION 32 77 00
WOOD STRUCTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. CONTRACTOR acknowledges that access areas where WOOD STRUCTURES are to be installed, and where onsite wood is to be harvested, those areas shall be restored to original conditions.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS, which may be related to this section.
 - 1. Applicable articles of the Standard General Conditions
 - 2. Applicable articles of the Standard Specifications
 - 3. Section 32 93 00 Restoration Planting
 - 4. Section 32 92 19 Seeding

PART 2 PRODUCTS

2.01 WOOD MATERIALS

- A. Only onsite marked WOOD materials shall be harvested in the project area. If additional WOOD to meet the project needs to be imported, it will be considered incidental to WORK and do not constitute a change in WORK.
- B. Harvesting WOOD materials shall include the entire root ball and tree. All disturbance to the native ground shall be restored to match native ground. No disturbance shall occur to adjacent trees.
- C. WOOD materials shall be prepared for the use of WOOD STRUCTURES following the sizes specified in the project DRAWINGS. Smaller brush materials shall be stockpiled and salvaged for packing between TOEWOOD structures. All other debris shall be hauled and disposed of offsite.
- D. WOOD materials to be uniform and free of branches, damage, degradation, disease, insect infestation. Logs to be straight with no sweeps or forks.
- E. Small WOOD Debris and Slash material used for backfill shall consist of branches 3'-6' in length with a 3" maximum diameter. Small Woody Debris and Slash material may be harvested from large branches from the trees removed and salvaged for the construction of WOOD structures.
- F. The CONTRACTOR shall submit to the DESIGN ENGINEER documentation of the WOOD materials stockpiled and suitable for construction.

PART 3 EXECUTION

3.01 WOOD STRUCTURE PREPARATION

- A. Trim and dress the channel bottom and side slopes to proper lines and grade prior to placing Wood Structures. Where shown on the Plans, place erosion control matting in accordance with Sections referenced above.

3.02 WOOD STRUCTURE INSTALLATION

- A. WOOD STRUCTURES shall follow the configurations laid out in the DRAWINGS. The angle of WOOD STRUCTURES to the flowing channel, soil cover depth, and ballast boulders are shown on the DRAWINGS.
- B. Field adjustments to the WORK may be necessary to accommodate or protect existing conditions. Field adjustments are minor to the WORK and do not constitute a change in WORK, scope or cost and will be authorized in the FIELD by the DESIGN ENGINEER.
- C. Stabilization of the bank shall follow details shown on the project DRAWINGS and reference to the specifications listed above.
- D. The CONTRACTOR shall abide by all the required provisions in the clean water act permit, and the easement and access agreements.

3.03 RESTORATION

- A. The Contractor shall restore all areas of the channel disturbed during the construction of WOOD STRUCTURES in accordance with the plans, specifications, and vegetation cover requirements. No separate payment will be made.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.01 DESCRIPTION

- A. The WORK under this section consists of the revegetation with seeded grasses. CONTRACTOR shall furnish all labor, materials, equipment, tools, and transportation required to complete the WORK, and shall perform all operations in connection with and reasonably incidental to establishing, maintaining, and warranting the reseeded areas.
- B. All WORK shall be completed in accordance with these SPECIFICATIONS, the DRAWINGS and CONTRACT DOCUMENTS, and in a manner consistent with accepted horticultural practices. All permits, licenses, and fees associated with any WORK under this CONTRACT are the responsibility of CONTRACTOR, unless otherwise noted.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:
 - 1. Applicable articles of the Standard General Conditions
 - 2. Applicable articles of the Standard Specifications
 - 3. Section 31 25 00 Erosion and Sedimentation Controls
 - 4. Section 32 93 00 Restoration Plantings

1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. Association of Official Seed Analysts (AOSA).

1.04 SUBMITTALS

- A. CONTRACTOR shall be required to submit statements of guarantee and/or certifications from vendors who supply seed, mulches, tackifiers, and fertilizers.
- B. CONTRACTOR shall furnish to ENGINEER a signed statement certifying that the seed furnished is from a lot that has been tested by a recognized laboratory for seed testing within six (6) months prior to the date of delivery.
- C. Seed container labels shall be submitted to ENGINEER at the completion of PROJECT.

- D. CONTRACTOR shall submit to ENGINEER the manufacturers guaranteed chemical analysis, name, trade name, trademark, and conformance to state law of all fertilizers and herbicides.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be furnished in original manufacturers shipping bags or containers and remain in these bags or containers until they are used. All materials shall be stored in a manner that will prevent them from coming into contact with precipitation, surface water, or any other contaminating substance.
- B. Fertilizer: It shall be delivered in original, unopened containers, unless provisions are made and approved by ENGINEER for bulk deliveries to the site of the WORK.

PART 2 PRODUCTS

2.01 GENERAL

- A. All materials used shall be new and without flaws or defects of any type, and shall be the best of their class and kind. Seeds shall be prepared for sale during the year of installation.
- B. All materials and equipment furnished shall be free of noxious weeds including, but not limited to Russian knapweed, diffuse knapweed, Canada thistle, field bindweed, Johnsongrass, leafy spurge, kochia, or any state-listed noxious weed species.
- C. Any materials that have become wet, moldy, or otherwise damaged in transit or in storage shall not be used.

2.02 SEED

- A. Seed shall be only that which is specified by ENGINEER or PLANT ECOLOGIST (refer to DRAWINGS). All seed shall be mixed by a wholesale seed supplier in order to obtain the specified mixture and application rate required by ENGINEER or PLANT ECOLOGIST. No species substitutions shall be permitted without prior approval of the ENGINEER or PLANT ECOLOGIST.
- B. All seed shall conform to all current State and Federal regulations and shall be subject to the testing provisions of the Association of Official Seed Analysts.
- C. All seed and seed mixes shall be furnished in bags or containers clearly labeled to show the name and address of the supplier, the common, scientific, and variety name(s) of the seed(s), the lot number, point of origin, net weight, percent of weed content, and the guaranteed percentage of purity and germination.

- D. All seed shall be guaranteed for purity and germination, free of noxious weed seed and supplied on a Pure Live Seed (PLS) basis.
- E. Suggested seed mix: Western Native Seed high elevation seed mix (<https://www.westernnativeseed.com/HEwildflowermix.html>) or an approved equal.

2.03 FERTILIZER

- A. No fertilizer shall be used.

2.04 MULCH

- A. The type of mulching material to be used shall be crimped weed-free straw. At least seventy percent (70%) of the mulch by weight shall be ten (10) inches or more in length. Mulch shall not contain any noxious weed, must, mold, cake, or decay. No hay may be used on the PROJECT unless approved in advance by the PLANT ECOLOGIST.

2.05 ORGANIC TACKIFIER/BINDER

- A. Organic tackifier/binder shall be applied as shown on the DRAWINGS.

2.06 EROSION CONTROL NETTING, BLANKETS, MATS, FABRICS

- A. Erosion control blankets, straw wattles, mats, or other commercial products for stabilizing land disturbed areas may be required in certain areas. If so, the type, manufacturer, and installation method for these products shall be specified by ENGINEER or PLANT ECOLOGIST.

2.07 WATER

- A. All water used on the PROJECT shall be free of any substances harmful to plant germination and growth or to the environment in general. CONTRACTOR shall be responsible for furnishing and applying water that meets these requirements. ENGINEER or PLANT ECOLOGIST may, at CONTRACTOR's expense, submit samples of water used on the PROJECT for laboratory analysis (of a reasonable number and kind) to ensure the quality of the water. Onsite water shall not be used unless approved by OWNER or OWNERS REPRESENTATIVE.

2.08 TOPSOIL AND WETLAND TOPSOIL

- A. Topsoil and Wetland Topsoil shall meet the requirements of Section 32 91 13.

2.09 ORGANIC COMPOST (SOIL AMENDMENT)

- A. For use as a component for seed establishment use a well decomposed, stable, weed free organic matter source, derived from agricultural food, or industrial residuals' biosolids (treated sewage sludge); yard trimmings, or source-separated or mixed solid waste. The product shall contain no substances toxic to plants and shall be reasonably free (less than one percent [$<1\%$] by dry weight) of man-made foreign matter. Compost shall be processed at sustained high heat so that any weed seeds contained

within it shall no longer be viable and it shall possess no objectionable odors and shall not resemble the raw material from which it was derived.

B. Compost shall have the following characteristics:

1. pH Range: 5.5 - 8.0.
2. Moisture Content: 35% - 55%.
3. Particle Size: Pass through 1-inch screen or smaller.
4. Stability: Stable to highly stable, providing nutrients for plant growth.
5. Maturity/Growth Screening: Demonstrate ability to enhance plant growth.
6. Soluble Salt Concentrations: 2.5 dS (mmhos/cm) or less preferred.
7. Organic Matter Content: 30% - 70%.
8. Suggested Source: Soil Not Dirt Farm, Montrose, Colorado ([Compost-Western Slope Colorado](#)), Beaver Lakes Nursery, Montrose, Colorado ([Beaver Lakes Nursery & Landscape Supply in Montrose, Colorado](#)) or an approved equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Contractor's Site Responsibilities: It shall be the responsibility of CONTRACTOR to locate and protect all utilities, structures, roadways, parking areas, fences, survey markers, and existing vegetation (such as trees and shrubs) on all WORK sites. Any damage caused by CONTRACTOR or SUBCONTRACTORS shall be immediately repaired or corrected by CONTRACTOR at no expense to OWNER.
- B. Timing of the Work: Seeding shall be completed as soon as practical after the completion of final grading. CONTRACTOR shall coordinate the actual start of the seeding operation with ENGINEER or PLANT ECOLOGIST. Seeding shall occur between September 15 and May 15, unless otherwise permitted by the ENGINEER or PLANT ECOLOGIST
- C. Notice to Proceed: CONTRACTOR shall inform ENGINEER when they are ready to commence permanent revegetation. Upon agreement with CONTRACTOR's preparation for this WORK ENGINEER shall provide CONTRACTOR with a Notice to Proceed. CONTRACTOR shall begin and complete the WORK as specified in this section.
- D. Performance of the WORK: All WORK is to be performed by personnel thoroughly familiar with proper and accepted methods for soil preparation, herbicide applications, fertilizing, seeding, and mulching. All WORK is to be performed under the direct supervision of CONTRACTOR's superintendent, who shall be thoroughly familiar with the provisions of this CONTRACT.
Project Monitoring: CONTRACTOR shall notify ENGINEER prior to the commencement of any WORK under this section. ENGINEER shall monitor the progress of the WORK throughout the CONTRACT period, and shall assist in

determining where soils samples, as required in Article Submittals, are to be collected. ENGINEER or PLANT ECOLOGIST shall also collect samples of the seed used on the PROJECT, and may collect samples of fertilizers, soil additives, water, or other materials as they deem necessary to ensure the PROJECT SPECIFICATIONS are met.

3.02 SOIL/SEEDBED PREPARATION, SOIL AMENDMENTS

- A. All ripping and tilling operations shall be done in a direction which follows the natural contour of the land on slopes of three to one (3:1) or less. Soils on slopes greater than three to one (3:1) shall be prepared for planting in a manner specified by ENGINEER. Any irregularities in the ground surface resulting from soil preparation operations shall be corrected and sloped to drain.
- B. Limit subgrade preparation to areas that shall be planted in the immediate future.
- C. Prior to spreading salvaged topsoil and seeding, thoroughly till or rip to a depth of twelve (12) inches all areas compacted by access, staging, or construction traffic. Till all remaining areas to a depth of six (6) inches. Channel bottom areas are to be ripped to a depth of at least twelve (12) inches on approximately two- (2-) to four- (4-) foot centers. The soils shall be worked until no clods greater than two (2) inches in diameter remain, unless directed otherwise by ENGINEER. Remove rocks and other objects three (3) inches or greater in any dimension.
- D. Spread topsoil to depth required to meet grades and elevations shown on DRAWINGS after light rolling and natural settlement.
- E. Either mix soils with soil amendments and fertilizers before spreading or apply soil amendments on surface of spread topsoil and till thoroughly into top four (4) inches before planting. Mix soil amendments at the rate that is indicated on the DRAWINGS.
- F. Organic Compost:
 - 1. Organic Compost Soil Amendment shall be applied at a rate of three (3) cubic yards per one-thousand (1,000) square feet or as shown on the DRAWINGS.
 - 2. Organic Compost shall only be applied if required and designated on the DRAWINGS.
- G. Prior to seeding, grade the areas to be seeded to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Soils shall meet grades and elevations shown on DRAWINGS after light rolling and natural settlement. Limit fine grading to areas that can be planted in the immediate future.
- H. Moisten prepared areas to be seeded prior to planting when soils are dry. Water thoroughly and allow surface to dry before seeding. Do not create muddy conditions. Restore prepared areas if eroded or disturbed after fine grading and before planting.

3.03 SEEDING

- A. General: CONTRACTOR shall notify ENGINEER or PLANT ECOLOGIST when seeding is to take place so these samples can be obtained (seed tags from all mixtures shall also be supplied to the ENGINEER or PLANT ECOLOGIST).
- B. Drill Seeding:
 - 1. All seed is to be drilled one-quarter (1/4) inch to one-half (1/2) inch into the soil at the specified pure live seed (PLS) per acre rate with a mechanical grass drill with depth bands and an agitator in the seed box. Rows shall be spaced not more than seven (7) inches apart. CONTRACTOR shall drill one-half (1/2) of the required PLS per acre in one compass direction, and then drill the remaining half of the required PLS per acre in a direction ninety degrees (90°) to the first half.
 - 2. Following drill seeding of all areas, the forb patch seed mix and the grass/shrub patch seed mix should be broadcast in the areas specified on the DRAWINGS. All forb and grass/shrub patch areas shall be both drill seeded with the appropriate upland or riparian mix as specified on the DRAWINGS and then immediately broadcast with the appropriate forb or grass/shrub patch seed mix prior to mulch application
- C. Broadcast Seeding:
 - 1. Some portions of PROJECT areas may be inaccessible to a drill. In these areas, which shall be agreed upon by CONTRACTOR and ENGINEER or PLANT ECOLOGIST, seed shall be uniformly broadcast at twice the specified PLS per acre and covered with soil to a depth of one-quarter (1/4) inch to one-half (1/2) inch by hand raking or harrowing by some other means acceptable to ENGINEER or PLANT ECOLOGIST.
 - 2. Broadcast seeding shall be accomplished using hand-operated “cyclone-type” seeders or rotary broadcast equipment attached to construction or revegetation machinery. All machinery shall be equipped with metering devices. Broadcasting by hand shall be acceptable on small, isolated sites. Prior to hand broadcast seeding, divide the seed required into two portions. Apply the first half of the seed and then follow up by applying the second portion to ensure complete coverage by seed. When broadcast seeding, passes shall be made over each site to be seeded in a manner to ensure an even distribution of seed. When using hopper type equipment, seed shall be frequently mixed within the hopper to discourage seed settling and uneven planting distribution of species.
 - 3. Broadcast seeding shall take place immediately following the completion of final seedbed preparation techniques and upon inspection and approval of ENGINEER. Broadcast seeding should not be conducted when wind velocities would prohibit even seed distribution.

3.04 MULCHING

- A. Straw mulch shall be applied immediately after seeding has been completed with a mechanical spreader at a rate not less than one and one-half (1-1/2) tons per acre, and not more than two (2) tons per acre. Straw mulch shall then be anchored to the soil with a standard commercial crimper which shall crimp the fiber four (4) inches or more into the soil. Failure to apply designated mulch at the specified rate may result in the ENGINEER or PLANT ECOLOGIST requiring the CONTRACTOR to remobilize and complete the specified WORK at no additional cost to the OWNER.

3.05 EROSION CONTROL NETTING, BLANKETS, MATS, FABRICS

- A. Slopes over three to 1 (3:1), concave areas on slopes, drainage swales, areas along the edges of hard surfaces (trails and roads), and any other areas which may rill, shall be mulched with jute netting or other erosion control fabric as specified in DRAWINGS. These fabrics shall be installed only after the installation area is graded smooth. All clods or rocks shall be removed from the area, so that the fabric will lie flat on the surface of the soil and not bridge over it. The edges of the fabric shall be secured by two- (2-) foot wooden stakes installed two (2) feet on center along all edges and seams. Seams shall overlap one (1) foot and the body of the fabric shall be further secured to the soil surface on three- (3-) foot centers. The fabric shall not be stretched tight.

3.06 FIELD QUALITY CONTROL

- A. Final Acceptance:
 - 1. When WORK has been completed for the PROJECT, CONTRACTOR and ENGINEER shall inspect the site together and determine the total area of the WORK, and whether or not the WORK is complete and has been done in accordance with CONTRACT DOCUMENTS and SPECIFICATIONS. If mutual agreement cannot be reached on these issues, the determinations made by ENGINEER shall be final. Deficiencies in the WORK, if any, shall be noted and a checklist of these deficiencies given to CONTRACTOR by ENGINEER. CONTRACTOR shall immediately correct any deficiencies listed on the checklist at no cost to OWNER.
 - 2. When all checklist items are completed to the satisfaction of ENGINEER, ENGINEER shall issue a Certificate of Final Acceptance. CONTRACTOR shall then submit these items for payment to OWNER.

3.07 CLEANING

- A. All WORK sites shall be kept clean and free from all debris. At the conclusion of WORK at any site, CONTRACTOR shall remove and haul from the site all excess materials, debris, and equipment. Any damage (for example, damaged fencing, damaged road surfaces, excessive tire furrows, mud tracked onto pavement) resulting from CONTRACTOR's activities shall be repaired by CONTRACTOR to ENGINEER's satisfaction at no expense to OWNER.

END OF SECTION

SECTION 32 93 00

RESTORATION PLANTINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. CONTRACTOR shall furnish all labor, materials, supplies, equipment, tools and transportation; perform all operations to complete installation of the plantings; and guarantee all plantings. The WORK shall include, but not be limited to the following:
 - 1. Procurement of all applicable licenses, permits, and fees.
 - 2. Ascertainment of utility locations prior to construction.
 - 3. Site inspection.
 - 4. Planting of trees and shrubs.
 - 5. Soil preparation and fine grading.
 - 6. Staking and guying of trees.
 - 7. Mulching of all trees.
 - 8. Cleanup, inspection, and approval.
 - 9. Guarantee of all plantings.

1.02 GENERAL

- A. No substitutions for specified materials shall be accepted in the base BID. Alternative BID proposals, which propose material substitutions, may be submitted for consideration by ENGINEER or PLANT ECOLOGIST. Alternative proposals shall be fully supported by necessary documentation showing compatibility/comparability with specified materials.
- B. Additional WORK shall be paid for at CONTRACT unit prices. If unit prices are not available, the WORK shall be paid for on a time and material basis or for an agreed to lump sum amount.
- C. Precautions have been taken to ensure accuracy and conformance of the CONTRACT DOCUMENTS with the design concept of the PROJECT. Nevertheless, CONTRACTOR shall be responsible for confirming and correlating actual job site dimensions, for acquiring information that pertains solely to the fabrication process or to techniques of construction, and for coordinating the WORK with all other trades.

1.03 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Applicable articles of the Standard General Conditions
2. Applicable articles of the Standard Specifications
3. Section 31 25 00 Erosion and Sedimentation Controls
4. Section 32 92 19 Seeding

1.04 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Nursery and Landscape Association (ANLA): ANSI Z60.1, American Standard for Nursery Stock.

1.05 SUBMITTALS

- A. CONTRACTOR shall direct submittals and samples, if noted, to ENGINEER and receive approval in writing before WORK commences.
- B. Submit Topsoil and Wetland Topsoil certifications as required in Section 32 91 13 Topsoil and Wetland Topsoil.
- C. Submit Weed free Certification and mulch sample for approval.
- D. Submit organic compost certification of characteristics for approval.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Digging, Wrapping, and Handling:
 1. Plants shall be dug and prepared for shipment in a manner that shall not cause damage to branches, shape, and future development after planting.
 2. Balled and burlapped plants shall be nursery grown stock adequately balled with firm, natural balls of soil in sizes and ratios conforming to the American Standard for Nursery Stock as cited below. Balls shall be firmly wrapped with non-treated burlap, secured with wire or jute. Broken or flattened or otherwise misshaped or otherwise damaged root balls will not be accepted.
 3. Willow stakes shall be collected from a local area with permission from the landowner or a local nursery, if available.
- B. Plants are to be delivered to the site with tags bearing the botanic name as indicated by the plant list.
- C. Plant Protection: Plants shall be handled so that roots are adequately protected at all times from drying out and from other injury. Plant materials shall be securely tarped during

transportation to prevent wind burn. Protect root balls and pots of plants which cannot be planted within twelve (12) hours of delivery with soil or other suitable materials. Where possible, store plants in the shade. Keep all plant roots moist before, during, and after planting. Plants shall be watered as soon as they arrive on the site and shall be kept moist until they are planted.

- D. Protect all materials used for construction from damage, deterioration, or loss of any kind while in storage and construction.

1.07 GUARANTEE AND REPLACEMENT

- A. Guarantee trees, shrubs, ground covers, and other plant materials to root and thrive free from defects from any cause until final acceptance of PROJECT.
- B. Replace plants when they are no longer in a satisfactory condition as determined by ENGINEER prior to final acceptance. This includes plants that die back and lose the form and size originally specified.
 - 1. Make replacements within seven (7) days of notification from ENGINEER.
 - 2. Replace trees in the spring planting season only, unless approved otherwise.
- C. All replacements shall be of the same kind and size as originally specified and shall be installed as described in the CONTRACT DOCUMENTS. Repairs and replacements shall be made at no expense to OWNER.
- D. Guarantee shall apply to originally specified and installed plants and other landscape materials, and any replacements made during the construction period.

PART 2 PRODUCTS

2.01 GENERAL

- A. All materials used for construction shall be new and without flaws or defects of any type, and shall be the best of their class and kind.
- B. A complete list of plantings and necessary landscape material is provided on the DRAWINGS.

2.02 SOIL AMENDMENTS/FERTILIZERS/MULCHES/EDGING

- A. Topsoil and Wetland Topsoil:
 - 1. Topsoil and Wetland Topsoil shall meet the requirements of Section 32 91 13 Topsoil and Wetland Topsoil.
 - 2. In-Situ: Soil in-place on the site, such as tree pit excavation, may be used provided it is free from roots, limbs, rocks, construction debris, and other foreign material.
- B. Improved Planting:
 - 1. Mix (Prepare Soil): Backfill planting pits and planters using an improved soil

mix consisting of the following:

- a. Eighty five percent (85%) onsite or imported topsoil.
- b. Fifteen percent (15%) organic compost.
- C. Fertilizer:
 1. Trees and Shrubs: Osmocote Sierrablend, nine- (9-) month slow-release.
- D. Herbicide: Coordinate type of herbicide with ENGINEER.
- E. Mulch: Three- (3-) inch depth shredded local trees if available, cedar mulch, or equal cedar mulch; free from noxious weed seed and all foreign material harmful to plant life. Chips or other angular bark chips are not acceptable.
- F. Organic Compost: Compost shall have the following characteristics:
 1. pH Range: 5.5-8.0.
 2. Moisture Content: 35% - 55%.
 3. Particle Size: Pass through one- (1-) inch screen or smaller.
 4. Stability: Stable to highly stable, providing nutrients for plant growth.
 5. Maturity/Growth Screening: Demonstrate ability to enhance plant growth.
 6. Soluble Salt Concentrations: 2.5 dS (mmhos/cm) or less preferred.
 7. Organic Matter Content: 30% – 70%.
 1. Suggested Source: Soil Not Dirt Farm, Montrose, Colorado ([Compost-Western Slope Colorado](#)), Beaver Lakes Nursery, Montrose, Colorado ([Beaver Lakes Nursery & Landscape Supply in Montrose, Colorado](#)) or an approved equal.

2.03 WATER

- A. CONTRACTOR shall provide water for planting during the construction period.

2.04 TREES, SHRUBS, AND GROUND COVERS

- A. Quantities: Furnish plants in quantities required to complete the WORK as indicated on the DRAWINGS.
- B. Quality: Use plants which are symmetrical and typical of their species; healthy, well-branched, and well-proportioned in respect to height and width; free from disease, injury, insects, and weak roots; and, conforming to the requirements of the ANLA ANSI Z60.1. All plants are subject to inspection.
- C. Botanic and Common Names: Nomenclature is in conformance with standard horticultural practice in the area. Trees, shrubs, and herbaceous plant materials designated as native shall NOT be hybrid varieties.

2.05 MATERIALS FOR STAKING, GUYING, WRAPPING, AND PROTECTING TREES

- A. Tree Stakes: Six- (6-) foot long metal T-Posts.
- B. Guying and Staking Wire: Galvanized steel twelve (12) gauge wire.
- C. Webbing: Two- (2-) inch nylon webbing or rubberized cloth.
- D. Wildlife Protection: Cement remesh or similar product to protect young trees from deer and other wildlife.

2.06 GRASS SEED

- A. Refer to Section 32 92 19, Seeding.

PART 3 EXECUTION

3.01 GENERAL

- A. CONTRACTOR shall appoint a competent resident superintendent. The superintendent shall be on site whenever the WORK is in progress. The superintendent shall not be replaced without notice to ENGINEER. Workers shall be competent in performance of WORK they are assigned.
- B. Coordination: Coordinate WORK with other trades to ensure proper sequencing of construction.
- C. Planting Time and Completion:
 - 1. Plants shall be planted only when weather and soil conditions permit and in accordance with locally accepted practices, and as approved by ENGINEER or PLANT ECOLOGIST. Planting should typically be completed in the fall before the first freeze, or in late spring/early summer.
 - 2. Trees shall be planted in same growing season in which they were dug.

3.02 PREPARATION

- A. Preplanting Observation of Materials:
 - 1. ENGINEER or PLANT ECOLOGIST shall observe and approve plant material before planting. This observation may be either at the site, nursery, or holding area, at the option of ENGINEER OR PLANT ECOLOGIST. Materials planted prior to approval are subject to rejection. Observation of materials may be sequenced by major planting areas to accommodate efficient planting operations. Acceptance of plant material at the nursery or holding area does not preclude rejection at the site. All rejected materials shall be removed from the site, replaced, and reinspected before planting.
 - 2. All fertilizers, backfill, seed, mulches, and soil amendments shall be reviewed at the site by ENGINEER or PLANT ECOLOGIST before they are used in planting operations. ENGINEER shall check invoices to verify specified quantities have been delivered.
- B. Site Inspection:

1. CONTRACTOR, Landscape Contractor, and ENGINEER shall inspect site prior to being accepted by ENGINEER as complete and acceptable for the Landscape Contractor to proceed.
2. Beginning WORK of this section implies acceptance of existing conditions by the CONTRACTOR, Landscape Contractor, and ENGINEER.
- C. Grades: Grades have been established under WORK of another section to within one (1) inch, plus or minus, of required finished grades. Verify that grades are within one (1) inch, plus or minus, of required finished grades. Notify ENGINEER prior to commencing soil preparation WORK if existing grades are not satisfactory, or assume responsibility for conditions as they exist.
- D. Contaminated Soil: Do not perform any soil preparation work in areas where soil is contaminated with cement, plaster, paint or other construction debris. Bring such areas to the attention of ENGINEER and do not proceed until the contaminated soil is removed and replaced.
- E. Dimensions: All scaled dimensions are approximate. Before proceeding with any WORK, carefully check and verify all dimensions and quantities and immediately inform ENGINEER of any discrepancy between the DRAWINGS and/or specifications and actual conditions.
- F. Protection of Existing Features:
 1. Protect all existing site development including, but not limited to, existing buildings, equipment, underground utilities, walls, materials, or vegetated areas including, but not limited to, trees, native grasslands, wetlands, or shrublands. Any existing site development damaged by willful or negligent acts of CONTRACTOR or any of CONTRACTOR's employees shall be replaced or repaired at no expense to OWNER and in a manner satisfactory to ENGINEER or PLANT ECOLOGIST before PROJECT acceptance is given.
 2. The above provision applies to onsite damage as well as to that which may occur to adjacent properties.
 3. Until the PROJECT has been accepted, erect and maintain shoring, barricades, guards, warning signs, and lights as necessary or required for the protection of the public, the WORK, and the workers. To the same ends, provide traffic control and institute site security measures, as needed.
 4. CONTRACTOR shall be responsible for adhering to the following tree protection standards during construction:
 - a. During the construction stage, CONTRACTOR shall not cause, or permit the cleaning of equipment or material, or the storage or disposal of waste material including, but not limited to, paints, solvents, asphalt, concrete, mortar, or any other material harmful to the life of a tree, within the drip line or root zone of each tree, or group of trees.
 - b. No damaging attachments, wires, signs, permits, or other objects may be fastened by any means to any tree preserved on this

PROJECT.

5. Tree areas, shrublands, grasslands, or existing landscape areas within the PROJECT area shall be fenced and excluded from use for vehicle traffic, staging, or parking, unless specifically designated for these purposes on the DRAWINGS or by the ENGINEER.

3.03 SOIL PREPARATION

- A. Weed and Debris Removal: All ground areas to be planted shall be cleaned of all weeds and debris prior to any soil preparation or grading work. Any growing noxious weeds on the site shall be pretreated with approved herbicide prior to grading. Annual or biennial weeds over two (2) feet tall shall be mowed, raked, and removed prior to grading. Weeds and debris shall be disposed of off the site.
- B. Moisture Content: Soil shall not be worked when moisture content is so great that excessive compaction occurs, nor when it is so dry that dust will form in the air or clods will not break readily. Water shall be applied, if necessary, to bring soil to an optimum moisture content for tilling and planting.
- C. Prior to spreading salvaged topsoil and seeding, thoroughly till or rip to a depth of twelve (12) inches all areas compacted by access, staging, or construction traffic. Till all remaining areas to a depth of six (6) inches. Channel bottom areas are to be ripped to a depth of at least twelve (12) inches on approximately two- (2-) to four- (4-) foot centers. The soils shall be worked until no clods greater than two (2) inches in diameter remain, unless directed otherwise by ENGINEER. Remove rocks and other objects three (3) inches or greater in any dimension.
- D. Soil Conditioning: After soil preparation has been completed and high and low spots graded, add soil amendments as indicated below and rototill, making repeated passes with the cultivator to the depth specified until the amendments have been thoroughly mixed.
 1. Organic Compost Soil Amendment shall be applied at a rate of three (3) cubic yards per one-thousand (1,000) square feet or as shown on the DRAWINGS.
 2. Organic Compost shall only be applied if required and designated on the DRAWINGS.

3.04 FINE GRADING

- A. When weeding, soil preparation, and soil conditioning have been completed and soil has been thoroughly water settled, all planting areas shall be smooth-graded, ready for placement of plant materials and for seeding.
 1. Grades: Finish grades shall conform to site grading plans and produce a smooth, even surface without abrupt changes, including the interface with the adjacent undisturbed landscape. Minor adjustments of finish grades shall be made at the direction of ENGINEER or PLANT ECOLOGIST, if required.
 2. Drainage: All grades shall provide for natural runoff of water without low spots or pockets. Flow-line grades shall be accurately

set and shall be not less than two percent (2%) gradient wherever possible.

3. Slopes: Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.

B. Inspection of turf/turf bed and grading shall occur before sodding and/or seeding.

3.05 SHRUB AND TREE PLANTING

A. Established Location: ENGINEER or PLANT ECOLOGIST shall approve location of trees and shrubs before any planting occurs.

B. Planting Pits:

1. Dig planting pits two (2) times the size of the soil ball and the depth of the soil ball.
2. Roughen sides of the pit to remove any compacting or glazing.

C. Existing Tree Roots:

1. When the cutting of tree roots is necessary, each final cut shall be made as cleanly as possible for all roots over three (3) inches in diameter using the following method:
 - a. The line of excavation shall be drawn out and appropriate excavation equipment used to clear the area at least six (6) inches in front of the actual finished excavation line. Roots can then be cut using tools such as axes, stump grinders, or trenchers.
 - b. Each root over three (3) inches in diameter shall then be cut cleanly back to the final excavation line using a stump grinder operated by an experienced, licensed arborist. A sharp hand or bow saw is acceptable for roots under three (3) inches in diameter. Axes and trenchers do not cut roots cleanly and shall not be used for final root cuts.
2. The ENGINEER or PLANT ECOLOGIST, shall be contacted prior to removal of branches over four (4) inches in diameter. All branches shall be cut with a sharp pruner or saw. All cuts shall be cleanly made back to the next crotch or tree, leaving the bark collar intact at the base of the cut.

D. Backfill Material: Tree and shrub planting pits shall be backfilled with the specified improved planting mix. (Refer to Paragraph 2.02.B.)

E. Containerized Planting:

1. For balled and burlapped materials, untie and remove burlap from top third of root ball on balled and burlapped material. Remove wire baskets from top and sides of root ball. Remove twine from around tree trunks.

2. Backfill one-half (1/2) of pit with backfill mixture and water thoroughly before placing any more backfill. Do not work wet soil.
3. Fertilize trees and shrubs with specified fertilizer at the rate recommended by the manufacturer.
4. Backfill the rest of the planting pit with backfill mixture. Water thoroughly on day of planting. Do not work wet soil.
5. Stake or guy all trees.
6. ENGINEER will check mulch, tree staking, and tree wrapping where appropriate.

F. Willow Stake Planting:

1. Willow stakes should be planted late winter to early spring while willows are still dormant.
2. Stakes would be planted within 24 hours of harvest. If delayed, they must be stored at approximately 40 degrees F in moist conditions.
3. Stakes would be 1-2 inches in diameter and 2.5-5 feet in length.
4. Moist soil is key. Use a piece of rebar or iron bar to make pilot holes in firm soil. Avoid dry or compacted areas. Willow stakes should reach the water table or be planted in areas with consistent moisture.
5. Typical spacing should be approximately 2 feet apart between stakes and rows. Staggered rows are recommended for better coverage and erosion control.

3.06 MULCHING

- A. Mulch all tree plantings in irrigated landscapes with four (4) inches deep mulch, unless otherwise indicated on the DRAWINGS. Trees or shrubs planted in non-irrigated areas shall be surrounded with a watering dish. Trees or shrubs planted on slopes in non-irrigated areas shall be surrounded with a watering dish which shall be open on the uphill side to permit accumulation of runoff. The dishes in natural areas shall be mulched with no more than one (1) inch of wood chip mulch and may be seeded along with the adjacent area.

3.07 FIELD QUALITY CONTROL

A. Final Walk-Through:

1. The final walk-through shall be performed at the completion of all planting operations under this CONTRACT.
2. At the time of the final walk-through, the Landscape Contractor shall have planting areas free of debris. Plant basins shall be in good repair. Debris and litter shall be cleaned up, and walkways, curbs, and roads shall be cleared of soil and debris. The inspection shall not occur until these conditions are met.
3. ENGINEER or PLANT ECOLOGIST will identify any deficiencies.
4. ENGINEER will give written notice of final acceptance when WORK has been

performed in compliance with the CONTRACT DOCUMENTS.

5. Correct deficiencies within the first ten (10) days of the final walk-through. Correct WORK in accordance with the CONTRACT DOCUMENTS at no cost to OWNER.
6. Final acceptance shall not be given until all deficiencies are corrected. The Landscape Contractor shall maintain site until final acceptance.

3.08 CLEANING

- A. Remove from the site excess soil resulting from tree planting and mulching operations.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 33 12 00

INFILTRATION GALLERY

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This section covers furnishing and installing components of the Infiltration Gallery as shown on the drawings and herein.
- B. Related Sections:
 - 1. Applicable articles of the Standard Specifications
 - 2. Section 31 37 00 Riprap Boulders Soil Riprap and Bedding

1.02 REFERENCES

- A. This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

<u>Reference</u>	<u>Title</u>
AASHTO M43-05/ASTM D448	Standard Classification for Sizes of Aggregate for Road and Bridge Construction

1.03 SUBMITTALS

- A. Material List: As part of the submittal, include a letter listing the brand and quality of each different material for use on the PROJECT. Materials listed shall be accepted by ENGINEER before ordering materials.

1.04 PRODUCT DELIVERY, HANDLING, AND STORAGE

- A. Use safe lifting and handling practices anytime infiltration screens and collector pipe must be moved. Do not attempt to lift or move infiltration screens without proper lifting equipment i.e. cranes, hoist, or other lifting and rigging equipment.
- B. Lift and handle equipment using lifting points. All lifting points must be properly installed and engaged to ensure balance while lifting/moving the screen. Failure to balance screen while moving could result in severe damage.
- C. Keep infiltration screens in their original shipping container until ready for installation.
- D. Infiltration screens are fabricated using stainless steel, a corrosion resistant type of steel. No special precautions need to be taken for storing infiltration screens where they may be exposed to outside elements.

PART 2 – PRODUCTS

2.01 CYLINDRICAL FILTRATION SCREENS

- A. CONTRACTOR to provide all materials and equipment necessary to install the owner provided cylindrical filtration screen assemblies as specified. The filtration screen design is shown in the construction drawings.
- B. The (3) cylindrical filtration screens are stainless steel (type #304), #130 wire and #160R rod design. Dimensions of the cylindrical screens are:
 - a. O.D. 12.74 inches
 - b. Wall/screen thickness of 0.74 inches
 - c. Slot size of 0.125 inches, based on a 3/8-inch washed gravel filter pack.
 - d. Total screen length per each screen is 10 feet
- C. Fittings include a 0.19" thick end closure plate and a flange to attach to the collector pipe. CONTRACTOR to provide all fittings as shown on the construction drawings as necessary to complete construction. All threaded and coupled joints shall be API or equivalent so that all buried threads shall be buried in the lip of the coupling when tight.
- D. No materials shall be used in the work until they have been duly observed and a submittal reviewed by the ENGINEER.

2.02 GRAVEL FILTER PACK

- A. Gravel shall be thoroughly washed, sound, durable, well-rounded siliceous material containing, when delivered, less than 1 percent silt and clay, and no organic material, anhydrite, gypsum, mica, or calcareous material. Gravel specific gravity shall be no less than 2.5. Gradation of the filter pack shall be in accordance with AASHTO M43-05 and ASTM D448 aggregate designation #6:

Sieve	% Passing
1"	100
¾"	90-100
½"	20-55
3/8"	0-20
¼"	0-1

- B. Gravel pack will be placed from the bottom of the excavated riverbed 1 foot below cylindrical screen placement, to 1 foot above the cylindrical screens at elevations below ground level as shown on the DRAWINGS. Additional gravel pack shall be placed on top of the geotextile layer as shown on the DRAWINGS.
- C. The CONTRACTOR shall have on site the necessary volume of gravel pack to meet construction requirements as specified on the drawings. If sufficient material is not provided, the time and expense necessary to procure additional gravel pack will be at the CONTRATOR'S cost.

The CONTRACTOR shall supply gravel specifications and manufacturer name and address before purchasing the material. Once delivered, the CONTRACTOR shall test the material to ensure it meets specified gradation.

The ENGINEER will review the delivery ticket to verify the correct material was ordered. The ENGINEER will observe the material after it is delivered to determine if it contains abundant

fines. If there are abundant fines, either a portion of or all of the material will be rejected and the CONTRACTOR will be required to replace it at no cost to the OWNER.

- D. The gravel pack shall be placed in such a manner that it is readily known what volume of gravel pack has been added. The CONTRACTOR shall use a weighted measurement tape to monitor the depth to the top of gravel pack during placement.

2.03 GRANULAR SEPARATION FILTER

- A. Riverbed material shall be thoroughly washed, sound, durable, and well-rounded. Gradation of the separation filter shall be in accordance with the following gradation:

Sieve	% Passing
6"	100
3"	75
1 ½"	50
3/8"	0

- B. All material shall be sourced on-site and sieved to provided gradation. Material will be placed at a minimum thickness of 6".
- C. The CONTRACTOR shall submit gradation results to ENGINEER to review and approve prior to placement of the material.
- D. The CONTRACTOR shall have on site the necessary volume of material to meet construction requirements as specified on the drawings. If sufficient material is not provided, the time and expense necessary to procure additional material will be at the CONTRATOR'S cost.

The CONTRACTOR shall supply gravel specifications and manufacturer name and address before purchasing or placing the material.

The ENGINEER will review the delivery ticket to verify the correct material was ordered. The ENGINEER will observe the material after it is delivered to determine if it contains abundant fines. If there are abundant fines, either a portion of or all of the material will be rejected and the CONTRACTOR will be required to replace it at no cost to the OWNER.

2.04 ARMOR LAYER

- A. Armor mix for protection of the infiltration screens and filter layers shall be the type designated in the DRAWINGS. Mix and gradation of the armor layer shall be in accordance with Section 31 37 00 – Boulders and Special Project Gradation Mix.
- B. The armor layer material shall be sourced and sieved on-site. Thickness of the armor layer is as specified in the DRAWINGS.

PART 3 – EXECUTION

3.01 GENERAL

- A. CONTRACTOR shall install infiltration screens, collector pipe, and fittings in accordance with manufacturers' instructions.
- B. Erect all WORK true to lines and planes, with vertical lines plumb and horizontal lines level.

3.02 INSTALLATION

- A. Infiltration screens, collector pipe, and granular materials shall follow the configurations laid out in the DRAWINGS.
- B. Field adjustments to the WORK may be necessary to accommodate or protect existing conditions. Field adjustments are minor to the WORK and do not constitute a change in WORK, scope or cost and will be authorized in the FIELD by the DESIGN ENGINEER.

END OF SECTION

SECTION 33 46 26

GEOTEXTILE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. CONTRACTOR shall furnish all labor, tools, and equipment and perform all Work necessary for, or incidental to, the supply and installation geotextile shown in the DRAWINGS and specified herein. This WORK includes furnishing and placement of a geotextile fabric for separation of filter materials for the infiltration gallery. The WORK shall be coordinated with the work of all other trades and activities on the PROJECT.
- B. CONTRACTOR shall furnish and install all supplementary and miscellaneous items, appurtenances and devices incidental to or necessary for a complete installation.

1.02 RELATED SECTIONS

- A. The following is a list of SPECIFICATIONS which may be related to this section:
 - 1. Section 01 57 19, Temporary Environmental Controls
 - 2. Section 31 23 19, Dewatering.
 - 3. Section 31 23 33, Trenching and Backfilling.
 - 4. Section 31 25 00, Erosion and Sedimentation Controls

1.03 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M252, Standard Specification for Corrugated Polyethylene Drainage Pipe.
 - b. M294, Standard Specification for Corrugated Polyethylene Pipe, 300-mm to 1500-mm Diameter.
 - 2. ASTM International (ASTM):
 - a. D737, Standard Test Method for Air Permeability of Textile Fabrics.

- e. D3776, Standard Test Method for Mass per Unit Area (Weight) of Fabric.
- f. D3786, Standard Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method.
- g. D3887, Standard Specification for Tolerances for Knitted Fabrics
- h. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- i. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
- j. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- k. D4751, Standard Test Method for Determining the Apparent Opening Size of a Geotextile.
- l. D4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
- m. D6241, Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products using a 50-mm Probe
- n. D6707, Standard Specification for Circular-Knit Geotextile for Use in Subsurface Drainage Applications

1.04 SUBMITTALS

- A. Submittals shall include as a minimum the following:
 - 1. Geotextile fabric - Specifications sheet and sample.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Geotextile: During shipment and storage, the rolls of fabric shall be protected against deterioration from the sun, mud, dirt, dust, and other deleterious conditions at all times.

PART 2 PRODUCTS

2.01 GEOTEXTILE FABRIC

- A. The fabric shall have complete resistance to deterioration from ambient temperatures, acid, and alkaline conditions, and shall be indestructible to microorganisms and insects. The material shall be resistant to short-term (until placement) deterioration by ultraviolet light or protected until placement, as recommended by the manufacturer, such that no deterioration occurs.
- B. Fibers used in the manufacture of geotextiles, and the threads used in joining geotextiles by sewing, shall consist of long chain synthetic polymers composed of at least eighty five percent (85%) by weight polyolefins, polyesters, or polyamides. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including selvages.
- C. The property values shown below are not design values, but represent the minimum accepted physical characteristics of the geotextile required. The number represents a value to be confirmed by the manufacturer. These values represent minimum average roll values (for example, any roll tested shall meet or exceed the minimum values in the table).

Property	Value	Test Method
Grab Tensile Strength	450x350 lbs.	ASTM D4632
Wide Width Tensile (@U)	3600x3240 lbs/ft	ASTM D4632
Wide Width Tensile (@5%)	1500x1560 lbs/ft	ASTM D3786
Puncture Resistance	1600 lbs.	ASTM D4833
Trapezoid Tear Strength	135x125 lbs.	ASTM D4533
Apparent Opening Size	30, U.S. Standard Sieve	ASTM D4751
Permittivity	0.8 sec. ⁻¹	ASTM D4491
Water Flow Rate	60 gal./min./ft. ²	ASTM D4491

- D. Geotextile fabric for pipe underdrains shall be US Fabrics US3600 or equivalent.

PART 3 EXECUTION

3.01 GEOTEXTILE FABRIC

- A. Geotextile shall be laid on the prepared granular filter material to the lines and grades shown on the DRAWINGS. Care shall be taken not to tear the geotextile fabric during installation and backfilling. The geotextile fabric shall not be backfilled until the installation is observed and accepted by the ENGINEER or the OWNER'S REPRESENTATIVE.

END OF SECTION

SECTION 40 05 06
COUPLINGS, ADAPTORS, AND SPECIALS FOR PROCESS PIPE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes general information, products, and execution for couplings, adaptors, and specials for process pipe.
- B. Related Sections:
 - 1. SECTION 40 05 23 – STAINLESS STEEL PROCESS PIPE AND TUBING
 - 2. SECTION 40 05 51 – COMMON REQUIREMENTS FOR PROCESS VALVES

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. A 153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 2. A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - 3. A 276 – Standard Specification for Stainless Steel Bars and Shapes
 - 4. A 536 – Specification for Ductile Iron Castings
 - 5. C 1173 – Standard Specification for Flexible Transition Couplings for Underground Piping Systems
 - 6. D 2000 – Standard Classification System for Rubber Products in Automotive Applications
 - 7. F 3125 – Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- B. NSF International/American National Standards Institute (NSF/ANSI):
 - 1. 61 – Drinking Water System Components – Health Effects
 - 2. 61, Annex G – Weighted Average Lead Evaluation Procedure to a 0.25% Lead Requirement
 - 3. 372 – Drinking Water System Components – Lead Content

1.3 SUBMITTALS

- A. Action Submittals: Provide the Manufacturer's data on materials, construction, end connections, ratings, overall lengths, and live lengths as applicable

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Connectors:
 - 1. Teflon bellows connector:
 - a. Garlock, Style 214
 - b. Proco Products, Inc., Style 442
 - c. Resistoflex, No. R6904
 - d. Unisource Manufacturing, Inc., Style 112A
 - 2. Metal bellows connector:
 - a. Hyspan Precision Products, Inc., Series 1500
 - b. Pathway Bellows, Inc., Style CT
 - 3. Flexible metal hose connector:
 - a. Proco Products, Inc.
 - b. Senior Flexonics
 - c. Unisource Manufacturing, Inc.
 - 4. Universal Metal Hose Quick-connect couplings for chemical services:
 - a. OPW, Kamlock
 - b. Ryan Herco, 1300 Series
 - 5. Dry quick-connect couplings for chemical services:
 - a. Banjo, Dry-Mate
 - b. OPW, Kamvaloc
- B. Couplings:
 - 1. Transition coupling for steel pipe:
 - a. Dresser Piping Specialties, Style 162
 - b. Smith-Blair, Inc., Style 413

2. Flanged coupling adapter:
 - a. Steel pipe:
 - 1) Dresser Piping Specialties, Style 128
 - 2) Smith-Blair, Inc., Style 913
 - b. DI pipe:
 - 1) Dresser Piping Specialties, Style 127
 - 2) Smith-Blair, Inc., Style 912
3. Exposed metallic piping plain end couplings:
 - a. Straub Couplings, Grip-L or Metal Grip

C. Miscellaneous Specialties:

2.2 MATERIALS

- A. Provide required piping specialty items, whether or not shown on the DRAWINGS, and as required by applicable codes and standard industry practice.
- B. Rubber ring joints, mechanical joints, flexible couplings, and proprietary restrained DI pipe joints shall be considered flexible joints; welded, screwed, and flanged pipe joints are not considered flexible joints.
- C. Brass and bronze valve components and accessories that have surfaces in contact with potable water shall be alloys containing less than 16% zinc and 2% aluminum and shall be certified in accordance with NSF/ANSI 61, NSF/ANSI 61, Annex G, and NSF/ANSI 372.
- D. Connectors:
 1. Teflon bellows connector:
 - a. Type: Two convolutions, unless otherwise shown on the DRAWINGS, with metal reinforcing bands.
 - b. Flanges: DI, drilled Class 150 in accordance with ASME B16.5.
 - c. Working pressure rating: 140 psi, minimum, at 120°F.
 - d. Thrust restraint: Limit bolts to restrain the force developed by the specified test pressure.
 2. Metal bellows connector:
 - a. Type: Single-ply, annular corrugated metal bellows with limit rods. Circumferential convolution welds are not permitted.
 - b. Material: Type 316 SST.
 - c. End connections: 150 lb carbon steel flanges in accordance with ASME B16.5.
 - d. Minimum design working pressure: 150 psi at 750°F.
 - e. Length: Minimum of four convolutions and the minimum Manufacturer's recommendation for vibration isolation.
 3. Flexible metal hose connector:
 - a. Type: Close pitch, annular corrugated with single braided jacket.
 - b. Material: Bronze.
 - c. End connections: Female copper solder joint.
 - d. Minimum burst pressure: 500 psig at 70°F.
 - e. Length: The minimum Manufacturer's recommendation for vibration isolation.
 4. Quick-connect couplings for chemical services:
 - a. Type: Twin cam arm actuated, male and female, locking, for chemical loading and transfer.
 - b. Materials: Glass-filled PP, PVDF with EPDM, Type 316 SST, EPDM, Viton-A or Teflon gaskets as recommended for the service by the Manufacturer.
 - c. End connections: NPT threaded or flanged to match piping connections; hose shank for chemical installations.
 - d. Plugs and caps: Female dust cap for each male end; male dust plug for each female end.
 - e. Pressure rating: 125 psi, minimum, at 70°F.

5. Dry quick-connect couplings for chemical services:
 - a. Type: Twin cam arm actuated, male and female, locking, for chemical loading and transfer. Locking isolation valve and handle for dry disconnection of the coupling.
 - b. Materials: Glass-filled PP or Type 316 SST, EPDM, Viton-A or Teflon gaskets as recommended for the service by the Manufacturer.
 - c. End connections: NPT threaded or flanged to match piping connections; hose shank for chemical installations.
 - d. Plugs and caps: Female dust cap for each male end; male dust plug for each female end.
 - e. Pressure rating: 125 psi, minimum, at 70°F.
- E. Couplings:
 1. General:
 - a. Coupling linings for use in potable water systems shall be in accordance with NSF/ANSI 61.
 - b. Couplings shall be rated for a working pressure no less than 150 psi.
 - c. Couplings shall be lined and coated with fusion-bonded epoxy in accordance with AWWA C213.
 - d. Unless thrust restraint is provided by other means, couplings shall be harnessed in accordance with AWWA Manual M11 and restrained with a retainer bar or ring welded to the pipe end or as shown on the DRAWINGS.
 - e. Sleeve type couplings shall be in accordance with AWWA C219 and shall be hydraulically expanded beyond the minimum yield for accurate sizing and proofing of tensile strength.
 2. Bolted sleeve-type and transition couplings, flanged coupling adapter:
 - a. In accordance with AWWA C 219.
 - b. Center sleeve shall match service pipe material and pressure rating.
 - c. Rubber gaskets shall be in accordance with ASTM D 2000.
 3. Flexible coupling:
 - a. Drain and CP applications:
 - 1) Flexible, slip-on elastomer in accordance with ASTM C 1173.
 - 2) SST clamps in accordance with ASTM A 276, Type 301 bands.
 - b. Pressure applications:
 - 1) DI in accordance with ASTM A 536 and AWWA C219.
 - 2) Working pressure rated to 150 psi minimum.
 - 3) Rubber gasket.
 - 4) Low alloy steel bolts and nuts in accordance with ASTM F 3125.
 - 5) Epoxy finish.
 4. Restrained flange adapter:
 - a. Pressure rating:
 - 1) Minimum working pressure rating: 150 psi.
 - 2) Safety factor: No less than two times the working pressure; supported by the Manufacturer's proof testing.
 - b. Thrust restraint:
 - 1) Provide hardened steel wedges that bear against and engage the outer pipe surface and allow articulation of the pipe joint after assembly while wedges remain in their original setting position on the pipe surface.
 - 2) Products employing set screws that bear directly on the pipe are not acceptable.
 5. Exposed metallic piping plain end couplings:
 - a. Plain end pipe couplings shall be self-restrained against hydrostatic thrust forces equal to no less than two times the working pressure rating of the coupling. Couplings shall accommodate 4 degrees of angular deflection at the time of installation and subsequent to pressurization.
 - b. Casing, bolts, and nuts shall be ASTM A 240, Type 304 or Type 316 SST. The sealing sleeve shall be EPDM or NBR elastomer as best suited for the fluid service.
- F. Expansion Joints:
 1. Elastomer bellows:
 - a. Type: Reinforced molded wide arch.
 - b. End connections: Flanged, Class 125 in accordance with ASME B16.1, split galvanized steel retaining rings.
 - c. Washers: Over-retaining rings to help provide a leak-proof joint under the test pressure.

- d. Thrust protection: Control rods to protect the bellows from over-extension.
- e. Bellows arch lining: Buna-N, nitrile, or butyl.
- f. Rated temperature: 250°F.
- g. Rated deflection and pressure:
 - 1) Lateral deflection: 3/4 inch, minimum.
 - 2) Burst pressure: Four times the working pressure.
 - 3) Compression deflection and minimum working pressure:

Size (Inches)	Deflection (Inches)	Pressure (PSI)
2 1/2 to 12	1.06	150
14	1.65	130
16 to 20	1.65	110

- 2. Teflon bellows:
 - a. Type: Three convolutions with metal reinforcing bands. Flanges: DI, drilled, Class 150 in accordance with ASME B16.5.
 - b. Working pressure rating: 100 psi, minimum, at 120°F.
 - c. Thrust restraint: Limit bolts to restrain force developed by the specified test pressure.
- 3. Metal bellows:
 - a. Type: Single-ply, annular corrugated metal bellows with limit rods; circumferential convolution welds shall not be permitted.
 - b. Material: ASTM A 240, Type 316 SST.
 - c. End connections: Class 150 carbon steel flanges in accordance with ASME B 16.5.
 - d. Minimum design working pressure: 150 psi at 750°F.
 - e. Length: Minimum of four convolutions and the minimum Manufacturer's recommendation for vibration isolation.
- 4. Copper pipe expansion compensator:
 - a. Material: SST bellows with female copper solder joint ends.
 - b. Working pressure rating: 175 psi, minimum.
 - c. Accessories: Anti-torque device to protect bellows.
- 5. Flexible metal hose:
 - a. Type: Close pitch, annular corrugated with single braided jacket.
 - b. Material: ASTM A 276 Type 321 SST.
 - c. End connections:
 - 1) For 3 inch and larger connections: Shop-fabricated flanged ends to match mating flanges.
 - 2) For 2 1/2 inch and smaller connections: Screwed ends with one union end.
 - d. Minimum burst pressure: 600 psi at 70°F for 12 inches and smaller.
 - e. Length: Provide hose live-length equal to the lengths shown on the DRAWINGS.
- G. Flexible Expansion Joints:
 - 1. Design:
 - a. Ball-and-socket type for earth settlement compensation.
 - b. Joints shall be double ball assemblies rated for 15 degree minimum deflection and no less than 4 inches offset from the centerline of connecting piping.
 - c. Assembly shall accommodate up to 4 inches of expansion in length.
 - d. DI in accordance with AWWA C153.
 - e. Rated for 350 psi.
 - f. Components lined and coated by the Manufacturer with fusion-bonded epoxy on surfaces not bearing gaskets.
 - g. End connections: Flanged or mechanical joint shall be as shown on the DRAWINGS and as required by connecting pipe and fittings.
 - h. The joint connecting to the mechanical joint shall be thrust restrained.
 - i. Bonding:
 - 1) The Manufacturer shall factory install exothermic welded joint bonds for the assembled expansion joint.
 - 2) Provide 24-inch bond wires for field bonds to adjacent metallic piping.

- H. Bond wires shall be #2 AWG with 2, 12 inch long THHN insulated #12 AWG wire pigtails Slab, Floor, Wall, and Roof Penetrations:
1. DI wall pipe:
 - a. Diameter and ends: Same as connecting DI pipe.
 - b. Thickness: Equal to or greater than the remainder of the pipe in line.
 - c. Fittings: As specified in the applicable pipe data sheet in SECTION 40 05 00.
 - d. Thrust collars:
 - 1) Rated for thrust load developed at 250 psi.
 - 2) Safety factor: Two, at a minimum.
 - 3) Material and construction: DI or CI, cast integral with wall pipe wherever possible, or thrust rated, welded attachment to wall pipe.
 2. Steel or SST wall pipe:
 - a. Same material and thickness as connecting pipe, except 1/4 inch minimum thickness.
 - b. Lining: Same as connecting pipe.
 - c. Thrust collar:
 - 1) The outside diameter shall be 3 inches greater than the outside diameter of the wall pipe unless otherwise shown on the DRAWINGS.
 - 2) Continuously fillet welded on each side all around.
 - I. Miscellaneous Specialties:
 1. Strainers, water service, 2 inches and smaller:
 - a. Type: Bronze body, Y-pattern, 200 psi non-shock rated, with screwed gasketed bronze cap.
 - b. Screen: Heavy-gauge Type 304 SST or monel, 20-mesh.
 2. Strainers, water service, 2 1/2 inches and larger:
 - a. Type: CI or DI body, Y-pattern, 175 psi non-shock rated, with flanged gasketed iron cap.
 - b. Screen: Heavy-gauge Type 316 SST, 0.045 inch perforations.
 3. Strainers, Y-pattern, chemical services, 4 inches and smaller:
 - a. Type: Y-pattern PVC or CPVC body to match piping, 150 psi non-shock rated, with screwed cap and seals to match piping service.
 - b. End connections: Screwed or solvent weld, 2 inches and smaller. Class 150 ANSI flanges, 2 1/2 inches and larger.
 - c. Screen: Heavy-gauge PVC or CPVC, 1/32 inch mesh, minimum 2 to 1 screen area to pipe size ratio.
 4. Strainers, basket, chemical services, 4 inches and smaller:
 - a. Type: Duplex basket strainer, PVC or CPVC to match piping, 150 psi non-shock rated, with screwed cap and seals to match piping service or release clamp cap.
 - b. End connections: Screwed or solvent weld, 2 inches and smaller. Class 150 ANSI flanges, 2 1/2 inches and larger.
 - c. Screen: Heavy-gauge PVC or CPVC, 3/32-inch mesh, minimum 6 to 1 screen area to pipe size ratio.
 - d. Include pressure gauge for pressure drop across the strainer.
 - e. Strainer shall operate so there is no system shutdown for basket cleaning.
 5. Calibration columns:
 - a. Materials: Schedule 80 clear PVC or CPVC to match piping, 150 psi rated, volume indication range as shown on the DRAWINGS.
 - b. End connections: Screwed, 2 inches and smaller. Class 150 ANSI flanges, 2 1/2 inches and larger.

PART 3 EXECUTION

3.1 GENERAL

- A. Provide accessibility to piping specialties for control and maintenance.

3.2 INSTALLATION

- A. Piping Flexibility Provisions:

1. General:
 - a. Thrust restraint shall be provided as specified in SECTION 40 05 00.
 - b. Install flexible couplings to facilitate piping installation in accordance with approved Shop DRAWINGS.
2. Flexible joints at concrete backfill or encasement: Install within 18 inches or 1/2 pipe diameter, whichever is less, from the termination of any concrete backfill or concrete encasement.
3. Flexible expansion joints shall be provided to compensate for earth settlement at buried piping connections to structure wall pipes.

- B. Piping Transition:
 - 1. Applications:
 - a. Provide complete closure assembly where pipes meet other pipes or structures.
 - b. Pressure pipeline closures: Plain end pieces with double flexible couplings.
 - c. Restrained joint pipe closures: Install with thrust tie-rod assemblies as shown on the DRAWINGS.
 - d. Gravity pipe closures: As specified for pressure pipelines or concrete closures.
 - e. Concrete closures: Use to make connections between dissimilar pipes where standard rubber gasketed joints or flexible couplings are impractical.
 - f. Elastomer sleeves bonded to pipe ends are not acceptable.
 - 2. Installation:
 - a. Flexible transition couplings: Install in accordance with the Coupling Manufacturer's instructions to connect dissimilar pipe and pipes with a small difference in outside diameter.
- C. Piping Expansion:
 - 1. Piping installation: Allow for thermal expansion due to differences between installation and operating temperatures.
 - 2. Expansion joints:
 - a. Grooved joint and flanged piping systems: Elastomer bellows expansion joint.
 - b. Nonmetallic pipe: Teflon bellows expansion joint.
 - c. Screwed and soldered piping systems: Copper or galvanized and black steel pipe expansion compensator, as applicable.
 - d. Air and water service above 120°F: Metal bellows expansion joint.
 - e. Pipe run offset: Flexible metal hose.
 - 3. Anchors and anchor walls: Install as specified in SECTION 40 05 07 to withstand expansion joint thrust loads and to direct and control thermal expansion.
- D. Couplings:
 - 1. General:
 - a. Install in accordance with the Manufacturer's instructions.
 - b. Before coupling, clean the pipe holdback area of oil, scale, rust, and dirt.
 - c. Do not remove pipe coating. If damaged, repair before the joint is made.
 - d. Application:
 - 1) Metallic piping systems: Flexible couplings, transition couplings, and flanged coupling adapters.
 - 2) Concrete encased couplings: Flexible coupling.
- E. Flexible Pipe Connections to Equipment:
 - 1. Install to prevent piping from being supported by equipment, for vibration isolation, and where shown on the DRAWINGS.
 - 2. Product applications:
 - a. Nonmetallic piping: Teflon bellows connector.
 - b. Copper piping: Flexible metal hose connector.
 - c. Compressor and blower discharge: Metal bellows connector.
 - d. All other piping: Elastomer bellows connector.
 - 3. Limit bolts and control rods: Tighten snug prior to applying pressure to system.
 - a. .

END OF SECTION

SECTION 40 05 23

STAINLESS STEEL PROCESS PIPE AND TUBING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Stainless-steel pipe and fittings.
2. Stainless-steel tube and fittings.
3. Accessories.

B. Related Requirements:

1. Section 40 05 06 - Couplings, Adaptors, and Specials for Process Piping: Pipe penetrations, restrained joints, flexible connections, expansion joints and loops, and sleeve-type couplings.
2. Section 40 05 51 - Common Requirements for Process Valves: Common product requirements for valves for placement by this Section.

1.02 REFERENCE STANDARDS

A. American Welding Society:

1. AWS D1.1/D1.1M - Structural Welding Code - Steel.

B. ASME International:

1. ASME B1.20.1 - Pipe Threads, General Purpose, Inch.
2. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, 250 and 800.
3. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
4. ASME B16.9 - Factory-Made Wrought Butt welding Fittings.
5. ASME B16.11 - Forged Fittings, Socket-Welding and Threaded.
6. ASME B16.20 - Metallic Gaskets for Pipe Flanges: Ring-Joint, Spiral-Wound, and Jacketed.
7. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges.
8. ASME B31.3 - Process Piping.
9. ASME Boiler and Pressure Vessel Code (BPVC), Section IX - Welding and Brazing Qualifications.

C. ASTM International:

1. ASTM A182/A182M - Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.

2. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
3. ASTM A194/A194M - Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
4. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
5. ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.

D. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.03 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information on pipe materials, tube materials, and fittings.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Permanently mark each length of pipe with manufacturer's name or trademark, and compliance with standards.
- B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 2. Protect piping and appurtenances by storing off ground.
 3. Provide additional protection according to manufacturer instructions.

1.10 AMBIENT CONDITIONS

- A. Minimum Conditions: Do not store or handle uninstalled lined pipes or fittings at temperatures below zero degrees F.

PART 2 - PRODUCTS

1.01 STAINLESS-STEEL PIPE AND FITTINGS

A. General Service Piping:

1. Type:
 - a. Welded; comply with ASTM A813/A813M.
 - b. Class: SW; comply with ASTM A814/A814M.
2. Schedule: 80S.
3. Grade: Type 316L.
4. Dimensions: As indicated in piping schedule.

B. Fittings:

1. Dimensions: Comply with ASTM A312/A312M.
2. Threaded Fittings:
 - a. Comply with ASME B16.11 and ASTM A182.
 - b. Grade: Type 316L.
 - c. Threads: Comply with ASME B1.20.1.
3. Butt-Welding Fittings:
 - a. Comply with ASTM A403/A403M.
 - b. Grade: Type 316L.
 - c. Class: CR; comply with ASME B16.9.
4. Socket-Welding Fittings:
 - a. Comply with ASTM A403/A403M.
 - b. Grade: Type 316L.
 - c. Class: WP; comply with ASME B16.11.
5. Flanged Fittings:
 - a. Type: Threaded.
 - b. Class: 300.
 - c. Comply with ASTM A182/A182M.
 - d. Grade: Type 316L.
 - e. Facing and Drilling: Comply with ASME B16.5.
 - f. Backing Flanges:
 - 1) Material: Stainless steel.
 - 2) Class: 150.
 - 3) Comply with ASTM A351/A351M.
 - 4) Type: Van stone.

- 5) Drilling: Comply with ASME B16.1.
- 6. Flanged Connections: as required to connect stainless-steel piping to fittings and equipment.

1.02 ACCESSORIES

- A. Pipe-Thread Tape:
 - 1. Material: PTFE.
 - 2. Comply with ASTM D3308.
- B. O-Ring Seals: EPDM.
- C. Flange Gaskets:
 - 1. Comply with ASME B16.5.
 - 2. Nonmetallic Gaskets:
 - a. Material: Chloroprene rubber.
 - b. Comply with ASME B16.21.
 - 3. Metallic Ring Joint Gaskets:
 - a. Comply with ASME B16.20.
 - 4. Type:
 - a. Raised-Face Flanges: Flat ring.
 - b. Flat-Face Flanges: Full face.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field dimensions are as indicated on shop Drawings.
- B. Inspect existing flanges for nonstandard bolt hole configurations or design and verify that new pipe and flange mate properly.

3.02 PREPARATION

- A. Ream pipe and tube ends and remove burrs.
- B. Thoroughly clean pipe and fittings before installation.

3.03 INSTALLATION

- A. Comply with ASME B31.3.

- B. Run piping straight along alignment as indicated on shop Drawings, with minimum number of joints.
- C. Fittings:
 - 1. Clean gasket seats thoroughly, and wipe gaskets clean prior to installation.
 - 2. Install according to manufacturer instructions.
 - 3. Bolting:
 - a. Tighten bolts progressively, drawing up bolts on opposite sides until bolts are uniformly tight.
 - b. Use torque wrench to tighten bolts to manufacturer instructions.
- D. Provide required upstream and downstream clearances from devices as indicated on shop Drawings.
- E. Install piping with sufficient slopes for venting or drainage of liquids and condensate to low points.
- F. Provide expansion joints as specified in Section 40 05 06 - Couplings, Adaptors, and Specials for Process Piping to compensate for pipe expansion due to temperature differences.
- G. Dielectric Fittings: Provide between dissimilar metals.
- H. Field Cuts: According to pipe manufacturer instructions.
- I. Field welding of stainless steel is not permitted.
- J. Provide cathodic protection where indicated on drawings for buried ferrous piping systems as specified in Section 40 46 42 – Cathodic Process Corrosion Protection.

3.04 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. Inspect for damage to piping or tubing that may be detrimental as determined by the ENGINEER or OWNERS REPRESENTATIVE.
 - 2. Repair damaged piping, or provide new, undamaged pipe.
 - 3. After installation, inspect for required supports and anchoring, interferences, and damage to pipe, tube, or fittings.
- B. Pressure Testing:
 - 1. Test Pressure: Not less than 200 psig or 50 psi in excess of maximum static pressure, whichever is greater.
 - 2. Conduct hydrostatic test for minimum two hours.
 - 3. Filling:
 - a. Fill section to be tested with water slowly and expel air from piping at high

- points.
- b. Install corporation cocks at high points.
- c. Close air vents and corporation cocks after air is expelled.
- d. Raise pressure to specified test pressure.
- 4. Observe joints, fittings, and valves under test.
- 5. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage and retest.
- 6. Leakage:
 - a. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate.
 - b. Maintain pressure within plus or minus 5 psi of test pressure.
 - c. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
 - d. Compute maximum allowable leakage by following formula:
 - 1) $L = SD \times \sqrt{P}/C$.
 - 2) L = testing allowance, in gallons per hour.
 - 3) S = length of pipe tested, in feet.
 - 4) D = nominal diameter of pipe, in inches.
 - 5) P = average test pressure during hydrostatic test, in psig.
 - 6) C = 148,000.
 - 7) When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
 - e. If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
 - f. Correct visible leaks regardless of quantity of leakage.
- C. Replace pipe or fittings with mortar cracks wider than 1/16 inch.

3.05 CLEANING

- A. Keep pipe interior clean as installation progresses.
- B. After installation, clean pipe interior of soil, grit, and other debris.

END OF SECTION

SECTION 40 05 51
COMMON REQUIREMENTS FOR PROCESS VALVES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes general information, products, and execution for common requirements for process valves.
- B. Related Sections:
 - 1. SECTION 33 14 19 – STAINLESS STEEL PROCESS PIPE AND TUBING

1.2 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.1 – Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250
- B. American Water Works Association (AWWA):
 - 1. C511 – Reduced-Pressure Principle Backflow Prevention Assembly
 - 2. C542 – Electric Motor Actuators for Valves and Slide Gates
 - 3. C550 – Protective Interior Coatings for Valves and Hydrants
 - 4. C800 – Underground Service Line Valves and Fittings
- C. ASTM International (ASTM):
 - 1. A 351 – Standard Specification for Castings, Austenitic, for Pressure-Containing Parts
 - 2. B 61 – Standard Specification for Steam or Valve Bronze Castings
 - 3. B 62 – Standard Specification for Composition Bronze or Ounce Metal Castings
 - 4. B 98 – Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes
 - 5. B 127 – Standard Specification for Nickel-Copper Alloy Plate, Sheet, and Strip
 - 6. B 139 – Standard Specification for Phosphor Bronze Rod, Bar and Shapes
 - 7. B 164 – Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire
 - 8. B 194 – Standard Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar
 - 9. B 584 – Standard Specification for Copper Alloy Sand Castings for General Applications
 - 10. B 763 – Standard Specification for Copper Alloy Sand Castings for Valve Applications
 - 11. D 429 – Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates
 - 12. D 1784 – Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 - 13. D 2513 – Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings
 - 14. D 4101 – Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials
- D. Manufacturers Standardization Society (MSS):
 - 1. SP-81 – Stainless-Steel or Stainless-Steel-Lined, Bonnetless, Knife Gate Valves with Flanged Ends
 - 2. SP-88 – Diaphragm Valves
- E. National Electrical Manufacturers Association (NEMA):
 - 1. 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
- F. NSF International/American National Standards Institute (NSF/ANSI):
 - 1. 61 – Drinking Water System Components – Health Effects
 - 2. 61, Annex G – Weighted Average Lead Evaluation Procedure to a 0.25% Lead Requirement
 - 3. 372 – Drinking Water System Components – Lead Content

1.3 SUBMITTALS

- A. Product Data: Sheets for each make and model; indicate valve type number, applicable tag number, and facility name/number or service where used.
- B. Shop Drawings:
 - 1. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - 2. Power and control wiring diagrams, including terminals and numbers.
 - 3. For each power actuator provided, the Manufacturer's standard data sheet with application specific features and options clearly identified.
 - 4. Sizing calculations for open-close/throttle and modulating valves.
- C. Certificates:
 - 1. Manufacturer's certificate of compliance, as specified in SECTION 01 44 33.
 - a. Electric actuators: In accordance with AWWA C542.
 - b. Butterfly valves: In accordance with AWWA C504.
 - 2. Manufacturer's certificate of proper installation as specified in SECTION 01 44 33.
- D. Quality Control Submittals: Tests and inspection data.
- E. O&M Data: As specified in SECTION 01 78 23.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Gate Valves:
 - 1. Type V104 bronze gate valve:
 - a. As specified in SECTION 33 14 19
 - 2. Type V125 resilient-seated gate valve – Class 150:
 - a. As specified in SECTION 33 14 19
 - 3. Type V130 PVC gate valve:
 - a. ASAHI/America, Type P
 - b. Spears
 - 4. Type V140 knife gate:
 - a. Dezurik, Series KGC-BD
 - b. ITT Fabri-Valve, Figure C67R
- B. Globe Valves:
 - 1. Type V200 bronze globe valve:
 - a. As specified in SECTION 33 14 19
 - 2. Type V210 PVC globe valve:
 - a. ASAHI/America
 - b. Spears
- C. Ball Valves:
 - 1. Type V300 bronze three-piece ball valve:
 - a. As specified in SECTION 33 14 19
 - 2. Type V301 SST ball valve:
 - a. As specified in SECTION 22 00 00
 - 3. Type V307 SST three-piece ball valve:
 - a. Apollo, 86A-100 Series
 - b. Neles-Jamesbury, Value-Line Series 3
 - 4. Type V330 PVC ball valve:
 - a. ASAHI/America, Type 21
 - b. Hayward, TB Series
 - c. Nibco, Chemtrol Tru-Bloc
 - d. Spears, True Union 2000 Industrial
 - 5. Type V335 CPVC ball valve:
 - a. ASAHI/America, Type 21
 - b. Nibco, Chemtrol Tru-Bloc
 - c. Spears, True Union 2000 Industrial
 - 6. Type V340 PP ball valve:
 - a. ASAHI/America, Type 21
 - b. Nibco, Chemtrol Tru-Bloc
 - 7. Type V350 PE ball valve:
 - a. AVK Plastics
 - b. R.W. Lyall
 - 8. Type V361 three-way ball valve:
 - a. Flow-Tek, Multiport Ball Valve
 - b. Valworx, Model 552916
- D. Plug Valves:
 - 1. Type V402 eccentric plug valve:
 - a. As specified in SECTION 33 14 19
 - 2. Type V420 non-lubricated plug valve:
 - a. Duriron Co., Figure No. G432
 - b. Tufline, Figure 066
 - 3. Type V462 gauge cock:
 - a. As specified in SECTION 33 14 19 Type V464 corporation stop:
 - b. As specified in SECTION 33 14 19
- E. Butterfly Valves:
 - 1. Type V504 AWWA butterfly valve:
 - a. As specified in SECTION 33 15 00
 - 2. Type V515 high performance butterfly valve:
 - a. DeZurik, BHP Series
 - b. Tyco/Keystone, K Lok Series
 - 3. Type V520 PVC butterfly valve:
 - a. ASAHI/America, Type 56
 - b. Nibco, Chemtrol Model B
- F. Check and Flap Valves:
 - 1. Type V605 bronze swing type check valve:
 - a. As specified in SECTION 33 14 19

2. Type V606 CI swing type check valve:
 - a. As specified in SECTION 33 14 19
3. Type V608 DI swing type check valve:
 - a. As specified in SECTION 33 14 19
4. Type V609 bronze spring check valve:
 - a. As specified in SECTION 33 14 19
5. Type V610 duck billed check valve:
 - a. As specified in SECTION 33 14 19
6. Type V612 double disk check valve:
 - a. APCO, Series 9000
 - b. Crane/Stockham, WG-970
 - c. Tyco, Gulf MB Series
 - d. Valmatic, Dual Disk
7. Type V615 PVC swing type check valve:
 - a. ASAHI/America
 - b. Spears
8. Type V616 CPVC swing type check valve:
 - a. Spears
9. Type V630 PVC ball check valve:
 - a. ASAHI/America, Tru Union Ball Valve
 - b. Nibco, Chemtrol Tru Union
 - c. Spears, True Union 2000
10. Type V631 CPVC ball check valve:
 - a. ASAHI/America, Tru Union Ball Valve
 - b. Nibco, Chemtrol Tru Union
 - c. Spears, True Union 2000
11. Type V632 PP ball check valve:
 - a. ASAHI/America
 - b. Nibco
 - c. Spears
12. Type V633 CI ball check valve, 3 inch and larger:
 - a. Flomatic, Model 408
 - b. Flygt, Model 5087
13. Type V642 RP BFPA:
 - a. FEBCO, Model 860
 - b. Watts, Series 009/909
14. Type V690 flap gate valve:
 - a. As specified in SECTION 33 14 19
- G. Self-Regulated Automatic Valves:
 1. Type V710 bronze PRV:
 - a. Fisher, Type 75A
 - b. Watts, Series 223
 2. Type V711 CI PRV:
 - a. Fisher, 95 Series
 3. Type V712 PVC PRV:
 - a. Hayward, Pressure Regulator
 - b. Plast-O-Matic, Series PR
 4. Type V713 CPVC PRV:
 - a. Hayward, Pressure Regulator
 - b. Plast-O-Matic, Series PR
 5. Type V714 PP PRV:
 - a. Plast-O-Matic
 6. Type V722 PVC pressure relief, bypass relief, back-pressure regulator, anti-siphon valve:
 - a. Griffco, Series BPV
 - b. Plast-O-Matic, Series RVDT
 - c. Primary Fluid Systems, TOP Valve
 - d. Pulsafeeder, Series BPV
 7. Type V723 CPVC pressure relief, bypass relief, back-pressure regulator, anti-siphon valve:
 - a. Griffco, Series BPV
 - b. Plast-O-Matic, Series RVDT
 - c. Primary Fluid Systems, TOP Valve
 - d. Pulsafeeder, Series BPV
 8. Type V732 DI pressure relief, bypass relief:
 - a. Cla-Val, 50-01, 650-01
 - b. Singer, Model 106 RPS, 206 RPS

9. Type V733 DI PRV:
 - a. Cla-Val, 90-01 KO Series
 - b. Singer, Model 106-AC
10. Type V747 air release and air vacuum combination valve:
 - a. As specified in SECTION 33 14 19
- H. Specialty Valves:
 1. Type V901 CI diaphragm valve:
 - a. ITT Engineered Valves
 - b. Saunders Valve, Inc.
 2. Type V903 PVC diaphragm valve:
 - a. ASAHI/America, Diaphragm Valve Type 14/15
 - b. ITT Engineered Valves, Dia-Flo
 - c. Saunders Valve, Diaphragm Valve
 3. Type V904 CPVC diaphragm valve:
 - a. ASAHI/America, Valve Type 14/15
 - b. Spears
 4. Type V910 pinch valve:
 - a. Red Valve Co., Series 75 and 5400E
 - b. RF Technologies, Inc., RF Valve
 5. Type V920 CPVC needle valve:
 - a. Hayward NVA Series
 6. Type V921 PVC needle valve:
 - a. Hayward NVA Series
 7. Type V922 PP needle valve:
 - a. Hayward NVA Series
 8. Type V925 sampling valve:
 - a. Fetterolf Corporation, Rod-Seal Sampling Valve
 - b. Strahman Valves, Inc., Piston Type Sampling Valve
 9. Type V940 solenoid valve:
 - a. As specified in SECTION 33 14 19
- I. Electric motor actuators:
 1. Open-close or modulating service (1E):
 - a. ASAHI/America, Series 94
 - b. Bettis, Model EM
 - c. El-O-Matic, EL Series
- J. Accessories:
 1. T-handled operating wrench:
 - a. Clow, F-2520
 - b. Mueller Co., No. A-24610
 2. Extension bonnet for valve operator complete with enclosed stem, extension, support brackets, and accessories for valve and operator:
 - a. DeZurik
 - b. Pratt
 3. Floor stand and extension stem:
 - a. Clow, F-5515
 - b. Mueller Co.,
 4. Floor box and stem:
 - a. Clow, F-5695
 - b. Neenah Foundry, R 7506
 5. Chain wheel and guide:
 - a. Clow, F-5680
 - b. DeZurik Corp., Series W or LWG
 - c. Walworth Co., Figure 804

2.2 MATERIALS

- A. General:
 1. Valves shall include operator, actuator, handwheel, chain wheel, extension stem, floor stand, operating nut, chain, wrench, and accessories to allow a complete operation from the intended operating level.
 2. The valve shall be suitable for its intended service. Renewable parts shall not be of a lower quality than specified.
 3. The valve shall be the same size as adjoining pipe unless otherwise called out on the Drawings.
 4. Valve ends shall suit adjacent piping.
 5. Resilient-seated valves shall have no leakage (drop-tight) in either direction at the valve rated design pressure. Other valves shall have no leakage (drop-tight) in either direction at the valve rated design pressure unless otherwise specified in this Section or in the stated valve standard.
 6. Size operators and actuators to operate valve for the full range of pressures and velocities.
 7. Buried valves shall open by turning clockwise. Non-buried, in-plant service valves shall open by turning counter-clockwise.

8. Valve construction shall be compatible with the electric actuator if an electric actuator is required; as specified in the electric operator schedule.
9. Factory-mount operator, actuator, and accessories.
10. Potable water applications:
 - a. Brass and bronze valve components and accessories that have surfaces in contact with potable water shall be alloys containing less than 16% zinc and 2% aluminum and shall be certified in accordance with NSF/ANSI 61, NSF/ANSI 61, Annex G, and NSF/ANSI 372.
 - 1) Approved alloys: ASTM B 61, ASTM B 62, ASTM B 98 (Alloy UNS No. C65100, C65500, or C66100), ASTM B 139 (Alloy UNS No. C51000), ASTM B 584 (Alloy UNS No. B89520, B89833, C90300 or C94700), ASTM B 164, ASTM B 194, ASTM B 127 and ASTM B 763 (Alloy UNS No. C9950).
 - 2) SST alloy 18-8 may be substituted for bronze.
11. Recycled water applications: Brass and bronze goods that have surfaces not in contact with potable water shall be manufactured in accordance with AWWA C800 using copper alloy UNS No. C83600, commercially known as 85-5-5, in accordance with ASTM B 62.
- B. Gate Valves: Type V130 PVC gate valve 1 1/2 inches to 4 inches: Solid PVC body in accordance with ASTM D 1784, removable bonnet, flanged ends, Class 150, rated 150 psi at 70°F, PP gate in accordance with ASTM D 4101, non-rising stem with sealed position indicator, clean-out plug and EPDM seals.
- C. Type V140 knife gate valve 24 inches and smaller: Bonnetless wafer body type, outside stem and yoke, rated for 150 psi cold water, ASME B16.1 flanged ends, non-clogging, with round port, resilient EPDM seat, bi-directional drip-tight shutoff. Wetted parts ASTM A 351 CF8M Type 316 SST, stem ASTM A 351 CF8 SST with stem extension kit, yoke sleeve bronze, gate finish ground both sides with a sharp knife edge. Packing system leak-tight seal around gate, valve superstructure and yoke designed for full peripheral access to gland bolts when valve is equipped with manual or power actuator. In accordance with MSS SP-81.
- D. Globe Valves: Type V210 PVC globe valve 4 inches and smaller: Solid PVC body in accordance with ASTM D 1784, removable bonnet, flanged ends, Class 150, rated 150 psi at 70°F, PP disc in accordance with ASTM D 4101 and EPDM seals.
- E. Ball Valves:
 1. Type V307 SST three-piece ball valve 3 inches and smaller: three-piece, standard port, NPT threaded ends, Type 316 SST body, ball and stem, PTFE seats and seals, adjustable packing nut, blow-out proof stem, rated 1,000 psi CWP.
 2. Type V330 PVC ball valve 2 inches and smaller: Rated 150 psi at 73°F, Type I, Grade 1 PVC body, ball, and stem, end entry, double union design, solvent weld socket ends, elastomer seat, EPDM O-ring stem seals, to block flow in both directions in accordance with ASTM D 1784.
 - a. For sodium hypochlorite service, provide a pressure relief hole drilled on the low-pressure side of the ball.
 3. Type V335 CPVC ball valve 4 inches and smaller: Rated 150 psi at 73°F, Type I, Grade 1 CPVC full port body, ball, and stem, end entry, double union design, solvent-weld socket ends, PTFE seat, Viton (FKM) O-ring stem, face, and carrier seals, to block flow in both directions in accordance with ASTM D 1784.
 - a. For sodium hypochlorite service, provide a pressure relief hole drilled on the low-pressure side of the ball.
 4. Type V340 PP ball valve 2 inches and smaller: Rated 150 psi at 73°F, PP body, ball, and stem, end entry, double union design, solvent-weld socket ends, elastomer seat, EPDM O-ring stem seals, to block flow in both directions in accordance with ASTM D 4101.
 5. Type V350 PE ball valve 2 inches and smaller: Solid PE body in accordance with ASTM D 2513, socket weld ends, EPDM seat and seals, rated 150 psi at 73°F.
 6. Type V361 three-way ball valve: Rated for a minimum of 150 psi, T-port flow path, Type 316 SST body and ball, full port, NPT threaded ends, live-loaded stem with primary and secondary sealing, PTFE seat, Type 316 SST hardware.
- F. Plug Valves: Type V420 non-lubricated plug valve 2 inches and smaller: DI or carbon steel body, Type 316 SST plug with straight-way rectangular ports, Teflon sleeves, screwed ends, wrench operator, Class 150, rated 275 psi WOG.
- G. Butterfly Valves:
 1. General:
 - a. Valves shall be in accordance with AWWA C504 and the following requirements:
 - 1) Suitable for throttling operations and infrequent operation after periods of inactivity.
 - 2) Elastomer seats which are bonded or vulcanized to the body shall have adhesive integrity of bond between the seat and the body assured by testing, with minimum 75 lb pull in accordance with ASTM D 429, Method B.
 - 3) Bubble-tight with rated pressure applied from either side; test valves with pressure applied in both directions.
 - 4) No travel stops for the disc on the interior of the body.
 - 5) Self-adjusting V-type or O-ring shaft seals.
 - 6) Isolate metal-to-metal thrust bearing surfaces from flowstream.
 - 7) Provided traveling nut or worm gear actuator with handwheel; valve actuators shall be in accordance with AWWA C504.
 - 8) Provide linings and coatings in accordance with AWWA unless otherwise shown on the Drawings or specified herein.
 - 9) Valves shall be in accordance with NSF/ANSI 61; provide a NSF/ANSI 61 certificate for each valve.

- b. Non-AWWA butterfly valves shall meet the following actuator requirements: For above ground installations, provide a handle and notch plate for valves 6 inches and smaller and heavy duty, totally-enclosed gearbox type operators with handwheel, position indicator and travel stops for valves 8 inches and larger unless otherwise shown on the Drawings or specified herein.
 2. Type V515 high performance butterfly valve, 2 inches to 20 inches: Wafer style, CI body, Type 316 SST disc, Type 316 SST one-piece stem, EPDM replaceable resilient seat suitable for operating temperatures up to 250°F, 150 psi working pressure, rating, bubble-tight at 50 psi differential pressure, externally adjustable bronze packing gland with Buna N packing, valve body to fit between ASME B16.1 Class 125/150 flanges.
 3. Type V520 PVC butterfly valve 1 1/2 inches to 8 inches: Wafer body type, pressure rated 150 psi at 70°F CWP, solid ASTM D 1784, Type I, Grade 1, PVC body and contoured PVC or PP valve disc, SST valve stem, Viton (FKM) seat, lever operator.
- H. Check and Flap Valves:
 1. Type V612 double disc swing check valve 2 inches to 48 inches: Wafer style, spring loaded, CI body, aluminum-bronze or DI discs, EPDM resilient seats, and Type 316 SST spring, hinge pin, and stop pin, rated for minimum 150 psi nonshock working pressure.
 2. Type V615 PVC swing type check valve 4 inches and smaller: In accordance with ASTM D 1784, Type I, Grade 1 PVC body, flanged ends, rated 150 psi at 73°F, EPDM seat and seal, external counter balance measure and top entry access.
 3. Type V616 CPVC swing type check valve 4 inches and smaller: In accordance with ASTM D 1784, Type IV, CPVC body, flanged ends, rated 150 psi at 73°F, EPDM seat and seal, external counter balance measure and top entry access.
 4. Type V630 PVC ball check valve 3 inches and smaller: In accordance with ASTM D 1784, Type I, Grade 1 PVC body, dual union socket weld ends, rated 150 psi at 73°F, and EPDM seat and seal.
 5. Type V631 CPVC ball check valve 4 inches and smaller: In accordance with ASTM D 1784, Cell Class 23477-B CPVC body, dual union socket weld ends, rated 150 psi at 73°F, 110 psi at 140°F, Viton seat and seal.
 6. Type V632 PP ball check valve 3 inches and smaller: In accordance with ASTM D 4101, PP body, dual union socket weld ends, rated 150 psi at 73°F, and EPDM seat and seal, minimum shut-off of 5 psi.
 7. Type V633 ball check valve 3 inches and larger: Flanged end, iron body valve with cleanout and sinking type hollow steel ball, vulcanized nitrile rubber exterior, flanges ASME B16.1, Class 125, rated 150-lb working pressure, suitable for horizontal flow. Valve shall be equipped with a limit switch with dry contacts, capable of communication with the plant control system, to provide indication when ball is in the closed position.
 8. Type V642 RP BFPA 3/4 inch to 10 inches: Two resilient-seated check valves with an independent relief valve between the valves, two non-rising stem resilient-seated isolation valves, test cocks, in accordance with AWWA C511, rated 175 psi maximum working pressure.
- I. Self-Regulated Automatic Valves:
 1. Type V710 bronze PRV 2 1/2 inches and smaller: Direct diaphragm operated, spring controlled, bronze body, adjustable pressure setting, rated 300 psi.
 2. Type V711 CI PRV 2 inches and smaller: Direct diaphragm, spring controlled, CI body, spring case, composition seat and diaphragm, SST valve stem, adjustable pressure setting, rated 300 psi.
 3. Type V712 PVC PRV 1 1/2 inches and smaller: Diaphragm operated assembly, spring controlled, in-line pattern, NPT threaded inlet and outlet, rated 150 psi, PVC body, EPDM seals and diaphragm, coated SST spring, SST adjusting bolt, locknut, and fasteners, designed to regulate downstream pressure closing when pressure reaches SP, set pressure adjustable from 5 psi to 50 psi.
 4. Type V713 CPVC PRV 1 1/2 inches and smaller: Diaphragm operated assembly, spring controlled, in-line pattern, NPT threaded inlet and outlet, rated 150 psi, CPVC body, EPDM seals and diaphragm, coated SST spring, SST adjusting bolt, locknut, and fasteners, designed to regulate downstream pressure closing when pressure reaches SP, set pressure adjustable from 5 psi to 50 psi.
 5. Type V714 PP PRV 1 1/2 inches and smaller: Diaphragm operated assembly, spring controlled, in-line pattern, NPT threaded inlet and outlet, rated 150 psi, PP body, EPDM seals and diaphragm, coated SST spring, SST adjusting bolt, locknut, and fasteners, designed to regulate downstream pressure closing when pressure reaches SP, set pressure adjustable from 5 psi to 50 psi.
 6. Type V722 PVC pressure relief, bypass relief, back-pressure regulator, back-pressure, anti-siphon valve 2 inches and smaller: Direct acting diaphragm, spring controlled, in-line pattern, NPT threaded inlet and outlet, rated 150 psi, PVC body, Teflon diaphragm, PVC or Teflon piston, high-density PE or SST adjusting bolt and locknut, SST or coated steel spring, SST fasteners, designed to open when upstream pressure reaches SP, set pressure adjustable from 10 psi to 100 psi, minimum.
 7. Type V723 CPVC pressure relief, bypass relief, back-pressure regulator, back-pressure, anti-siphon valve 2 inches and smaller: Direct acting diaphragm, spring controlled, in-line pattern, NPT threaded inlet and outlet, rated 150 psi, CPVC body, Teflon diaphragm, CPVC or Teflon piston, high-density PE or SST adjusting bolt and locknut, SST or coated steel spring, SST fasteners, designed to open when upstream pressure reaches SP, set pressure adjustable from 10 psi to 100 psi, minimum.
 8. Type V732 DI pressure relief, bypass relief, 3 inches and larger: Hydraulically operated, diaphragm actuated, pilot-controlled globe valve, in-line pattern, ASME B16.1 Class 150 flanged ends rated 250 psi, SST trim and stem, FDA approved fusion-bonded epoxy lining and coating installed in accordance with AWWA C550, externally mounted strainers with cocks, to open when upstream pressure reaches a maximum SP, set pressure as shown on the Drawings.

9. Type V733 PRV 3 inches and larger: Hydraulically operated, diaphragm actuated, pilot controlled globe valve, pilot on the left side looking in the direction of flow, anti-cavitation option, DI body, ASME B16.1 Class 150 flanged ends, rated 250 psi, SST trim, SST stem, externally mounted wye strainers with cocks, maintains a constant downstream pressure regardless of fluctuations in flow or upstream pressure. Fusion bonded epoxy lining (and coating) installed in accordance with AWWA C550. The size/rating shall be as shown on the Drawings.
- J. Specialty Valves:
1. Type V901 CI diaphragm valve 1/2 inch to 12 inches: Straight-through type, soft rubber lined CI body, ASME B16.1 flanged ends, manual operator indicating, rising stem type with handwheel, diaphragm natural rubber, in accordance with MSS SP-88, Category B.
 2. Type V903 PVC diaphragm valve 1/2 inch to 4 inches: Weir type with PVC Type 1, Grade 1 body, PTFE diaphragm, double union design, solvent weld socket ends, handwheel operator, position indicator, adjustable travel stop, clear molded acrylic stem cap. For sodium hypochlorite service, diaphragm shall be three-layer type, designed with PVDF gas barrier between wetted PTFE layer and EPDM top cushion.
 3. Type V904 CPVC diaphragm valve 1/2 inch to 4 inches: Weir type with CPVC body, PTFE diaphragm, double union design, solvent weld socket ends, handwheel operator, position indicator, adjustable travel stop, clear molded acrylic stem cap. For sodium hypochlorite service, diaphragm shall be three-layer type, designed with PVDF gas barrier between wetted PTFE layer and EPDM top cushion.
 4. Type V910 pinch valve 1 inch to 12 inches: CI fully enclosed body, ASME B16.1 Class 125 flanged ends, one-piece molded Buna-N elastomer tube, 90 psi minimum working pressure, double-acting upper and lower pinch bars that close on centerline, SST stem, electrically actuated or handwheel operator, position indicator, geared operator for valves 6 inches and larger. Cone sleeve configuration to eliminate cavitation at design flow. Select cone size to minimize flow restriction when the valve is fully opened.
 5. Type V920 CPVC needle valve 1/2 inch and smaller: CPVC body, in-line style, integrated stem with PTFE seat, threaded connections, fine pitch stem thread for precise adjustment, body shall be rated for 150 psig at 70°F.
 6. Type V921 PVC needle valve 1/2 inch and smaller: PVC body, in-line style, integrated stem with PTFE seat, threaded connections, fine pitch stem thread for precise adjustment, body shall be rated for 150 psig at 70°F.
 7. Type V921 PP needle valve 1/2 inch and smaller: PP body, in-line style, integrated stem with PTFE seat, threaded connections, fine pitch stem thread for precise adjustment, body shall be rated for 150 psig at 70°F.
 8. Type V925 sampling valve: Type 316 SST wetted parts, hand-operated iron crank, piston to extend to inner surface of pipe, sealed by two compressible replaceable PTFE rings, one above discharge port and other below discharge port, 3/4 inch NPT inlet and 3/4 inch NPT outlet.
- K. Operators and Actuators:
1. Manual operators:
 - a. General:
 - 1) For AWWA valves, the operator force shall not exceed the requirements of the applicable valve standard. For non-AWWA valves, the operator force shall not exceed the applicable industry standard or 80 lbs, whichever is less, under any operating condition, including initial breakaway. Provide a gear reduction operator when force exceeds requirements.
 - 2) The operator shall be the self-locking type or equipped with a self-locking device.
 - 3) Position indicator on quarter-turn valves.
 - 4) Worm and gear operators shall be one-piece design worm-gears of gear bronze material. Worm hardened alloy steel with thread ground and polished. Traveling nut type operators threaded steel reach rods with internally threaded bronze or DI nut.
 - b. Exposed operator:
 - 1) Galvanized and painted unless otherwise specified.
 - 2) Cranks on gear type operators.
 - 3) Chain wheel operator with tiebacks, extension stem, floor stands, and other accessories to permit operation from normal operation level.
 - 4) Valve handles shall take a padlock; wheels shall take a chain and padlock.
 - c. Buried operator:
 - 1) Buried service operators on valves larger than 2 1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2 inches and smaller shall have a cross handle for operation by forked key. Enclose moving parts of the valve and the operator in housing to prevent contact with the soil.
 - 2) Design buried service operators for quarter-turn valves to withstand 450 ft-lbs of input torque at the fully open or fully closed positions, grease-packed and gasketed to withstand a submersion in water to 10 psi.
 - 3) Buried valves shall have extension stems, bonnets, and valve boxes.
 2. Electric motor actuators:
 - a. General:
 - 1) In accordance with AWWA C542.
 - 2) Size to 1 1/2 times the required operating torque; motor stall torque shall not exceed the torque capacity of the valve.
 - 3) Controls integral with the actuator and fully equipped in accordance with AWWA C542.
 - 4) Stem protection for rising stem valves.
 - b. Actuator operation – general:
 - 1) Suitable for full 90 degree rotation of quarter-turn valves or for use on multi-turn valves, as applicable.
 - 2) Manual override handwheel.
 - 3) Valve position indication.

- 4) Operate from full closed to full open positions or the reverse in the number of seconds specified in the electric operator schedule.
- 5) Valve shall remain in the last position upon loss of signal (fail last position) unless otherwise shown on the Drawings.
- c. Open-close or modulating service (1E):
 - 1) Size motors for unrestricted continuous duty.
 - 2) Feedback potentiometer and integral electronic positioner/comparator circuit to maintain valve position.
 - 3) Hand-off-auto (local-off-remote) selector switch:
 - a) Open-stop-close push button to control valve in hand position.
 - b) 4 mA to 20 mA DC input signal to control valve in auto position.
 - c) Auxiliary contact which closes when the hand-off-auto or local-off-remote switch is in the auto or remote position.
 - 4) Open and closed indicating lights.
 - 5) Reversing motor starter with built-in overload protection.
 - 6) Actuator power supply:
 - a) 120 V, single-phase unless otherwise shown on the Drawings.
 - b) Externally operable power disconnect switch.
 - 7) Enclosure:
 - a) In accordance with NEMA 250, Type 4X.
 - b) Contain 120 V space heaters.
 - 8) Limit switch:
 - a) SPDT type, field adjustable cam-operated, with contacts rated for 5 A, 120 VAC.
 - b) Each valve actuator shall have a minimum of two transfer contacts at end position, one for valve full open and one for valve full closed; limit switches shall be for customer use only.
 - c) Housed in actuator control enclosure.
 - 9) Control features: Furnish electric actuators with features as specified in the electric operator schedule.

2.3 ACCESSORIES

- A. Tagging: 1 1/2 inch diameter heavy brass or SST tag attached with No. 16 solid brass or SST jack chain for each valve bearing the valve tag number affixed to the valve at the factory prior to shipment.
- B. T-Handled Operating Wrench:
 1. Galvanized operating wrenches, 4 feet long: Two each.
 2. Galvanized operating keys for cross handled valves: One each.
- C. Floor Stand:
 1. Non-rising, heavy pattern, indicating type.
 2. Complete with solid extension stem, coupling, handwheel, stem guide brackets, and yoke attachment; stem length as required to connect valve operating nut and floor stand.
 3. Stem guide: Space such that stem L/R ratio does not exceed 200.
 4. Anchor bolts: Type 304 SST.
- D. Floor Box:
 1. Plain type, for support of non-rising type stem.
 2. Complete with solid extension stem, operating nut, and stem guide brackets; stem length as required to extend valve operating nut to within 3 inches of finish floor.
 3. Stem guide: Space such that stem L/R ratio does not exceed 200.
 4. Anchor bolts: Type 304 SST.
- E. Chain Wheel and Guide:
 1. Handwheel direct-mount type.
 2. Complete with chain.
 3. Galvanized or cadmium-plated.
- F. Indicator Post Assembly:
 1. Cast or DI post head, bell, and wrench with cast, DI, or steel barrel.
 2. Plexiglas protected window to indicate open and closed position.
 3. Padlockable eye bolt for wrench.
 4. Adjustable bury depth; bury depth as required for valve installation.
 5. UL listed, FMG approved.

2.4 FINISHES

- A. Factory Finishing:
 1. Epoxy lining and coating:
 - a. Use where specified for individual valves described herein.
 - b. In accordance with AWWA C550.
 - c. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as fusion or fusion-bonded epoxy.
 - d. MDFT 7 mil, except where limited by valve operating tolerances.
 2. Exposed valves:
 - a. Coating shall match the Pipe Schedule and shall be as specified in SECTION 09 90 00.
 - b. Safety isolation valves and lockout valves with handles, handwheels, or chain wheels shall be safety yellow.

PART 3 EXECUTION

3.1 INSTALLATION

A. Flange Ends:

1. Flanged valve bolt holes shall straddle vertical centerline of pipe.
2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

B. Screwed Ends:

1. Clean threads by wire brushing or swabbing.
2. Apply joint compound.

C. Valve Installation and Orientation:

1. General:
 - a. Install valves so handles operate from fully open to fully closed without encountering obstructions.
 - b. Install valves in a location that allows for easy access for routine O&M.
 - c. Install valves in accordance with the Manufacturer's recommendations.
 - d. Install a line size ball valve and union upstream of each solenoid valve, in-line flow switch, or other in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.
 - e. Locate the valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.
2. Gate, globe, and ball valves:
 - a. Install the operating stem vertical when the valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above the finished floor.
 - b. Install the operating stem horizontal in horizontal runs of pipe having centerline elevations greater than 4 feet 6 inches above the finished floor.
3. Plug valves:
 - a. Unless otherwise restricted or shown on the Drawings, install the valve as follows:
 - 1) Liquids with suspended solids service with horizontal flow: Install the valve with the stem in the horizontal position with the plug up when the valve is open; install the valve with the seat end upstream, the flow shall produce unseating pressure.
 - 2) Liquids with suspended solids service with vertical flow: Install the valve with the seat in the highest portion of the valve, seat up.
 - 3) Clean liquids and gas service: Install the valve with the seat end downstream of higher pressure when the valve is closed; higher pressure forces the plug into the seat.
4. Butterfly valves:
 - a. Unless otherwise restricted or shown on the Drawings, install the valve a minimum of eight diameters downstream of an elbow or branch tee and with the shaft in horizontal position.
 - b. For a vertical elbow or branch tee immediately upstream of the valve, install the valve with the shaft in the vertical position.
 - c. For a horizontal elbow or branch tee immediately upstream of the valve, install the valve with the shaft in the horizontal position.
 - d. When installed immediately downstream of a swing check, install the valve with the shaft perpendicular to the swing check shaft.
 - e. For free inlet or discharge into basins and tanks, install the valve with the shaft in the vertical position.
5. Check valves:
 - a. Install the valve in horizontal or vertical flow (up) flow piping only for liquid services.
 - b. Install the valve in vertical flow (up) piping only for gas services.
 - c. Install the swing check valve with the shaft in horizontal position.
6. Extension stem for operator: Where the depth of the valve operating nut is 3 feet or greater below finish grade, furnish an operating extension stem with a 2-inch operating nut to bring the operating nut to a point within 6 inches of finish grade.
7. Torque tube: Where the operator for the quarter-turn valve is located on a floor stand, furnish an extension stem torque tube of a type properly sized for the maximum torque capacity of the valve.
8. Floor box and stem: Steel extension stem length shall locate the operating nut in the floor box.
9. Chain wheel and guide: Install chain wheel and guide assemblies or chain lever assemblies on manually operated valves over 6 feet 9 inches above the finished floor. Install chain to within 3 feet of finished floor. Where chains hang in normally traveled areas, use appropriate L-type, tie-back anchors. Install chains to within operator horizontal reach of 2 feet 6 inches, maximum, measured from the normal operator standing location or station.

3.2 QUALITY CONTROL

A. Tests and Inspection:

1. Valves may be tested while testing pipelines or as a separate step.
2. Test that valves open and close smoothly under operating pressure conditions. Test that two-way valves open and close smoothly under operating pressure conditions from both directions.
3. Inspect air and vacuum valves as the pipe is being filled to verify the venting and seating is fully functional.
4. Count and record the number of turns to open and close each valve; account for any discrepancies with the Manufacturer's data.
5. Set, verify, and record set pressures for relief and regulating valves.
6. Automatic valves shall be tested in conjunction with control system testing. Set opening and closing speeds and limit switches as required or recommended by the ENGINEER.

7. Test hydrostatic relief valve seating; record leakage. Adjust and retest to a maximum leakage of 0.1 gpm/ft of seat periphery.

END OF SECTION

100% CONSTRUCTION DRAWINGS FOR
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY
TOWN OF RIDGWAY, OURAY COUNTY

100% SUBMITTAL
NOT FOR CONSTRUCTION

KEY PROJECT PROJECT CONTACTS

OWNER - TOWN OF RIDGWAY
PRESTON NEILL
TOWN MANAGER
970-626-5308
PNEILL@TOWN.RIDGWAY.CO.US

JOANNE FAGAN
TOWN ENGINEER
JFAGAN@TOWN.RIDGWAY.CO.US

ENGINEER - RESPEC
ALAN LEAK, PE
PRRINCIPAL IN CHARGE
720-775-6406 X 1404
ALAN.LEAK@RESPEC.COM

MICHELLE HOPKINS, PE
PROJECT MANAGER
720-775-6425
MICHELLE.HOPKINS@RESPEC.COM

CRYSTAL YOUNG
GEOMORPHOLOGIST
970-471-6848
CRYSTAL.YOUNG@RESPEC.COM

FUNDING AGENCIES
NATURAL RESOURCE CONSERVATION SERVICE
CLINTON WHITTEN
COLORADO EWP PROGRAM MANAGER
970-439-3241
CLINTON.WHITTEN@USDA.GOV

COLORADO DIVISION OF HOMELAND SECURITY & EMERGENCY MANAGEMENT
ELSA HENRY
RECOVERY GRANTS MANAGER
720-467-1979
ELSA.HENRY@STATE.CO.US

COLORADO WATER COMMISSION BOARD
JOSHUA GODWIN
CONSTRUCTION FINANCE PROJECT MANAGER
850-450-8253
JOSHUA.GODWIN@STATE.CO.US



LOCATION MAP
1" = 10,000'

SHEET LIST TABLE

SHEET	DRAWING	TITLE
1	G-1	COVER SHEET
2	G-2	NOTES & LEGEND
3	C-1	EXISTING CONDITIONS & DEMOLITION
4	C-2	SITE PLAN
5	C-3	INFILTRATION PIPELINE PLAN & PROFILE
6	C-4	INFILTRATION GALLERY PLAN & PROFILE
7	C-5	INFILTRATION GALLERY SECTIONS
8	C-6	CIVIL DETAILS (1 OF 4)
9	C-7	CIVIL DETAILS (2 OF 4)
10	C-8	CIVIL DETAILS (3 OF 4)
11	C-9	CIVIL DETAILS (4 OF 4)
12	ER-1	INITIAL & INTERIM EROSION CONTROL PLAN
13	ER-2	FINAL EROSION CONTROL PLAN
14	ER-3	EROSION CONTROL DETAILS (1 OF 4)
15	ER-4	EROSION CONTROL DETAILS (2 OF 4)
16	ER-5	EROSION CONTROL DETAILS (3 OF 4)
17	ER-6	EROSION CONTROL DETAILS (4 OF 4)

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-COVER.DWG
PLOT DATE: March 18, 2026 3:47 PM, BY: MICHELLE HOPKINS

PERMITS

THE FOLLOWING PERMITS HAVE BEEN APPLIED FOR THE PROJECT.
USACE RGP 96 - SPA-2025-00226
STATE DEWATERING PERMIT - COG081284
STATE STORMWATER PERMIT - COR428150
OURAY COUNTY RIGHT-OF-WAY PERMIT

CONTRACTOR SHALL ADHERE TO ALL GENERAL AND SPECIAL
CONDITIONS OF THE PERMIT(S) WHEN AUTHORIZED.

SURVEY CONTROL MONUMENTS

DATUM IS IN COLORADO STATE PLAN SOUTH ZONE, US SURVEY
FT WITH NAVD88 VERTICAL DATUM
CP 100
NORTHING: 1513883.59
EASTING: 2348118.56
CP 101
NORTHING: 1513767.61
EASTING: 2348048.78

CERTIFICATION

"I CERTIFY TO THE BEST OF MY PROFESSIONAL
KNOWLEDGE, JUDGEMENT, AND BELIEF, THESE
PLANS MEET APPLICABLE NRCS STANDARDS"


MICHELLE HOPKINS, PE
ENGINEER OF RECORD
STATE OF COLORADO NO. 57389
3/13/2026
DATE

DESIGNED DRAWN CHECKED DATE	MA/H MTT MA/H 02/13/2026	RESPEC 720 S COLORADO BLVD SUITE 410S DENVER, CO 80246 PHONE (303) 757-3855		REVISION
STAMP				
 Know what's below. Call before you dig.				
TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308				
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY				
COVER SHEET				
DRAWING NUMBER: G-1 SHEET 1				

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708-25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-COVER.DWG
PLOT DATE: March 18, 2026 3:47 PM, BY: MICHELLE HOPKINS

PROJECT LIMITS

- ALL CONSTRUCTION ACTIVITY SHALL BE CONFINED TO THE PROJECT LIMITS AS DEFINED ON THE EROSION CONTROL SHEETS. THE GENERAL LOCATIONS OF THE PROJECT LIMITS SHALL BE SURVEYED BY THE CONTRACTOR PRIOR TO CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR IS WHOLLY RESPONSIBLE FOR MAINTAINING CONSTRUCTION BARRIERS AND TO LIMIT PUBLIC ENTRY INTO DEFINED PROJECT LIMITS. ACCESS SHALL BE LIMITED TO THE EXISTING ACCESS ROAD AND STAGING AREA. THE ACCESS GATE SHALL REMAIN LOCKED AT ALL TIMES.
- THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY FACILITIES REQUIRED FOR PERFORMING THE WORK. TEMPORARY CONSTRUCTION FACILITIES AND UTILITY CONNECTIONS ARE SOLELY THE CONTRACTOR'S RESPONSIBILITY.
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING A CLEAN AND SAFE ENVIRONMENT FOR ALL WORKERS ON THE JOB SITE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SANITARY FACILITIES. CONTRACTOR SHALL FOLLOW OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL POWER, WATER AND UTILITY NEEDS. CONTRACTOR SHALL KEEP THE PROJECT LIMITS IN A NEAT AND ORDERLY MANNER. CONTRACTOR IS RESPONSIBLE FOR REMOVING TEMPORARY FACILITIES AND CONTROLS AFTER COMPLETION OF ALL WORK.

CONSTRUCTION STAKING

- THE ENGINEER HAS PROVIDED ADEQUATE HORIZONTAL AND VERTICAL CONTROL POINTS FOR THE CONTRACTOR TO ESTABLISH THE LINES AND GRADES SHOWN ON THE PLANS. GRADE, ELEVATIONS AND ADDITIONAL CONSTRUCTION STAKING SHALL BE WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR.
- ESTABLISHED CONTROL POINTS SHALL BE PROVIDED WITH SPECIAL COLORED FLAGGING AND IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THOSE CONTROL POINTS. IN THE EVENT THEY ARE LOST, DUE TO ANY CAUSE, THE CONTRACTOR SHALL RE-ESTABLISH ADEQUATE AND PERMANENT CONTROL MARKERS.

SITE INTEGRITY

- THE CONTRACTOR IS REQUIRED TO DOCUMENT THE CONDITION OF THE PROJECT SITE AND ACCESS ROAD WITH PHOTOGRAPHS OR VIDEO RECORDINGS. THE CONTRACTOR IS RESPONSIBLE FOR REHABILITATING, REPAIRING OR REPLACING, TO PRE-CONSTRUCTION CONDITIONS, ANY DAMAGE TO THE ROAD, ACCESS GATES, PIP VEGETATION OR LANDS DIRECTLY OR INDIRECTLY RELATED TO CONSTRUCTION ACTIVITIES TO THE SATISFACTION OF THE UNDERLYING LAND OWNER.

EROSION CONTROL AND BMPS

- STAGING AREAS ARE DEFINED ON THE PROJECT DRAWINGS. ALL CONSTRUCTION STAGING, STOCKPILING OF MATERIALS, EQUIPMENT STORAGE, ETC. SHALL TAKE PLACE IN DESIGNATED AREAS WITH ADEQUATE BARRIERS TO PROTECT THE PUBLIC FROM ENTRY, AND ADEQUATE BMPS IN PLACE PRIOR TO COMMENCING WORK. STAGING AREAS SHALL HAVE A DESIGNATED AREA WITH CONTACT INFORMATION POSTED FOR INQUIRES. STAGING AREAS SHALL PROVIDE EMPLOYEES ALL NECESSARY FACILITIES, LEGAL POSTINGS, AND SAFETY PROTOCOL.
- CONSTRUCTION ACTIVITIES ARE ANTICIPATED TO PRODUCE SIGNIFICANT SOLID WASTE MATERIALS (TIMBERS AND CONCRETE), AND CLEAN FILL MATERIALS. NO POTENTIALLY CONTAMINATED SOILS ARE ANTICIPATED TO BE UNCOVERED DURING CONSTRUCTION ACTIVITIES.
- WORK IN THE CHANNEL IS PERMITTED TO BE IN THE WET DURING NORMAL SEASONAL FLOW CONDITIONS. NO WORK SHALL OCCUR DURING A STORM EVENT. THE CONTRACTOR IS RESPONSIBLE TO CHECK THE WEATHER EACH DAY AND MONITOR FLOW LEVELS. EACH DAYS WORK SHALL BE COMPLETE SUCH THAT IF A STORM EVENT OCCURRED NO DAMAGE WOULD OCCUR TO THE PROJECT SITE AND STRUCTURES.
- WATER CONTROL IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL COMPLY WITH THE COLORADO STATE DEWATERING PERMIT.
- DEWATERING FOR PLACEMENT OF PRECAST STRUCTURES, OR GROUT, MAY REQUIRE A GROUND WATER PUMP. ALL PUMPED GROUND WATER SHALL BE DISCHARGED BACK TO THE CHANNEL THROUGH A FILTRATION SOCK. DISCHARGED WATER SHALL NOT EXCEED 10 NTUs OR AS REQUIRED BY THE COLORADO STATE DEWATERING PERMIT..
- EQUIPMENT SHALL BE ALLOWED TO OPERATE IN THE WET CHANNELS. EQUIPMENT OPERATING IN OR ADJACENT TO ANY WET CHANNELS SHALL BE FREE OF ANY FLUID LEAKS AND IN EXCELLENT OPERATING CONDITION. BIODEGRADABLE HYDRAULIC FLUIDS ARE RECOMMENDED FOR EQUIPMENT OPERATING IN THE FLOWING CHANNEL. NO EQUIPMENT SHALL BE LEFT UNATTENDED, AT ANY TIME, IN ANY WET CHANNEL OR BELOW THE ORDINARY HIGH WATER LINE EQUIPMENT STORAGE SHALL OCCUR IN A DESIGNATED UPLAND LOCATION IN THE STAGING AREA.
- ALL EQUIPMENT SHALL BE CLEANED PRIOR TO BEING MOBILIZED ON-SITE TO MINIMIZE POTENTIAL SPREADING OF INVASIVE SPECIES. EQUIPMENT SHALL BE POWER-SPRAYED AND FREE OF WEEDS. IF ANY EQUIPMENT BEING USED FOR THE PROJECT HAS BEEN PREVIOUSLY WORKING IN ANOTHER STREAM, RIVER, LAKE, POND OR WETLAND, ONE OF THE

FOLLOWING DISINFECTION PRACTICES IS NECESSARY PRIOR TO CONSTRUCTION TO PREVENT THE SPREAD OF WHIRLING DISEASE, NEW ZEALAND MUD SNAILS, ZEBRA MUSSELS, DIDYMOSPHEINIA, AND OTHER AQUATIC HITCHHIKERS. CLEANING OF EQUIPMENT INCLUDE GROUND CREW BOOTS, WADERS, SHOVELS OR OTHER TOOLS.

- REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, HAND TOOLS, BOOTS, ECT.) AND SPRAY/SOAK EQUIPMENT IN A 1:15 SOLUTION OF SPARQUAT INSTITUTIONAL CLEANER AND WATER. KEEP EQUIPMENT MOIST FOR AT LEAST 10 MINUTES; OR
 - REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, HAND TOOLS, BOOTS, ETC.) AND SPRAY/SOAK EQUIPMENT WITH WATER GREATER THAN 140 DEGREES FAHRENHEIT FOR AT LEAST 10 MINUTES.
 - THE EXCAVATORS AND BACKHOES MAY NEED TO BE CLEANED ON SITE TO REMOVE EXCESS SEDIMENTS STUCK TO THE TRACK OR HOES. SEDIMENTS THAT ARE REMOVED WITH A SHOVEL SHALL BE PLACED IN DESIGNATED CLEAN FILL MATERIAL STORAGE AREAS. SEDIMENTS REMOVED WITH CLEAN WATER SHALL BE WASHED INTO THE DEWATERING AREA. ALL DEWATERING AREAS SHALL HAVE EROSION CONTROL LOGS STAKED AT FLOW LINES BEFORE POTENTIAL TRANSPORT TO THE BEAVER CREEK.
- ANY AND ALL FUELING AND OILING OF EQUIPMENT SHALL BE IN DESIGNATED UPLAND LOCATIONS, WITH ADEQUATE BMP'S TO CONTAIN ANY POTENTIAL SPILL. ALL MAJOR EQUIPMENT/VEHICLE MAINTENANCE SHALL BE PERFORMED OFF-SITE. FUEL TANK(S) MAY BE KEPT ON-SITE IN THE STAGING AREA WITH DRIP PANS UNDERNEATH THE FUELING AREA. ALL EQUIPMENT FLUIDS GENERATED FROM MAINTENANCE ACTIVITIES SHALL BE DISPOSED OF INTO DESIGNATED DRUMS STORED ON SPILL PALLETS IN ACCORDANCE WITH HAZARDOUS WASTE MANAGEMENT PRACTICES. DRIP PANS SHALL BE PLACED UNDER ALL EQUIPMENT RECEIVING MINOR OR ROUTINE MAINTENANCE.
 - A SPILL CLEANUP PLAN IS WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE POSTED AND AVAILABLE AT ALL TIMES ON SITE FOR ALL WORK AREAS PRIOR TO ANY CONSTRUCTION ACTIVITIES AND SHALL INCLUDE COORDINATION WITH LOCAL EMERGENCY RESPONSE AGENCIES. IN THE EVENT OF A SPILL DURING REFUELING OR EQUIPMENT MAINTENANCE, PETROLEUM CONTAMINATED SOILS AS DEFINED IN 6 CCR 1007-3 268.36 SHALL BE DISPOSED OF, IN A COLORADO HAZARDOUS MATERIALS AND WASTE MANAGEMENT QUALIFIED SOLID WASTE FACILITY.
 - A RELEASE OF ANY CHEMICAL, OIL, PETROLEUM PRODUCT, SEWAGE, ETC., WHICH MAY ENTER SURFACE OR GROUND WATER SHALL BE REPORTED TO THE DIVISION OF WATER QUALITY AS REQUIRED UNDER THE CLEAN WATER ACT AND THE OIL POLLUTION ACT.

ROAD ACCESS AND HAUL ROUTES

- THE IMPORT AND EXPORT OF EQUIPMENT AND MATERIALS FROM THE PROJECT LIMITS SHALL OCCUR AT DESIGNATED LOCATIONS AT DEFINED ROAD ACCESS AND HAUL ROUTES.
- DUST CONTROL SHALL BE IMPLEMENTED AS NEEDED. SPRAYING OF WATER AT A RATE OF 300 GALLONS PER ACRE OR LESS SHALL BE PERFORMED BY A MOBILE PRESSURE-TYPE DISTRIBUTOR TRUCK WHENEVER THE DRYNESS OF THE SOIL WARRANTS IT.

PROTECT IN PLACE TREES, AQUATIC RESOURCES, RIPARIAN AREAS AND SPECIAL GUARANTEES

- ENGINEER AND THE LANDOWNER WILL MARK ALL TREES FOR REMOVAL AND SELECTIVE CLEARING AND PRUNING FOR EQUIPMENT ACCESS AND SITE RESTORATION.
- CONTRACTOR GUARANTEES THAT CARE, CAUTION AND BEST MANAGEMENT TECHNIQUES ARE IMPLEMENTED TO MAXIMIZE THE SURVIVABILITY OF NATIVE MATURE TREES NOT DESIGNATED FOR REMOVAL.
- ALL PROTECT IN PLACE VEGETATION SHALL HAVE 100% SUCCESS RATE, SHOWING VIGOR AND GENERAL HEALTH, FOR ONE YEAR AFTER PIP MEASURES ARE CONDUCTED.

CULTURAL RESOURCES

- NO CULTURAL RESOURCES ARE ANTICIPATED TO BE IMPACTED BY THE PROJECT. IF POTENTIAL CULTURAL RESOURCES IN THE PROJECT AREA ARE DISCOVERED DURING CONSTRUCTION AND CANNOT BE AVOIDED, CONTRACTOR SHALL SUSPEND CONSTRUCTION ACTIVITIES IN THAT AREA UNTIL THE PROPERTIES CAN BE EVALUATED FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES IN CONSULTATION WITH COLORADO STATE HISTORICAL PRESERVATION OFFICE.

DIVERSION PIPELINE NOTES

- ALL STATIONING IS CENTER LINE UNLESS OTHERWISE NOTED. ALL ELEVATIONS ARE INVERT ELEVATION UNLESS OTHERWISE NOTED.
- ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE ENGINEER. THE ENGINEER RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT

CONFORM TO ITS STANDARDS AND SPECIFICATIONS.

- ALL OVER-LOT GRADING MUST BE COMPLETED TO WITHIN ONE (1) FOOT OF FINAL GRADE PRIOR TO INSTALLATION OF WATER INFRASTRUCTURE.
- ALL WATER MAIN PIPE SHALL BE AWWA C900 PVC OR EQUAL, PRESSURE CLASS 200. ALL WATER MAIN FITTINGS SHALL HAVE MECHANICAL RESTRAINTS. ALL WATER MAIN PIPE SHALL HAVE A MINIMUM COVER DEPTH OF THREE (3) FEET.
- DUCTILE IRON FITTINGS AND VALVES SHALL BE WRAPPED WITH POLYETHYLENE TUBING, DOUBLE BONDED AT EACH JOINT AND ELECTRICALLY ISOLATED. BONDING AND ANODE CONNECTIONS SHALL BE THOROUGHLY COATED WITH BITUMINOUS COATINGS.
- ALL DUCTILE IRON FITTINGS SHALL HAVE CATHODIC PROTECTION USING TWO NO. 6 WIRES WITH 9 LB. MAGNESIUM ANODES AT EACH FITTING.
- ALL MAIN LINES (PVC, HDPE & DUCTILE IRON) SHALL BE INSTALLED WITH COATED #12 TRACER WIRE WITH TEST STATIONS AT INTERVALS NO GREATER THAN 500 FT.
- COMPACTION TESTS SHALL BE 95% STANDARD PROCTOR AS DETERMINED BY ASTM D698, UNLESS OTHERWISE APPROVED BY THE ENGINEER. ALL REPORTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
- THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. THE LOCATION OF ALL UTILITIES SHALL BE FIELD VERIFIED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE ENGINEER SHALL BE NOTIFIED OF ANY DEVIATIONS TO THE LINE AND/OR GRADE AS DEPICTED ON THE PLANS. CONTRACTOR SHALL SUBMIT TO THE TOWN AND THE ENGINEER OF RECORD A REPORT OF THE FIELD VERIFIED INFORMATION PRIOR TO THE START OF CONSTRUCTION.
- ALL BENDS SHALL BE FIELD STAKED PRIOR TO THE START OF CONSTRUCTION.
- BENDS, DEFLECTION & CUT PIPE LENGTHS SHALL BE USED TO HOLD HORIZONTAL ALIGNMENT OF WATER LINES TO NO MORE THAN 0.5' FROM THE DESIGNED ALIGNMENT. CONSTRUCTION STAKES TO BE AT 25' INTERVALS ALONG CURVES TO ASSURE LOCATION OF PIPELINE CONSTRUCTION.
- ALL UNUSED SALVAGED WATER UTILITY MATERIAL SHALL BE RETURNED TO THE TOWN AS REQUESTED.
- AT THE CONTRACTOR'S EXPENSE, ALL UTILITY MAINS SHALL BE SUPPORTED AND PROTECTED SUCH THAT THEY SHALL FUNCTION CONTINUOUSLY DURING CONSTRUCTION OPERATIONS. SHOULD A UTILITY MAIN FAIL AS A RESULT OF THE CONTRACTOR'S OPERATION, IT SHALL BE REPLACED IMMEDIATELY BY THE CONTRACTOR OR BY THE TOWN AT FULL COST OF LABOR AND MATERIALS TO THE CONTRACTOR/DEVELOPER.
- PUMPING OR BYPASS OPERATIONS SHALL BE REVIEWED AND APPROVED BY BOTH THE TOWN AND THE ENGINEER PRIOR TO EXECUTION.
- THE CONTRACTOR SHALL REPLACE OR REPAIR DAMAGE TO ALL SURFACE IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO FENCES, LANDSCAPING THAT MAY BE CAUSED DURING CONSTRUCTION.
- TESTING OF FACILITIES:
 - THE CONTRACTOR SHALL NOTIFY THE TOWN AND ENGINEER A MINIMUM OF 48 HOURS AND A MAXIMUM OF 96 HOURS PRIOR TO THE START OF ANY TESTING.
 - ALL SECTIONS OF WATER LINE ARE TO MEET THE FOLLOWING PRESSURE TESTING REQUIREMENTS
 - TEST 100 % OF ALL LINES WITHIN THE SEGMENT
 - MUST PASS PRESSURE TEST TO 40 PSI FOR TWO HOURS (UNLESS OTHERWISE APPROVED ON THE PLANS).
 - SEE SPECIFICATION SECTION 33 01 12 FOR ADDITIONAL TESTING REQUIREMENTS.
- NO WATER MAIN FACILITY SHALL BE PLACED IN SERVICE UNTIL AFTER THE COMPLETION OF ALL PRESSURE TESTING, FLUSHING, COMPACTION TESTING.
- ALL WATER MAINS, INCLUDING SERVICE LINES, SHALL HAVE THE RELEVANT "AS-BUILT" DRAWING SHEETS PREPARED AND APPROVED PRIOR TO PRELIMINARY ACCEPTANCE BY THE TOWN AND ENGINEER.
- CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING SPRING WATER LINE WITHOUT SHUTDOWN, OR ELSE NOTIFY THE TOWN OF ANY SERVICE SHUTDOWNS NECESSARY TO CONNECT TO EXISTING LINES.

LEGEND

- EX MAJOR CONTOURS
- EX MINOR CONTOURS
- PR MAJOR CONTOURS
- PR MINOR CONTOURS
- EX FENCE
- EX EASEMENT LINE
- EX ROW
- PARCEL LINE
- EX STORM PIPE
- PR 2" CONDUIT
- PR STORM PIPE
- PR STORM MANHOLE
- EX DITCH DIVERSION
- EX DITCH FLOWLINE
- EX CHANNEL FLOWLINE
- EX ROCK OR BOULDER
- PR ROCK OR BOULDER
- EX LOG
- PR LOG
- PR TYPE H ONSITE MIX
- PR MAINTENANCE PATH
- PR LIMITS OF GRADING

EROSION CONTROL LEGEND

- CWA CONCRETE WASHOUT AREA
- CF CONSTRUCTION FENCE
- IP INLET PROTECTION
- SCL SEDIMENT CONTROL LOG
- DSM DRILL SEED AND SOIL STABILIZER
- SM BROADCAST SEEDING AND MULCHING
- SSA STABILIZED STAGING AREA
- SS STREET MAINTENANCE (SWEEPING)
- TOP TEMPORARY OUTLET PROTECTION
- TP TREE PROTECTION
- TSC TEMPORARY STREAM CROSSING
- VTC VEHICLE TRACKING CONTROL
- LOC LIMITS OF CONSTRUCTION
- LOD LIMITS OF DISTURBANCE

ABBREVIATIONS

TBR - TO BE REMOVED
TBR&R - TO BE REMOVED & REPLACED
TBS - TO BE SALVAGED
AIP - ABANDON IN PLACE
PIP - PROTECT IN PLACE
EXCON - EXISTING CONDITIONS
STM - STORM

DESIGNED
DRAWN
CHECKED
DATE

MAH/M
MTT
MAH/M
02/13/2026

RESPEC
720 S COLORADO BLVD
SUITE 410S
DENVER, CO 80246
PHONE (303) 757-3855

STAMP

Know what's below.
Call before you dig.

TOWN OF RIDGWAY
201 N RAILROAD ST
RIDGWAY, CO 81452
(970) 628-5308

BEAVER CREEK
DIVERSION
RESTORATION
INFILTRATION
GALLERY

NOTES & LEGEND

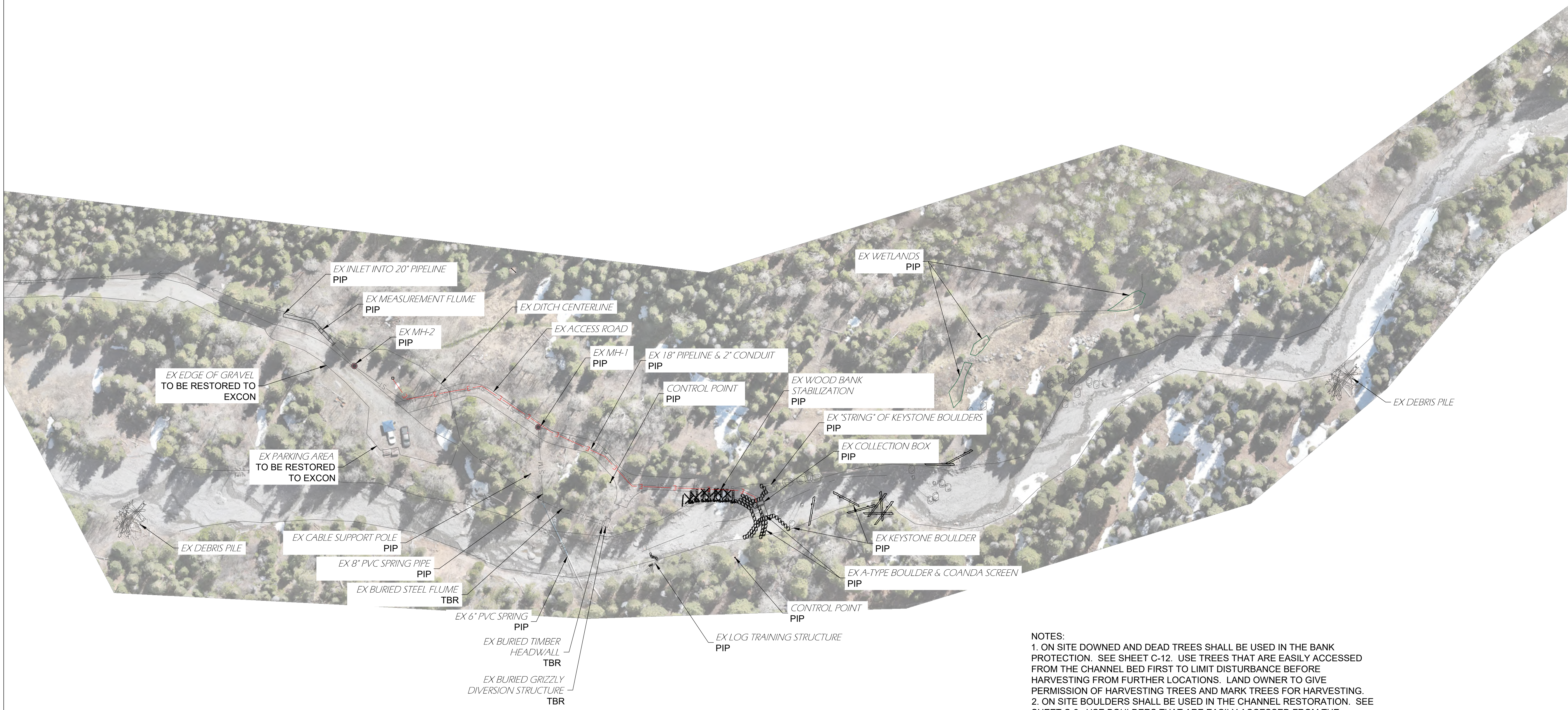
DRAWING NUMBER:

G-2

SHEET 2

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-EX-COND & DEMO.DWG
PLOT DATE: March 20, 2026 12:11 PM BY: MICHELLE HOPKINS

ABBREVIATIONS
TBR - TO BE REMOVED
TBR&R - TO BE REMOVED & REPLACED
TBS - TO BE SALVAGED
AIP - ABANDON IN PLACE
PIP - PROTECT IN PLACE
EXCON - EXISTING CONDITIONS
STM - STORM



NOTES:
1. ON SITE DOWNED AND DEAD TREES SHALL BE USED IN THE BANK PROTECTION. SEE SHEET C-12. USE TREES THAT ARE EASILY ACCESSED FROM THE CHANNEL BED FIRST TO LIMIT DISTURBANCE BEFORE HARVESTING FROM FURTHER LOCATIONS. LAND OWNER TO GIVE PERMISSION OF HARVESTING TREES AND MARK TREES FOR HARVESTING.
2. ON SITE BOULDERS SHALL BE USED IN THE CHANNEL RESTORATION. SEE SHEET C-2. USE BOULDERS THAT ARE EASILY ACCESSED FROM THE CHANNEL BED FIRST TO LIMIT DISTURBANCE BEFORE HARVESTING FROM FURTHER LOCATIONS. LAND OWNER TO GIVE PERMISSION OF HARVESTING BOULDERS.
3. CONTRACTOR SHALL LIMIT EXCAVATION ACTIVITIES DIRECTLY ADJACENT TO STRING OF KEYSTONE BOULDERS TO LIMIT COMPROMISING TOE RETURN STABILITY.



DESIGNED		DRAWN		CHECKED		DATE		REVISION	
RESPEC	MAIH	720 S COLORADO BLVD	MAIH	SUITE 410S	MTT	DENVER, CO 80246	02/13/2026		
PHONE (303) 757-3855									
STAMP		811		Know what's below. Call before you dig.		TOWN OF RIDGWAY		BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY	
						201 N RAILROAD ST		EXISTING CONDITIONS & DEMOLITION	
						RIDGWAY, CO 81452		DRAWING NUMBER:	
						(970) 628-5308		C-1	
								SHEET 3	

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708 25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-SITED.WG
PLOT DATE: March 20, 2026 12:12 PM BY: MICHELLE HOPKINS

SURVEY CONTROL MONUMENTS
DATUM IS IN COLORADO STATE PLAN SOUTH ZONE, US SURVEY FT
WITH NAD88 VERTICAL DATUM
CP 100
NORTHING: 1513883.59
EASTING: 2348118.56
CP 101
NORTHING: 1513767.61
EASTING: 2348048.78



INFILTRATION PIPELINE								
NUMBER	LENGTH	RADIUS	LINE/CHORD DIRECTION	DELTA	START NORTHING	START EASTING	END NORTHING	END EASTING
L1	32.33'		N47° 34' 43.03"E		1513772.75	2348053.03	1513794.55	2348076.89
L2	13.73'		N70° 04' 43.03"E		1513794.55	2348076.89	1513799.23	2348089.80
L3	41.49'		N27° 02' 27.11"E		1513799.23	2348089.80	1513836.18	2348108.66
L4	71.33'		N17° 57' 32.89"W		1513836.18	2348108.66	1513904.04	2348086.66
L5	24.01'		N04° 32' 27.11"E		1513904.04	2348086.66	1513927.98	2348088.56
L6	28.77'		N49° 29' 36.44"E		1513927.98	2348088.56	1513946.66	2348110.44
L7	71.58'		N86° 16' 15.96"E		1513946.66	2348110.44	1513951.32	2348181.87

SPRING DISCHARGE PIPE								
NUMBER	LENGTH	RADIUS	LINE/CHORD DIRECTION	DELTA	START NORTHING	START EASTING	END NORTHING	END EASTING
L8	55.63'		N59° 25' 05.23"W		1513948.17	2348108.07	1513976.47	2348060.18
L9	8.13'		N26° 10' 39.51"W		1513940.87	2348111.66	1513948.17	2348108.07

- NOTES:
- PREVIOUS WORK INCLUDED INSTALLATION OF AN ABOVE GROUND DIVERSION STRUCTURE (COANDA SCREEN & COLLECTION BOX), 18" PIPELINE, SPRING PIPELINE EXTENSION, ACCESS ROAD, A-TYPE BOULDER STRUCTURE, LOG-TRAINING STRUCTURE, FLUME, 20" PIPELINE, COMMUNICATIONS, AND SOLAR POWER. FEATURES ARE DENOTED AS EX (EXISTING).
 - PROPOSED WORK INCLUDE AN INFILTRATION GALLERY, WATER JETTING SYSTEM & ACCESS, 12" PIPELINE WITH TWO MANHOLES, CONNECTION TO EXISTING SPRING COLLECTION PIPE, DISCHARGE PIPE, WOODBANK STABILIZATION NEAR DISCHARGE PIPE, AND FINAL SITE RESTORATION.
 - THE AIR BURST SYSTEM IS AN ADDITIONAL BID ALTERNATIVE ITEM FOR THE TOWN'S CONSIDERATION.

DESIGNED
DRAWN
CHECKED
DATE

RESPEC
720 S COLORADO BLVD
SUITE 410S
DENVER, CO 80246
PHONE (303) 757-3855

MAH
MTT
MAH
02/13/2026

STAMP

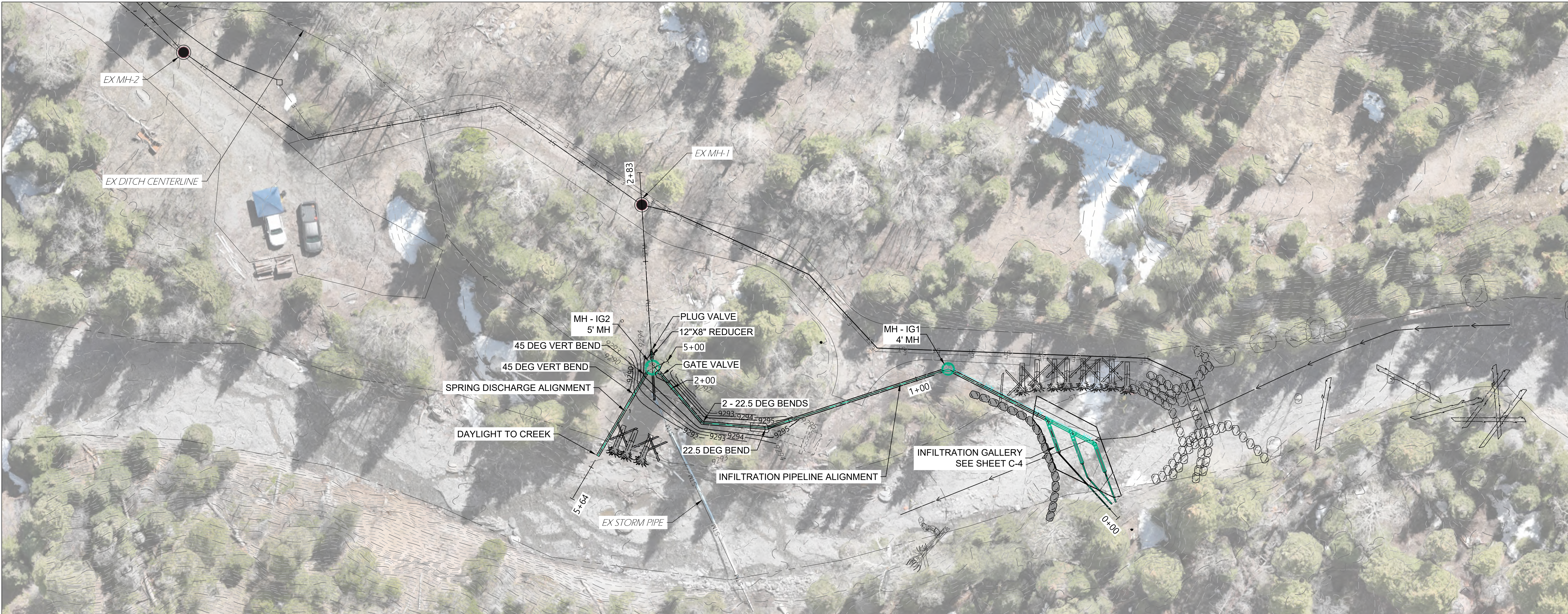
TOWN OF RIDGWAY
201 N RAILROAD ST
RIDGWAY, CO 81452
(970) 628-5308

BEAVER CREEK
DIVERSION
RESTORATION
INFILTRATION
GALLERY

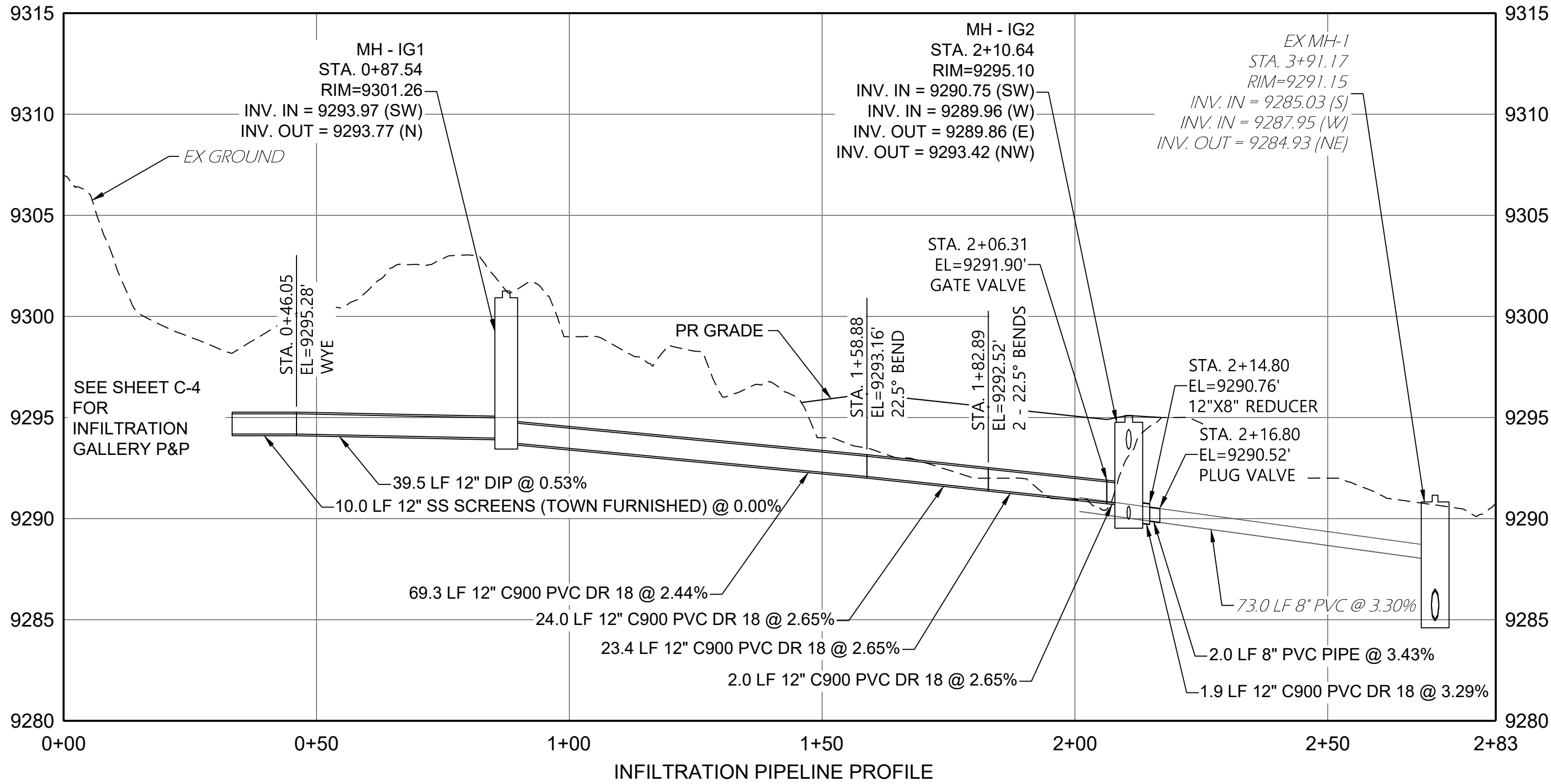
SITE PLAN

DRAWING NUMBER:
C-2
SHEET 4

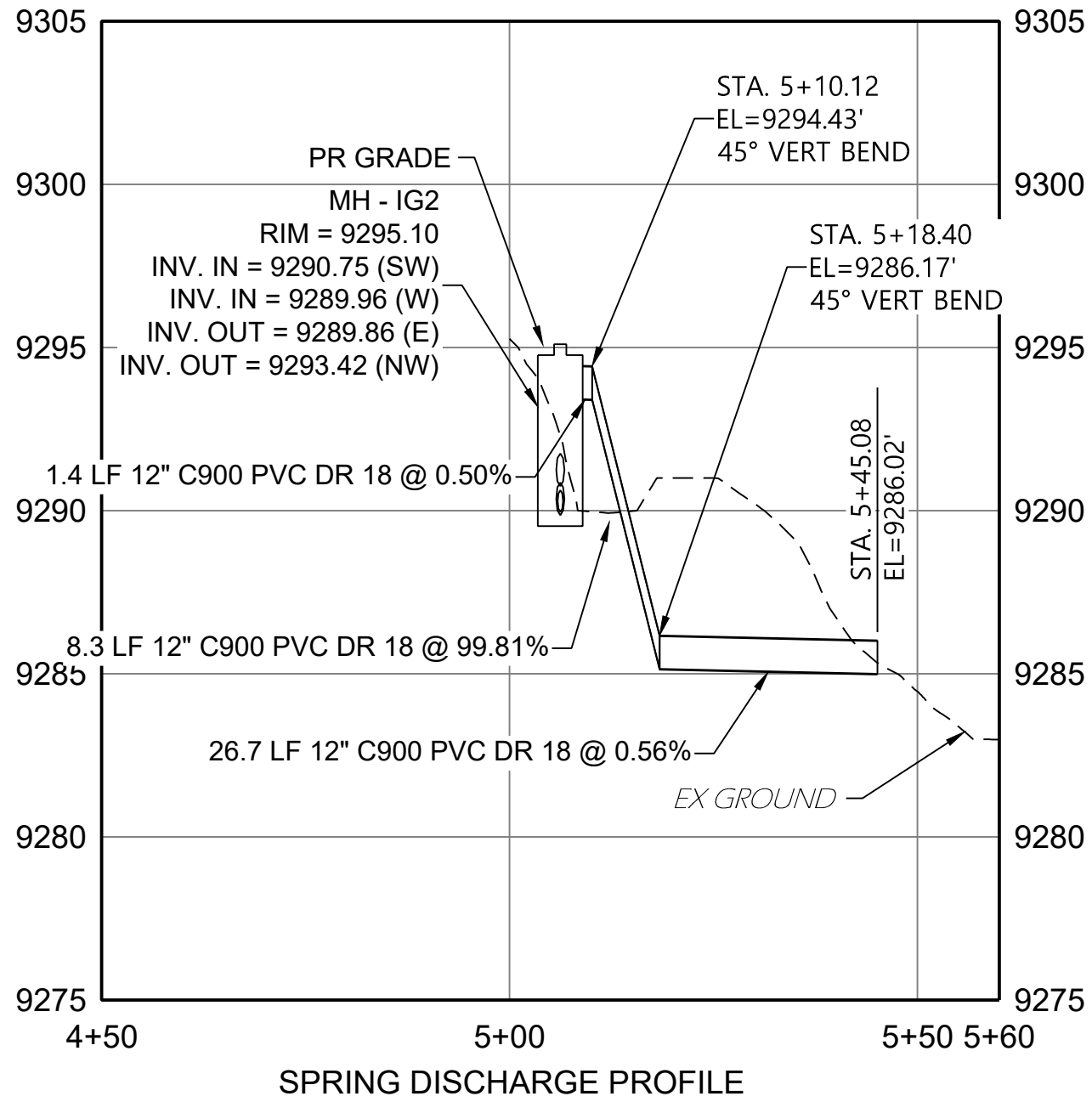
NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-INFILTRATION DOWNSTREAM.DWG
PLOT DATE: March 20, 2026 11:56 AM BY: MICHELLE HOPKINS



INFILTRATION PIPELINE PLAN



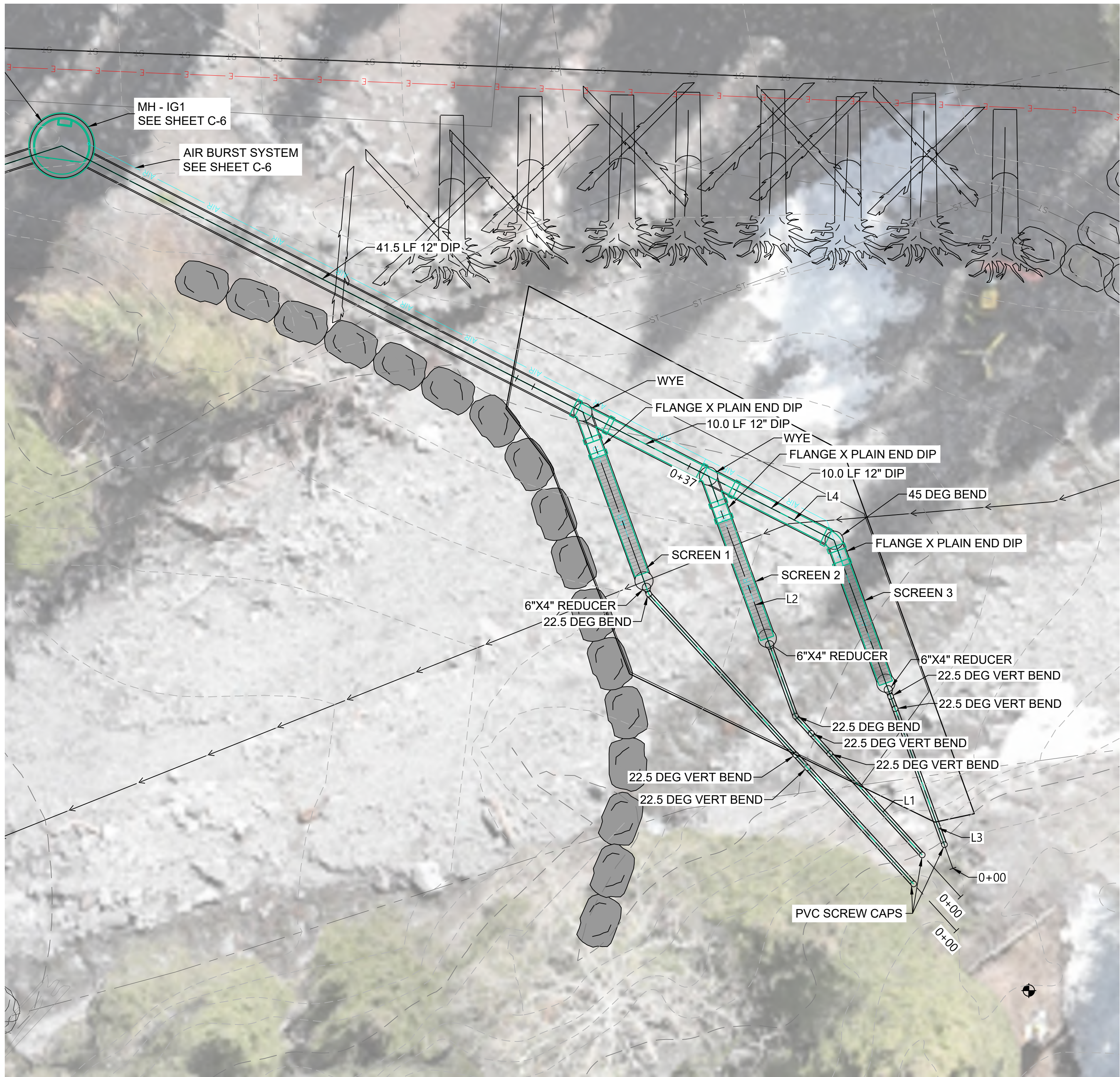
INFILTRATION PIPELINE PROFILE



SPRING DISCHARGE PROFILE

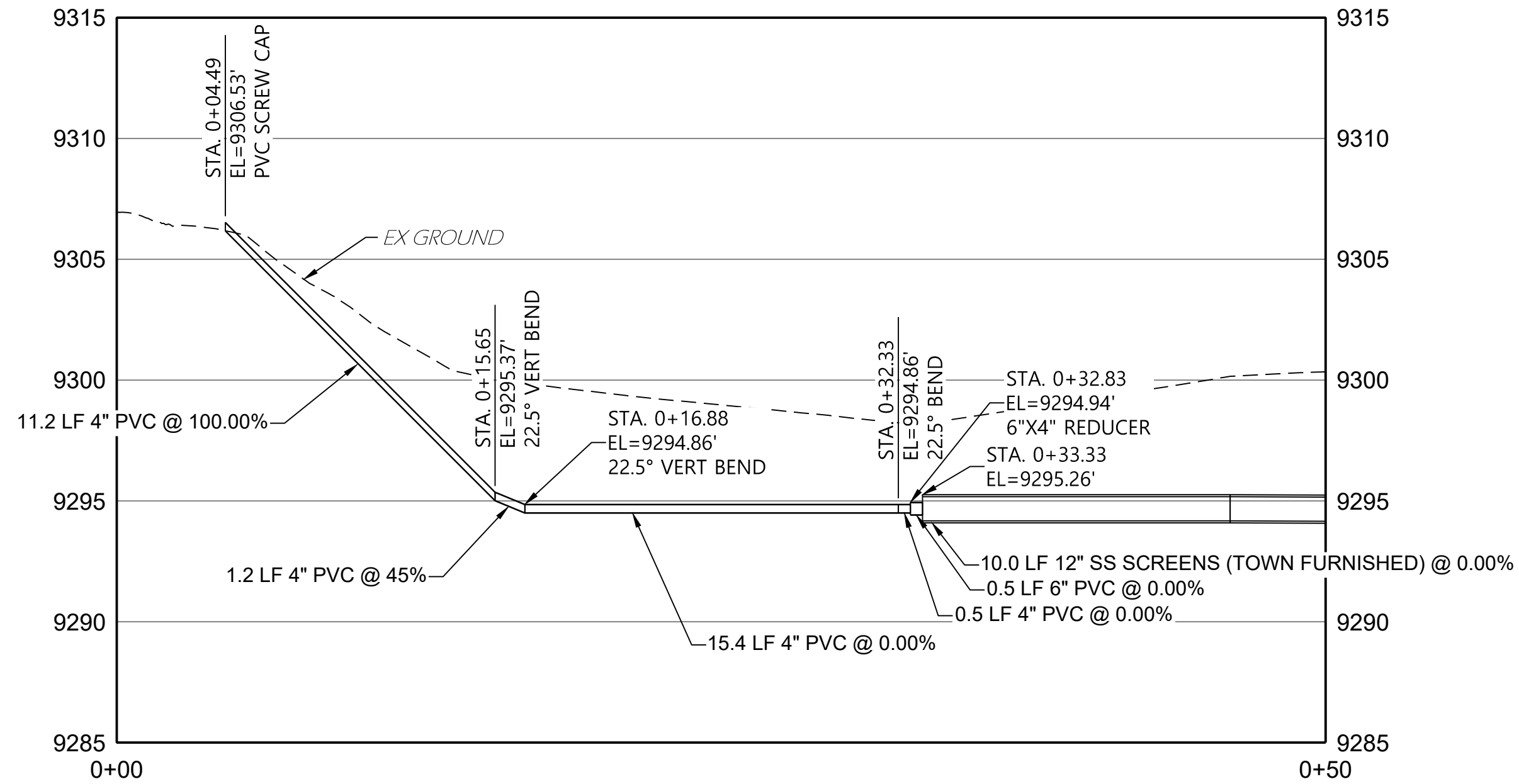
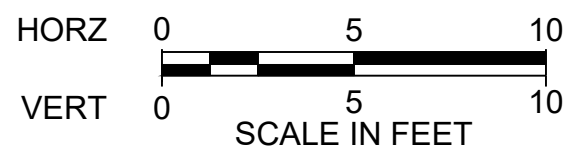
	DESIGNED	MAI/H
	DRAWN	MTT
	CHECKED	MAI/H
	DATE	02/13/2026
RESPEC	720 S COLORADO BLVD SUITE 410S DENVER, CO 80246 PHONE (303) 757-3655	
STAMP		
TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308		
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY		
INFILTRATION PIPELINE PLAN & PROFILE		
DRAWING NUMBER: C-3 SHEET 5		

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-INFILTRATION DOWNSTREAM.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS

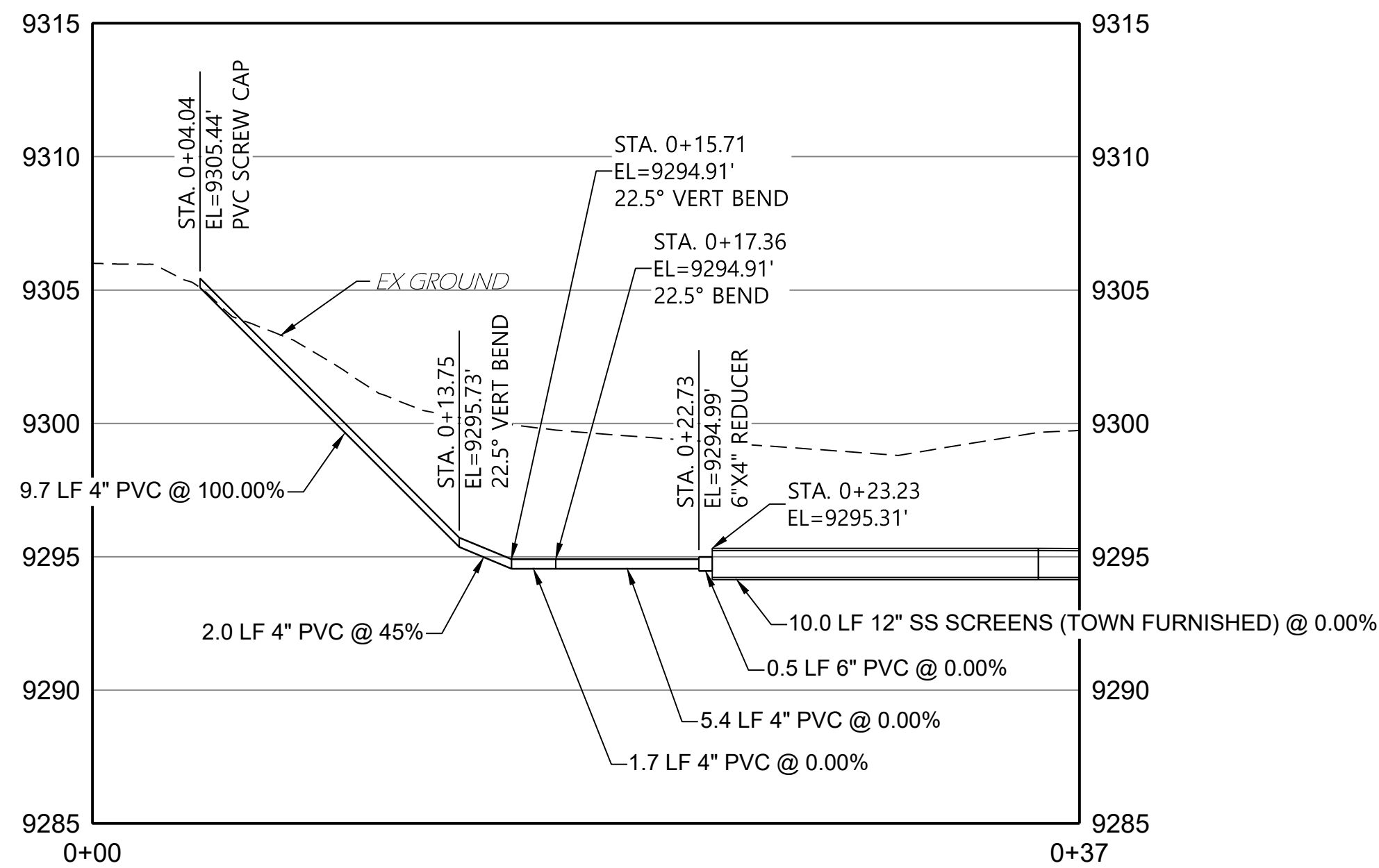


INFILTRATION GALLERY PLAN

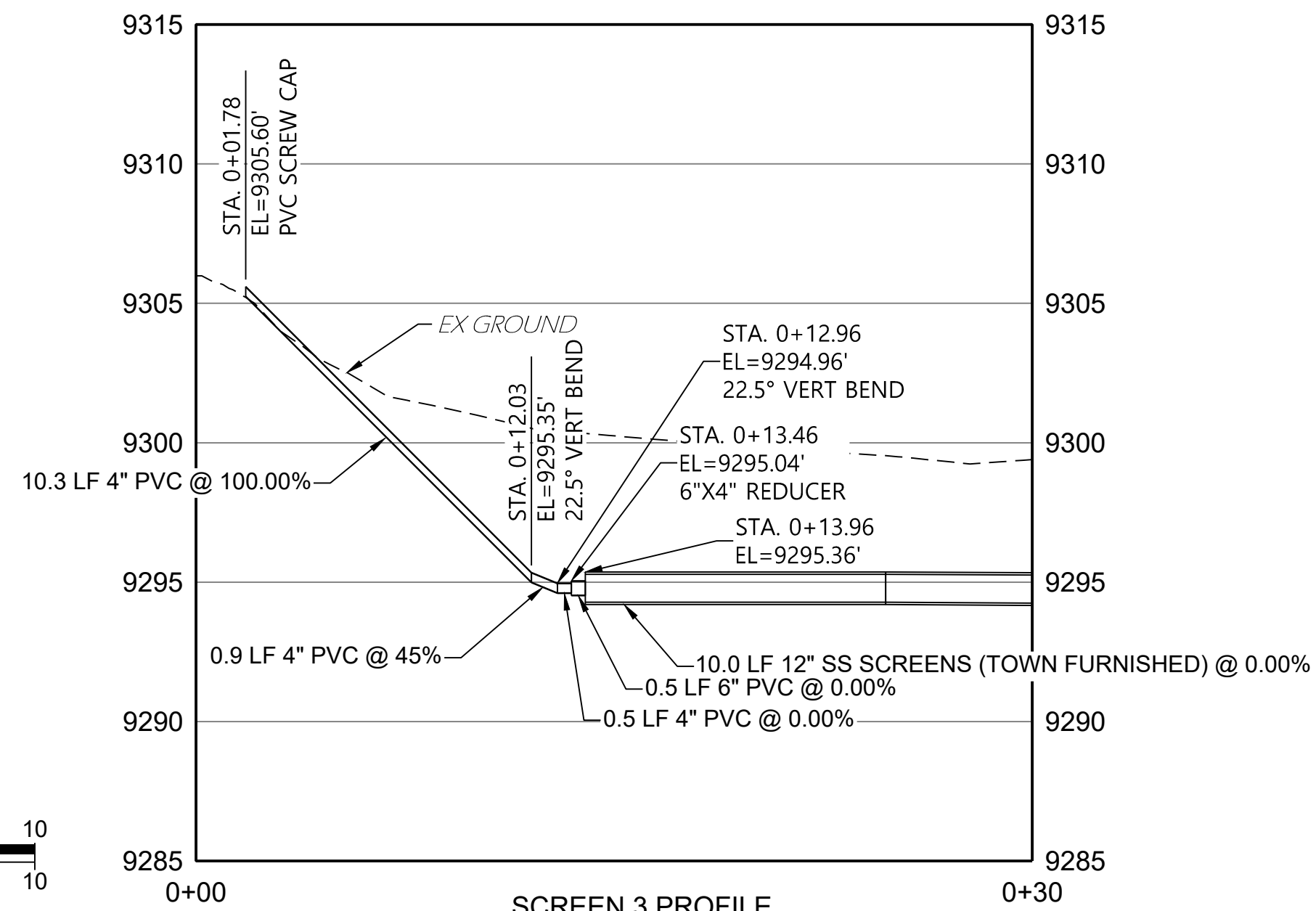
INFILTRATION GALLERY SCREEN 2 INFILTRATION GALLERY SCREEN 3								
NUMBER	LENGTH	RADIUS	LINE/CHORD DIRECTION	DELTA	START NORTHING	START EASTING	END NORTHING	END EASTING
L1	17.36'		N47° 34' 43.03"E		1513772.44	2348055.42	1513784.16	2348068.24
L2	18.10'		N70° 04' 43.03"E		1513784.16	2348068.24	1513790.32	2348085.25
L3	24.74'		N70° 04' 43.03"E		1513772.99	2348057.44	1513781.42	2348080.70
L4	61.49'		N27° 02' 27.11"E		1513781.42	2348080.70	1513836.18	2348108.66



SCREEN 1 PROFILE



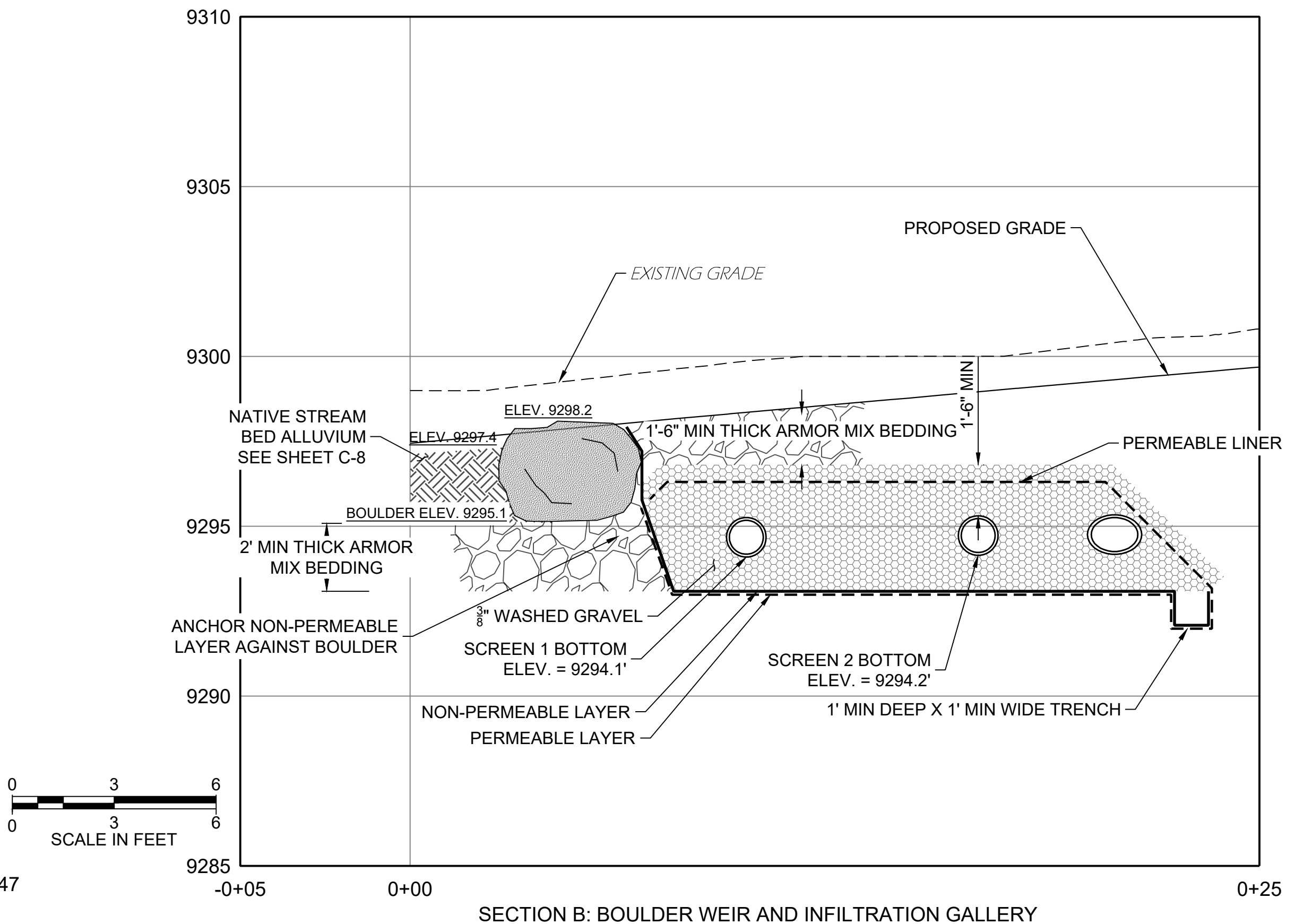
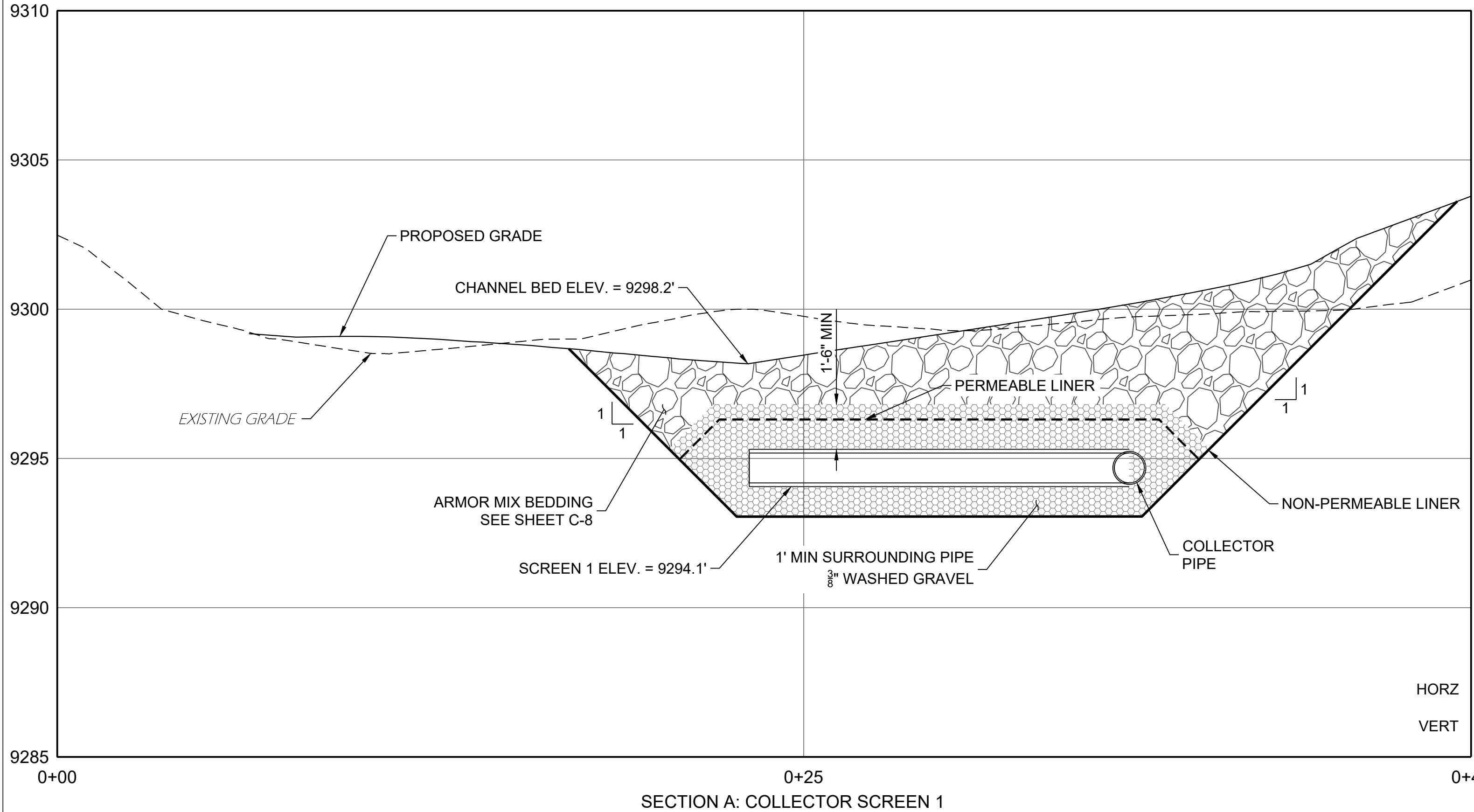
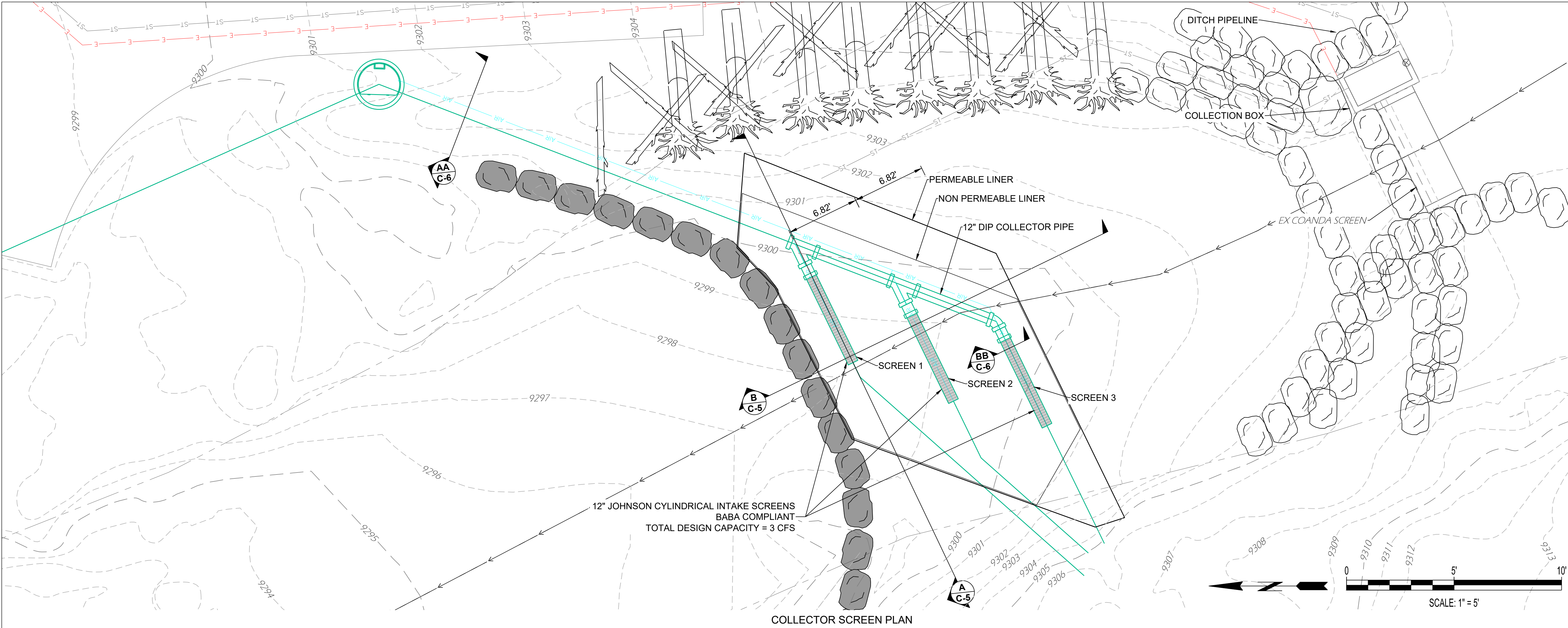
SCREEN 2 PROFILE



SCREEN 3 PROFILE

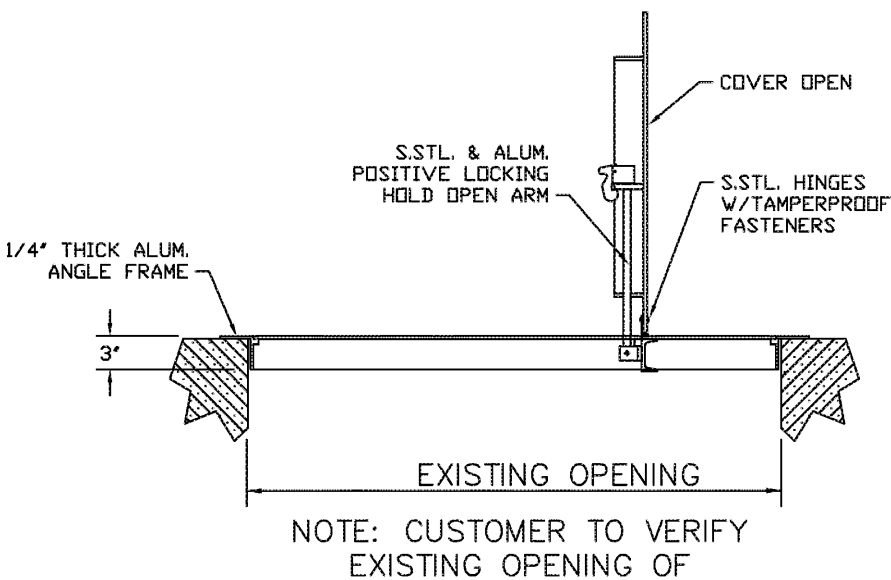
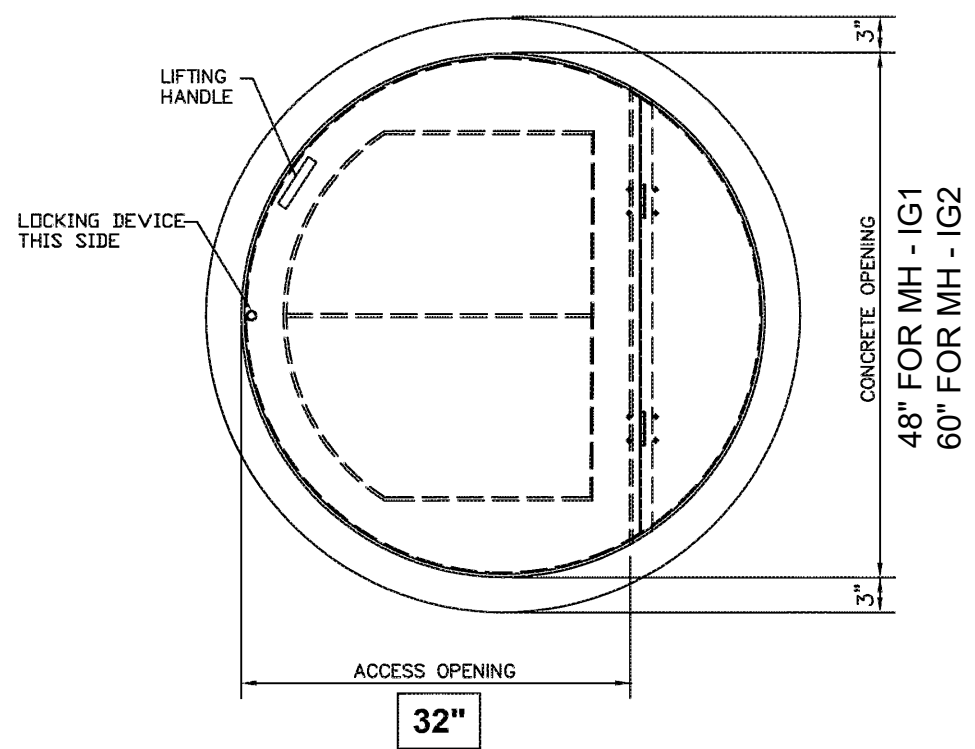
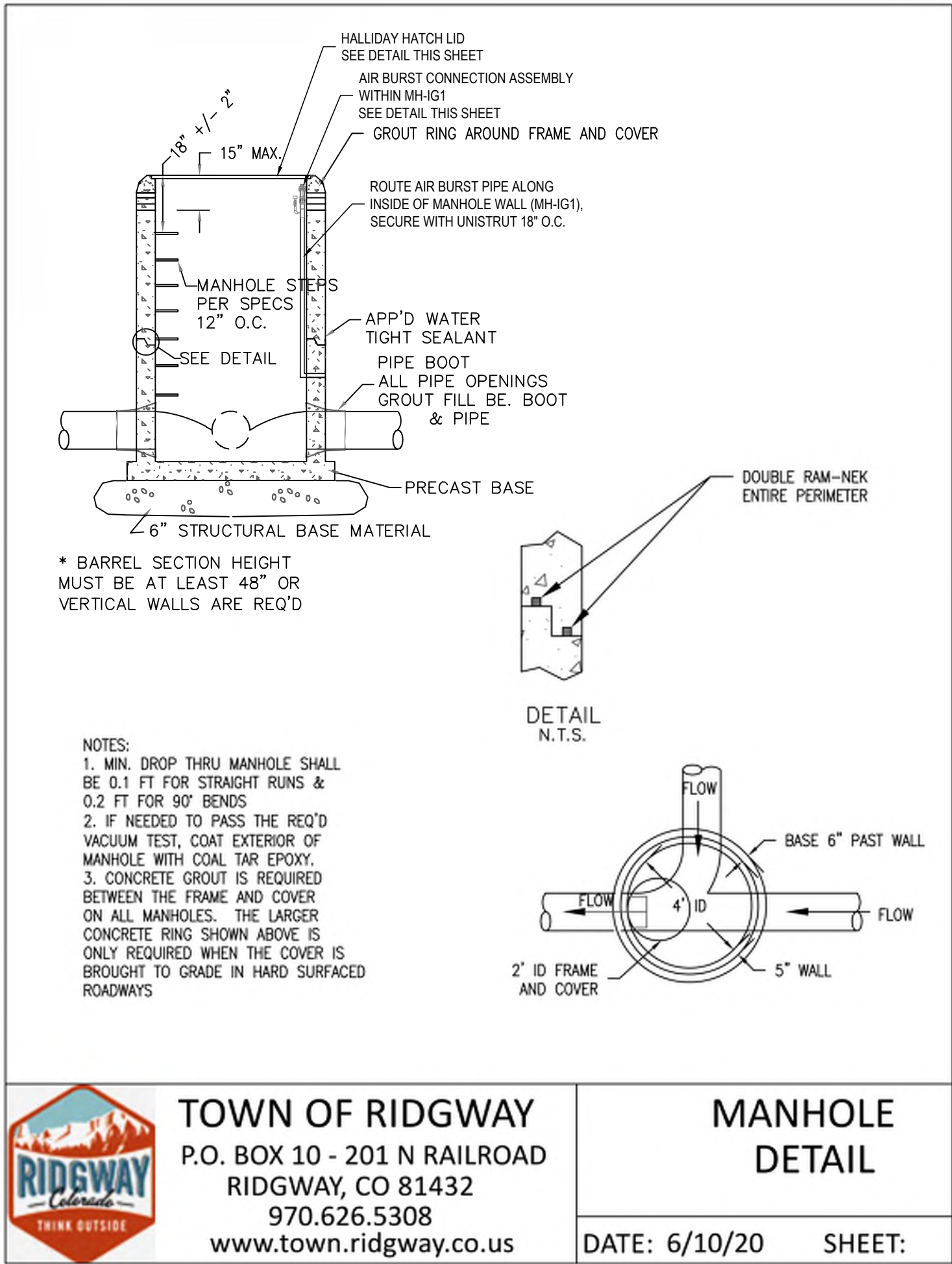
DESIGNED				DRAWN				CHECKED				DATE				REVISION			
MAMH	MTT	MAMH	02/13/2026	MAMH	MTT	MAMH	02/13/2026	MAMH	MTT	MAMH	02/13/2026	MAMH	MTT	MAMH	02/13/2026				
RESPEC				720 S COLORADO BLVD				SUITE 410S				DENVER, CO 80246				PHONE (303) 757-3655			
STAMP				811				Know what's below. Call before you dig.				TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308				BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY			
INFILTRATION GALLERY PLAN & PROFILE				DRAWING NUMBER:				C-4				SHEET 6							

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708 25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-INFILTRATION GALLERY P&P.DWG
PLOT DATE: March 20, 2026 12:02 PM BY: MICHELLE HOPKINS



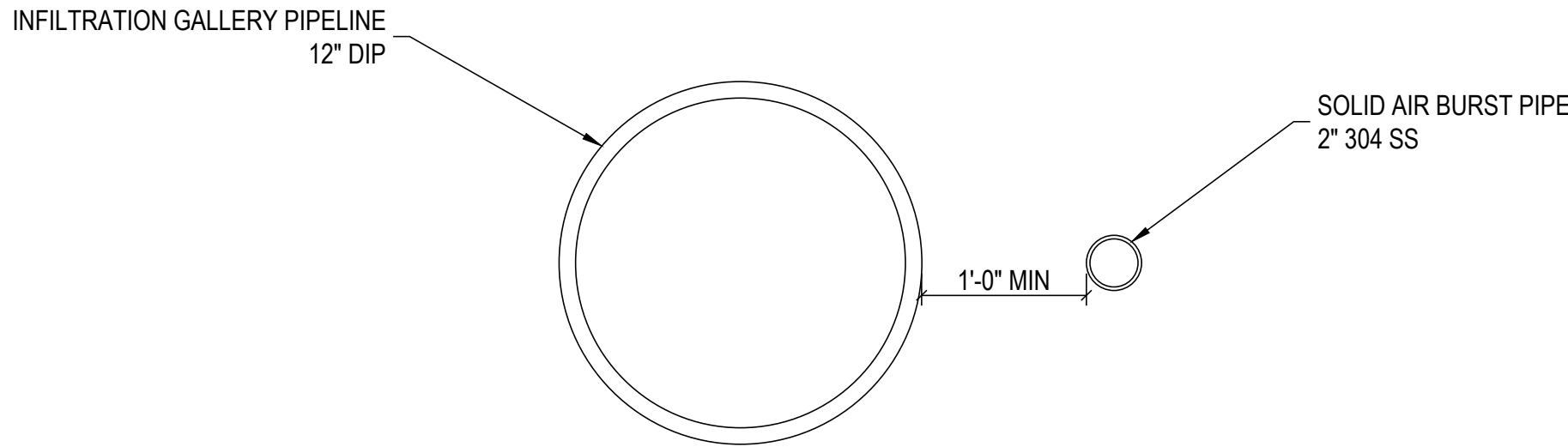
REVISION			
DESIGNED	MIN		
DRAWN	MIN		
CHECKED	MANH		
DATE	02/13/2026		
RESPEC			
720 S COLORADO BLVD			
SUITE 410S			
DENVER, CO 80246			
PHONE (303) 757-3855			
STAMP			
811			
Know what's below. Call before you dig.			
TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308			
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY			
INFILTRATION GALLERY SECTIONS			
DRAWING NUMBER:			
C-5			
SHEET 7			

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-STRUCTURAL.DWG
PLOT DATE: March 18, 2026 3:58 PM, BY: MICHELLE HOPKINS



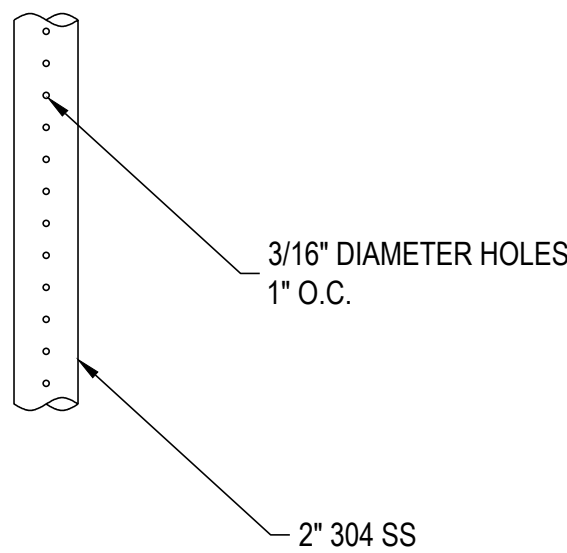
NOTE: STANDARD PRODUCT WARRANTY DOES NOT COVER CORROSION FROM CHLORINE CONTACT.

MANHOLE HATCH DETAIL

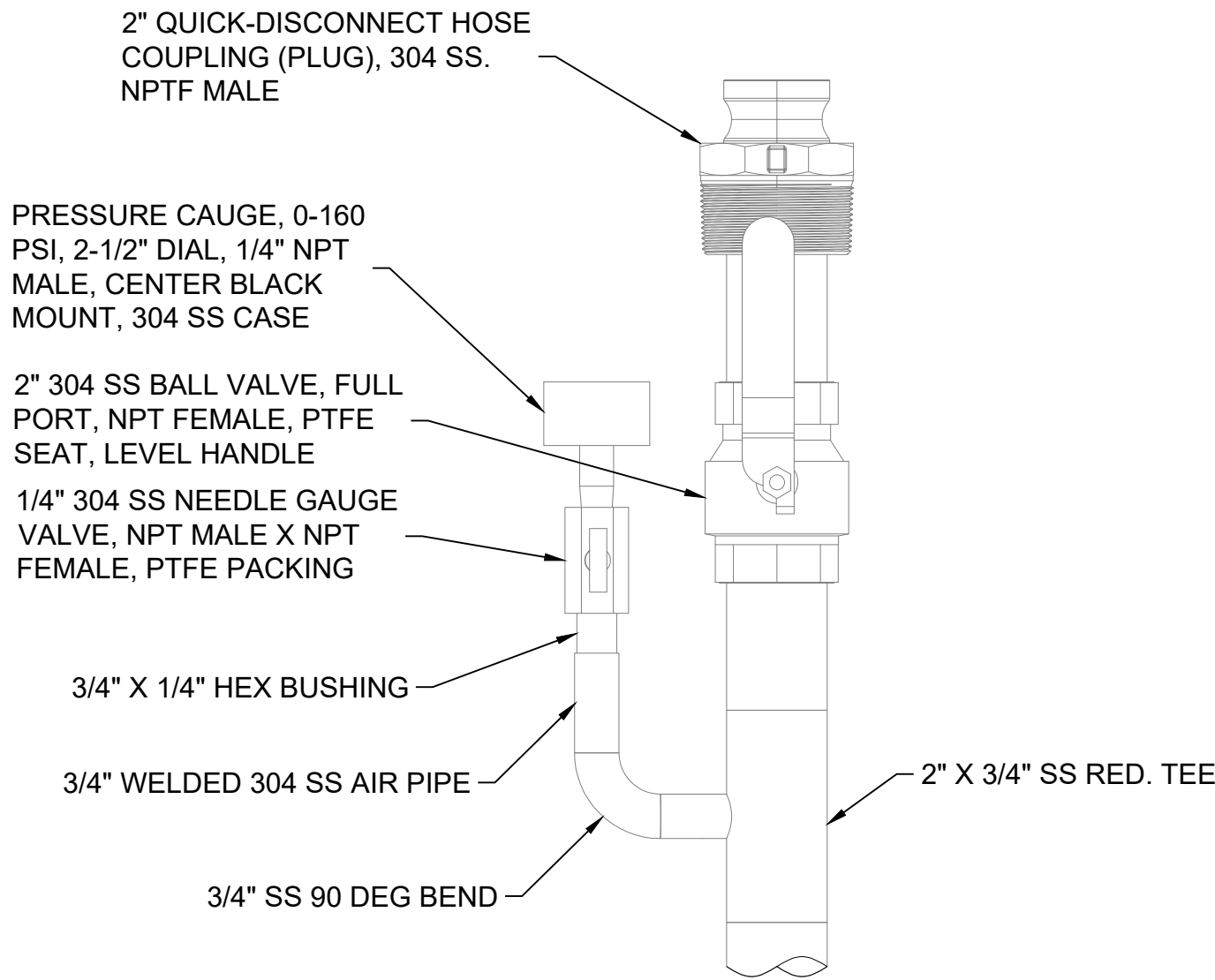


NOTE: AIR BURST PIPE SHALL BE CENTERED IN RELATION TO INFILTRATION GALLERY PIPELINE, OUTSIDE OF THE INFILTRATION SCREENS.

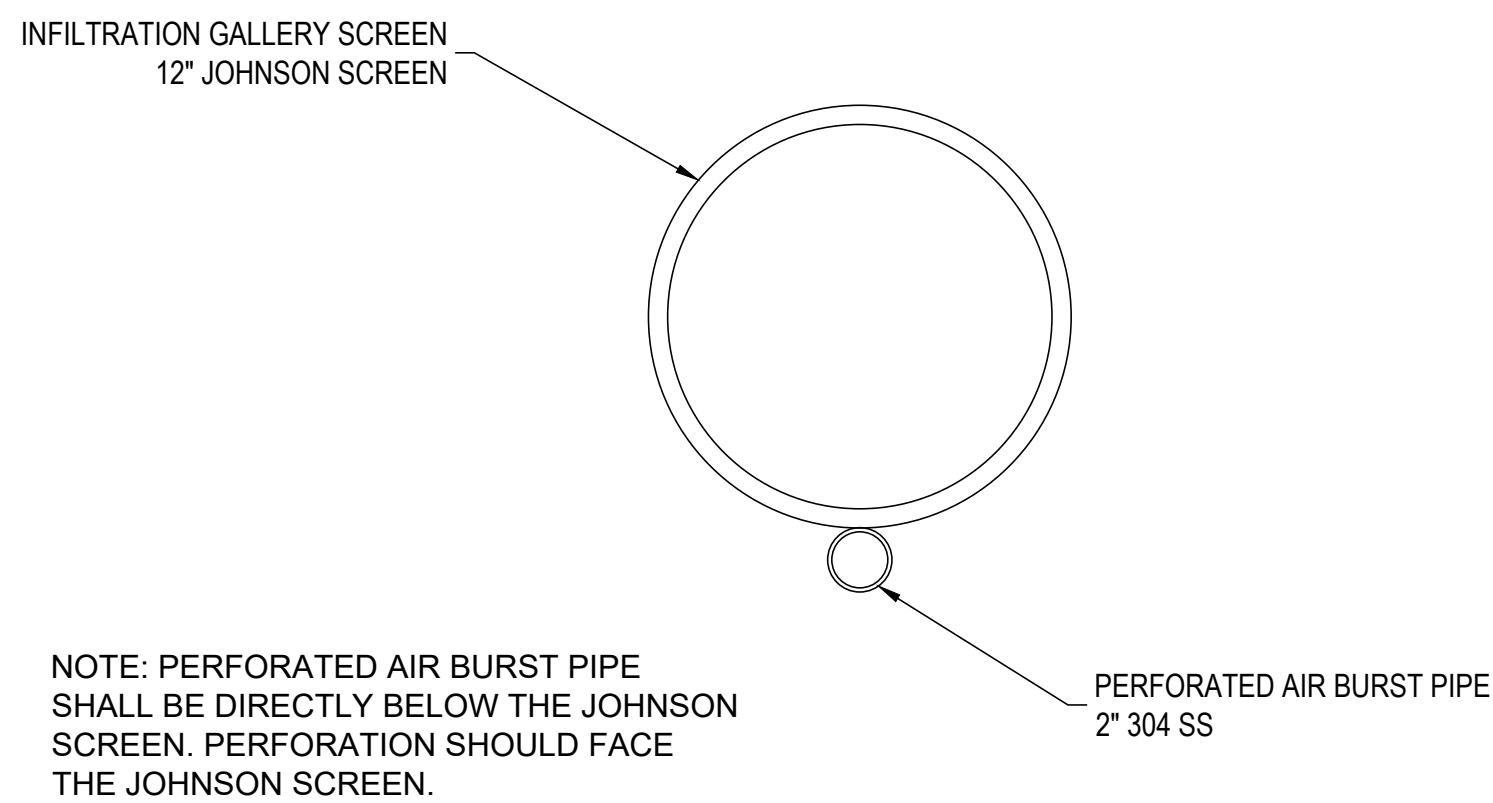
SECTION AA: AIR BURST PIPE LOCATION, OUTSIDE OF SCREEN



PERFORATED AIR BURST PIPE DETAIL

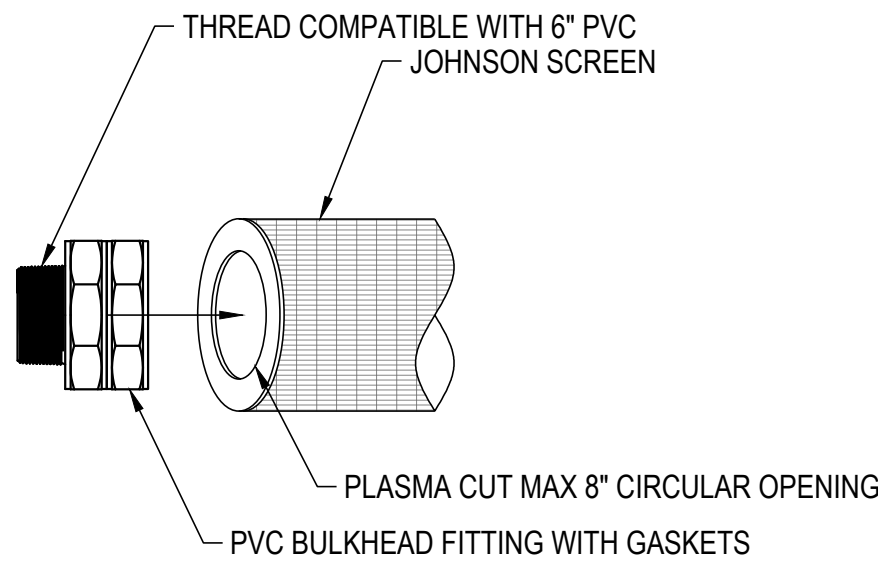


AIR BURST CONNECTION ASSEMBLY DETAIL



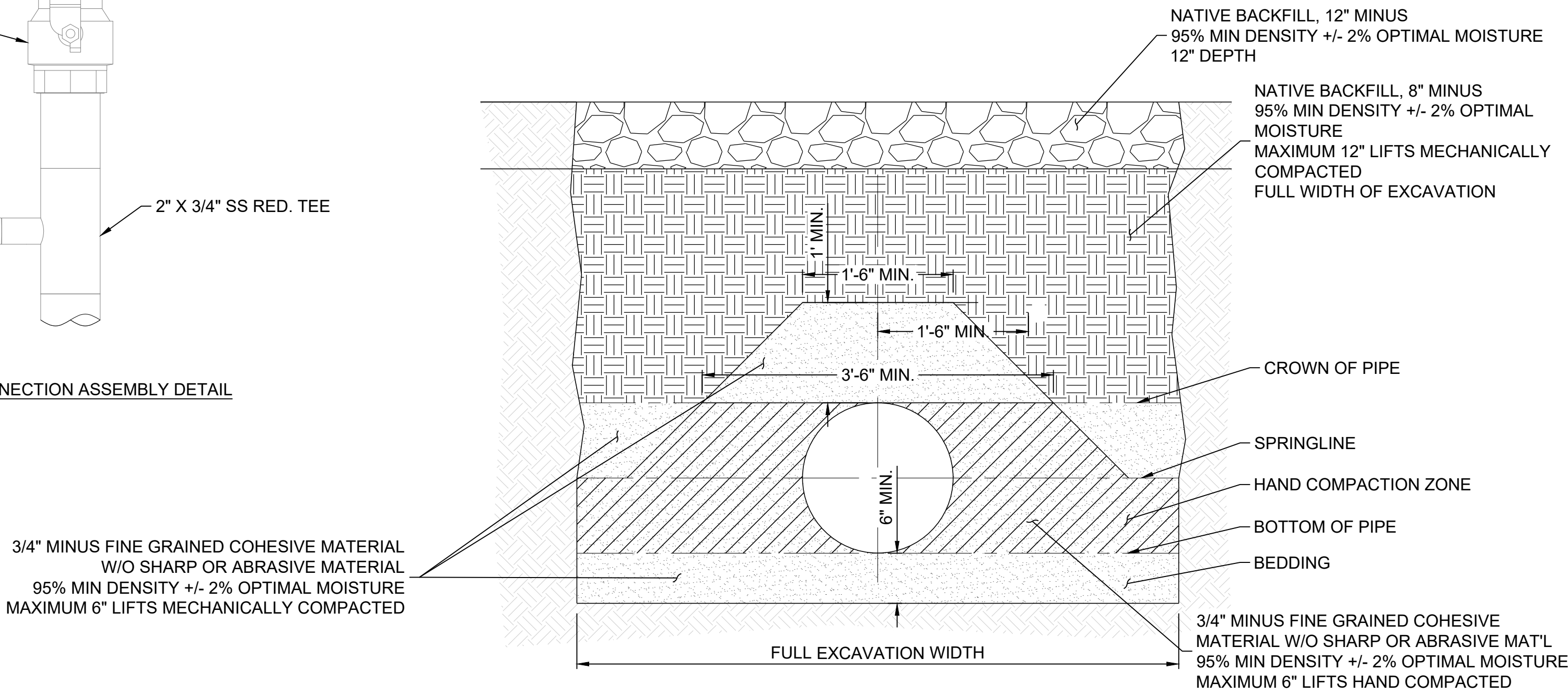
NOTE: PERFORATED AIR BURST PIPE SHALL BE DIRECTLY BELOW THE JOHNSON SCREEN. PERFORATION SHOULD FACE THE JOHNSON SCREEN.

SECTION BB: AIR BURST PIPE LOCATION, BELOW SCREEN



WATER JET ACCESS IN SCREEN DETAIL

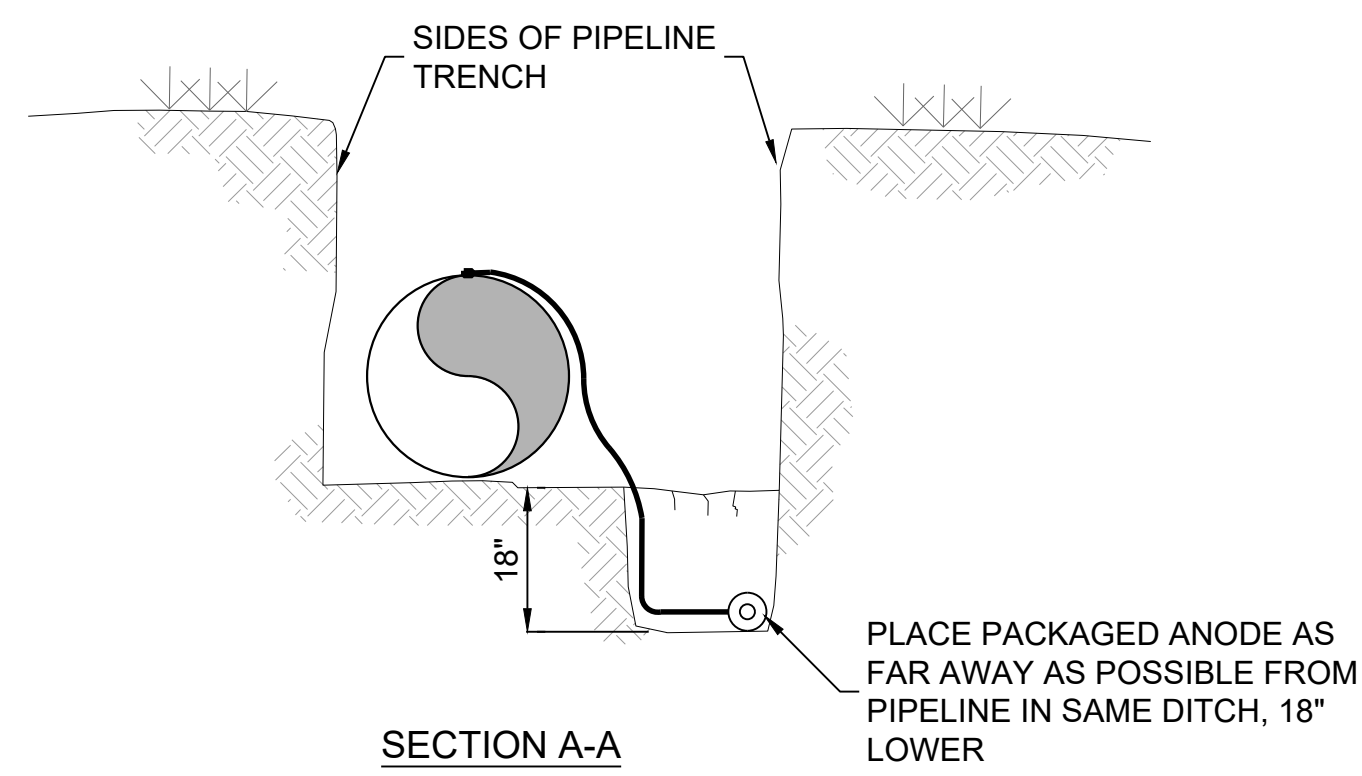
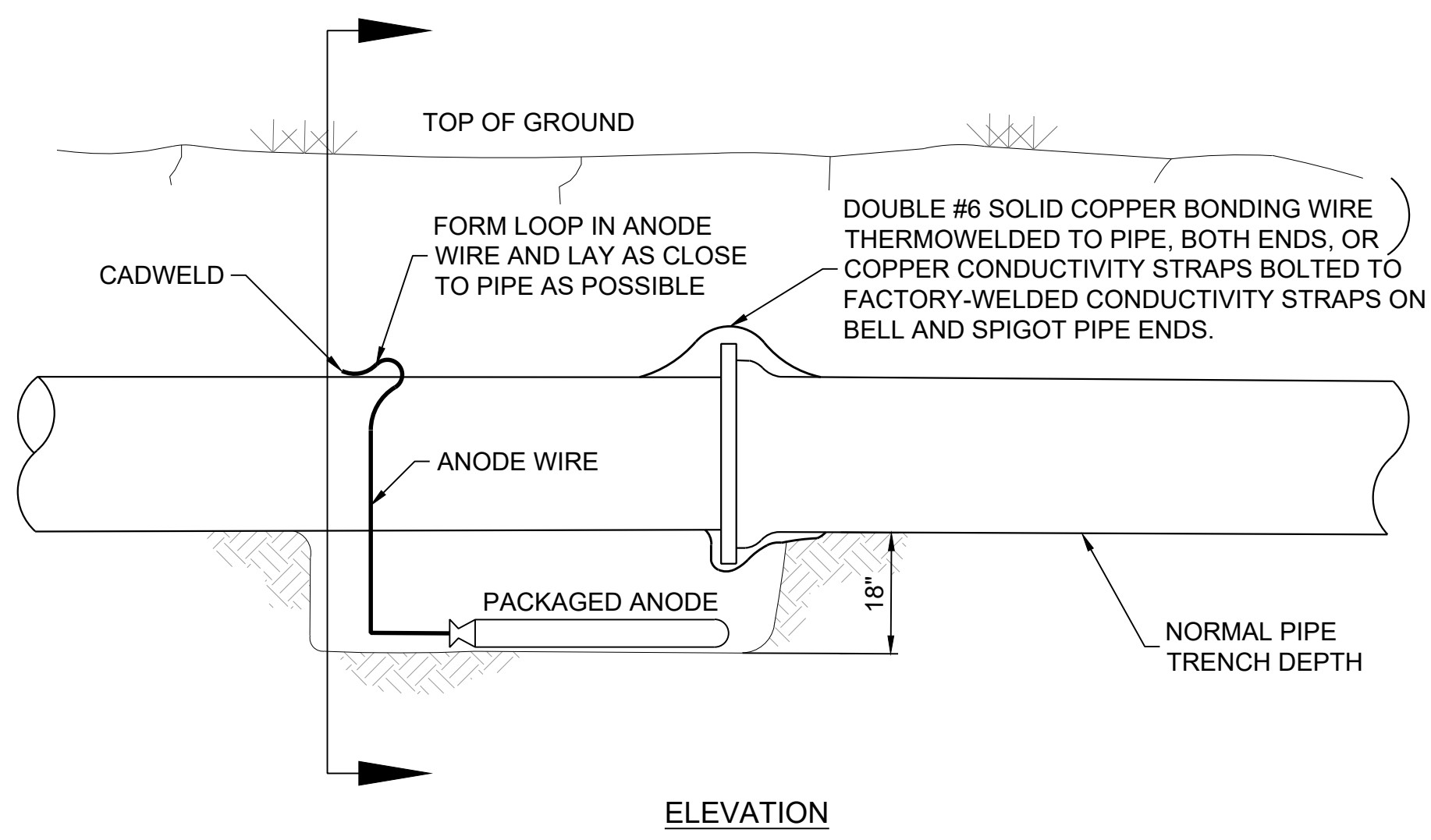
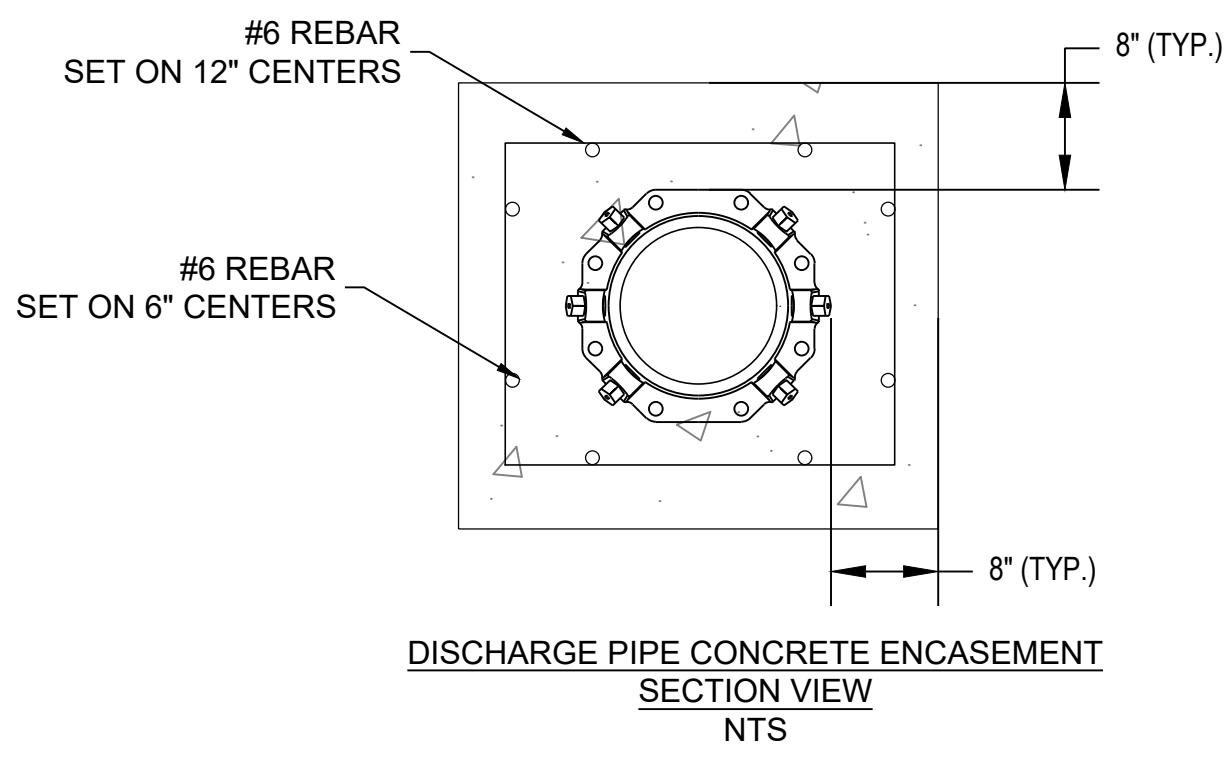
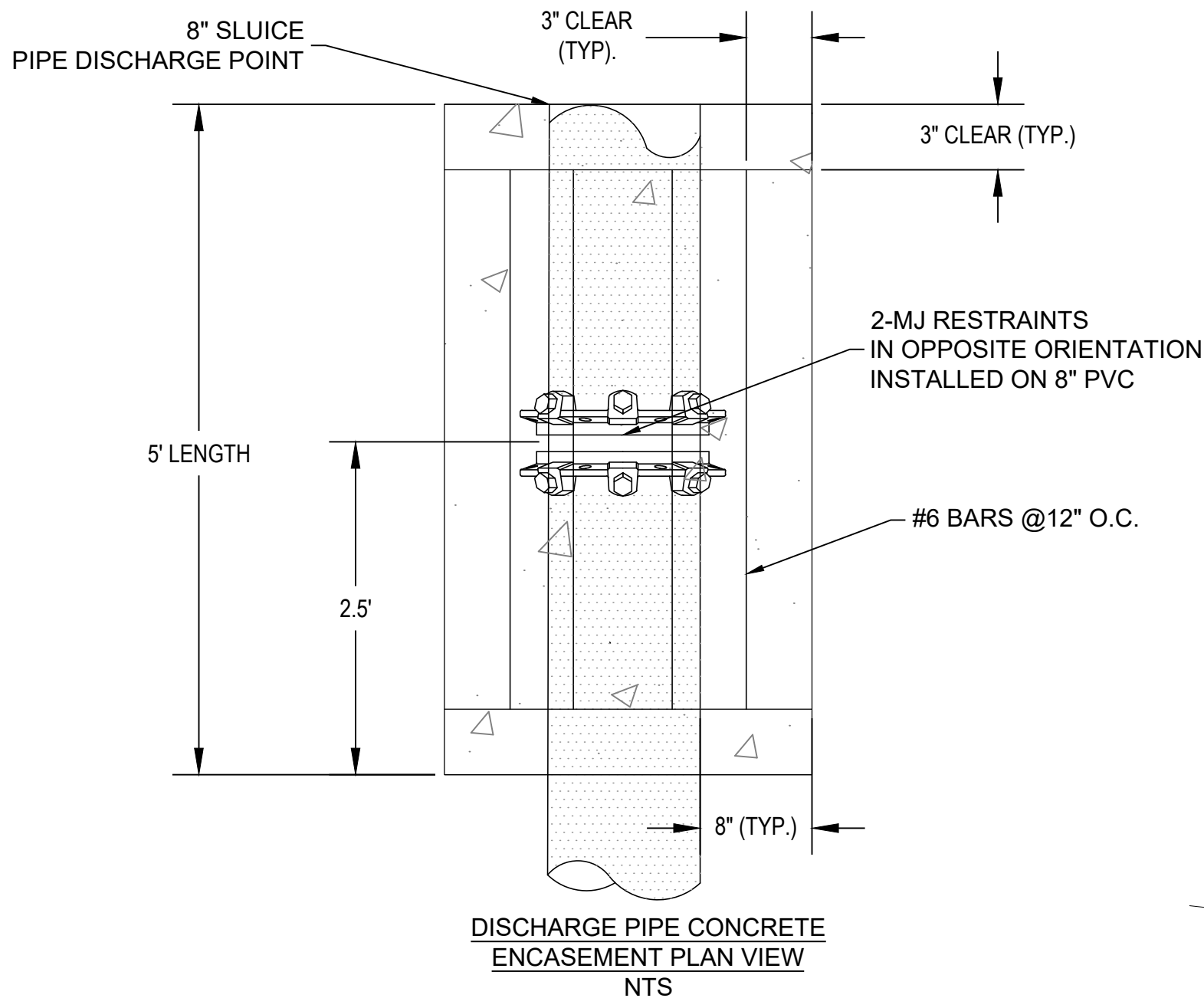
NOTE: TRENCH TO BE BRACED OR SHEETING AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND THE PROTECTION OF OTHER UTILITIES.



TRENCH SECTION
NTS

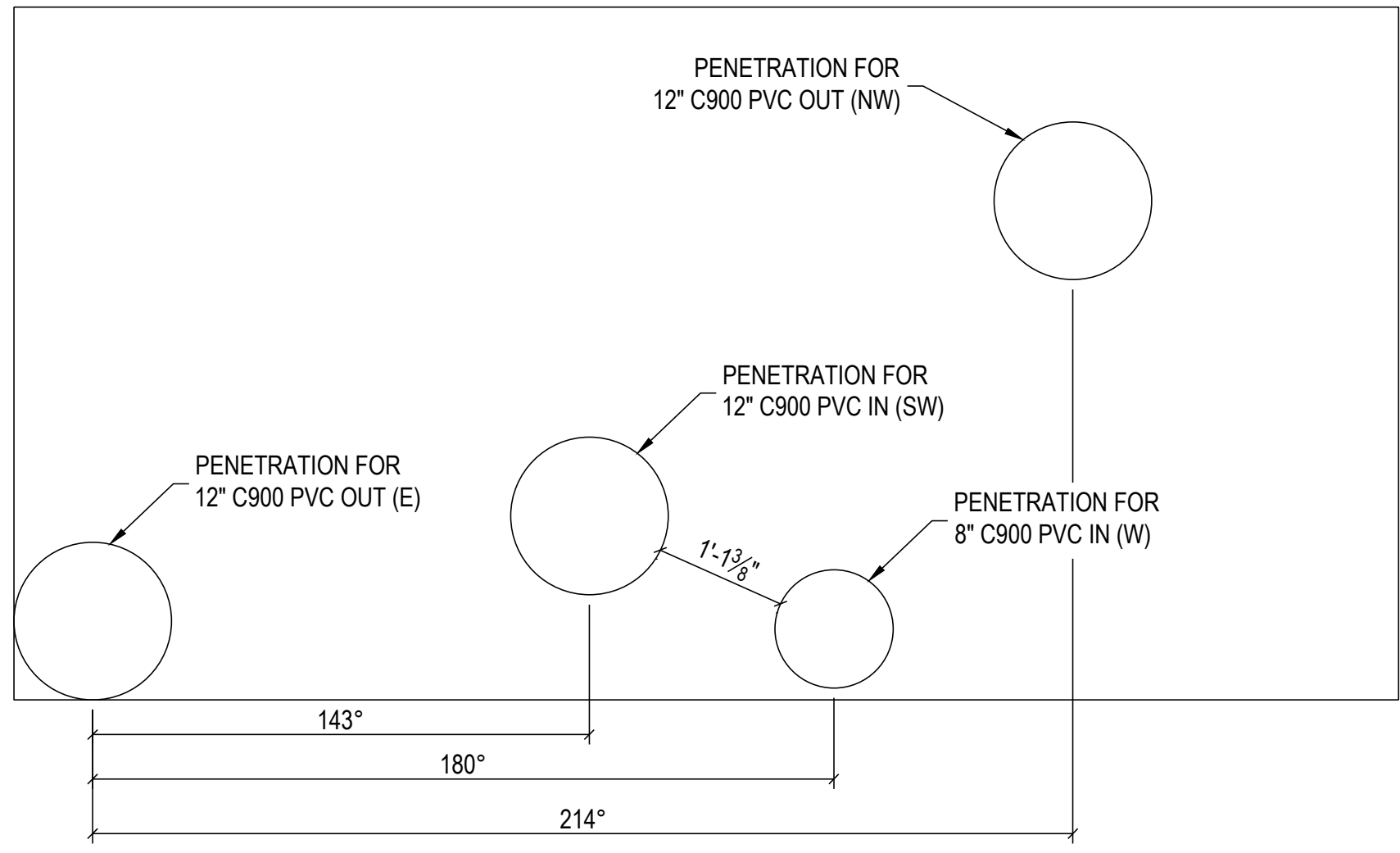
DESIGNED				DRAWN				CHECKED				DATE				REVISION			
JHP/CJB	JTR	EMS	02/13/2026	JHP/CJB	JTR	EMS	02/13/2026	JHP/CJB	JTR	EMS	02/13/2026	JHP/CJB	JTR	EMS	02/13/2026				
RESPEC				720 S COLORADO BLVD				SUITE 410S				DENVER, CO 80246				PHONE (303) 757-3855			
TOWN OF RIDGWAY				201 N RAILROAD ST				RIDGWAY, CO 81452				(970) 628-5308							
BEAVER CREEK DIVERSION				RESTORATION				INFILTRATION				GALLERY							
CIVIL DETAILS (1 OF 4)																			
DRAWING NUMBER:				C-6				SHEET				8							

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708 25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-STRUCTURAL.DWG
PLOT DATE: March 20, 2026 11:46 AM BY: MICHELLE HOPKINS



- NOTES:
1. CADWELD CONNECTION TO BE PRIMED AND COATED CAREFULLY. PACKAGED ANODE SHOULD BE COVERED WITH FINE SOIL CONTAINING NO ROCKS OR DIRT CLUMPS. TAMPED.
 2. WHEN ANODES ARE REQUIRED WITH METAL FITTINGS AND APPURTENANCES TOGETHER WITH PCV PIPE INSTALLATION, THE ANODES SHALL BE PLACED AND ATTACHED TO THE METAL IN SAME MANNER AS SHOWN IN THIS DRAWING. 9LB. ANODES CAN BE USED ON METAL FITTINGS 12" AND LESS IN DIAMETER AND 17LB. ANODES FOR METAL FITTINGS GREATER THAN 12" DIAMETER WHEN USING PVC PIPE.
 3. PACKAGED ANODE TO BE WETTED AND COVERED WITH SOIL PRIOR TO BACKFILLING.

BONDING JOINT AND ANODE INSTALLATION
NTS



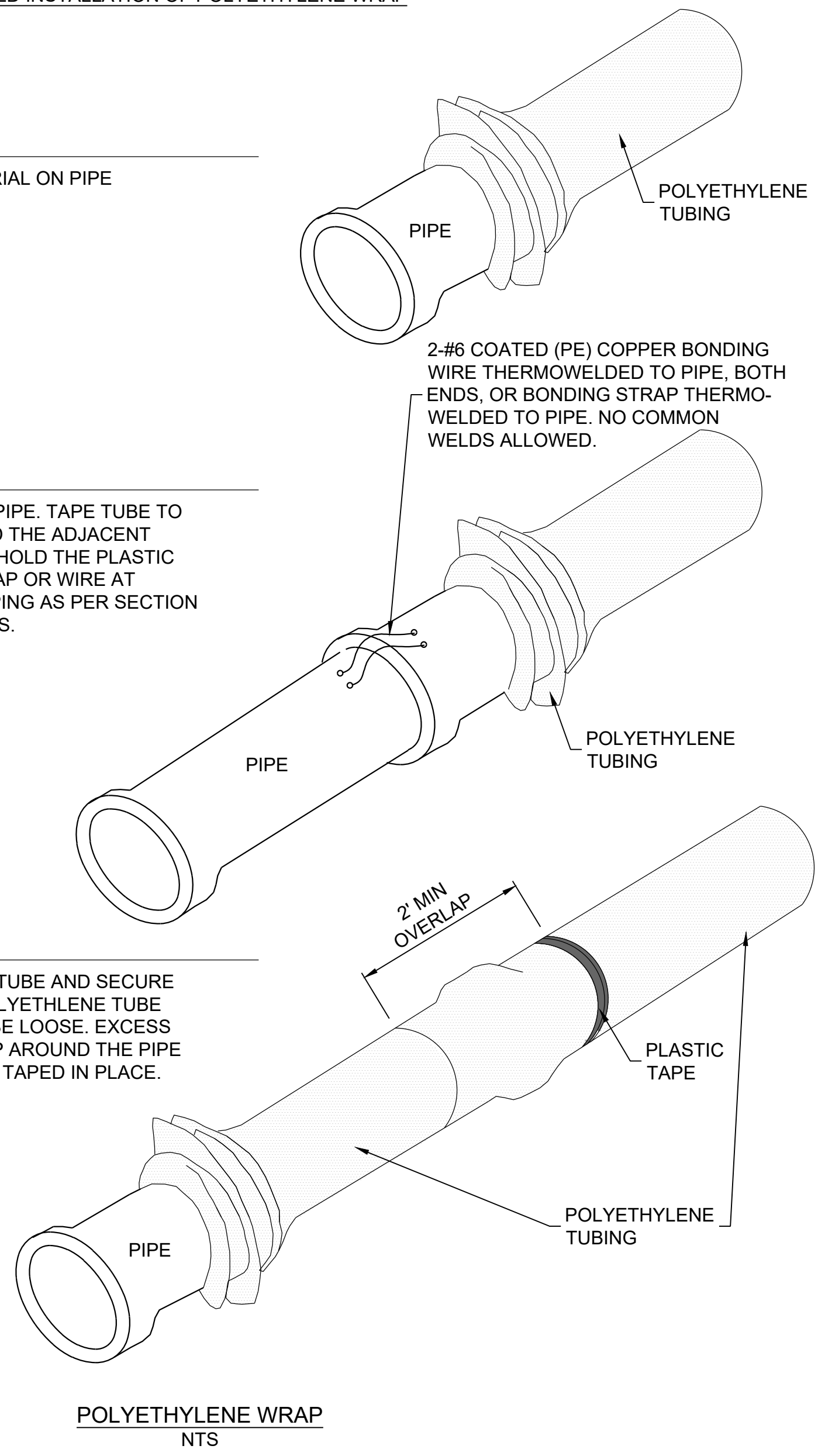
MH - IG1 INSIDE WALL WRAP DETAIL
NTS - FOR INFORMATION ONLY

FIELD INSTALLATION OF POLYETHYLENE WRAP

- STEP 1:
- PLACE TUBE OF POLYETHYLENE MATERIAL ON PIPE
PRIOR TO LOWERING IT INTO TRENCH

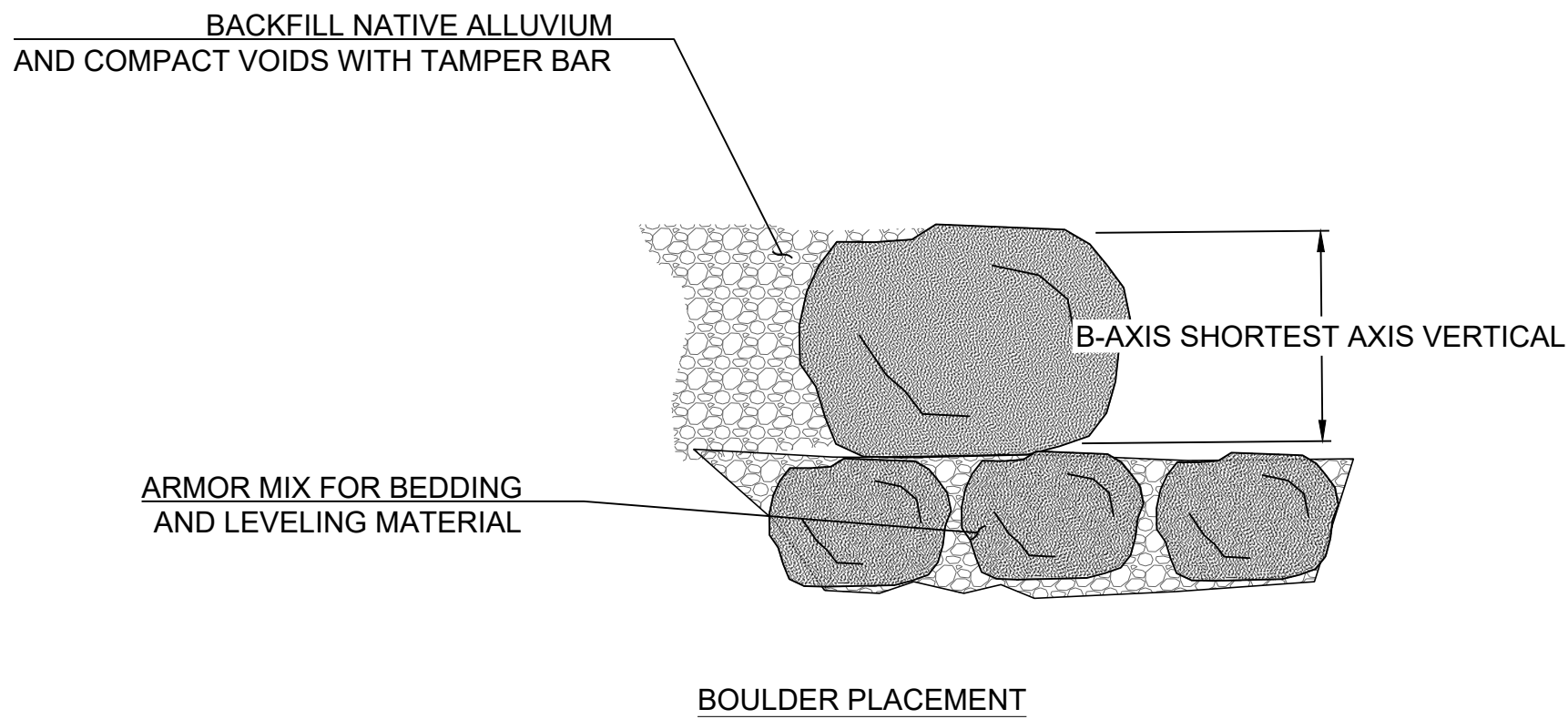
- STEP 2:
- PULL TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO
END AT JOINT. FOLD MATERIAL AROUND THE ADJACENT
SPIGOT END AND WRAP WITH TAPE TO HOLD THE PLASTIC
TUBE IN PLACE. INSTALL BONDING STRAP OR WIRE AT
EVERY JOINT OF PIPE PRIOR TO WRAPPING AS PER SECTION
7.10 OF THE STANDARD SPECIFICATIONS.

- STEP 3:
- OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE
WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE
MATERIAL COVERING THE PIPE SHALL BE LOOSE. EXCESS
MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE
BARREL, FOLDED ON TOP OF PIPE, AND TAPED IN PLACE.



DRAWING NUMBER:		C-7		SHEET 9	
CIVIL DETAILS (2 OF 4)		BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY		TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308	
811		Know what's below. Call before you dig.			
STAMP				RESPEC 720 S COLORADO BLVD SUITE 410S DENVER, CO 80246 PHONE (303) 757-3655 DESIGNED JHP/CJB DRAWN JTR CHECKED EMS DATE 02/13/2026	
				REVISION	

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-STREAM-DETAILS1.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS



NOTES:

1. ALL ROCK MATERIALS SHALL BE HARVESTED ON SITE.
2. SORT, STOCKPILE AND SIEVING OF MATERIALS WILL BE REQUIRED TO MEET SPECIFIED BOULDER SIZES AND BEDDING MATERIAL GRADATION.
3. BOULDERS FOR STRUCTURES SHALL BE A MINIMUM OF 3' SIZE.
4. BOULDERS SHALL BE PLACED WITH THE SHORTEST AXIS VERTICAL (B-AXIS).
5. BOULDER SHALL BE BACKFILLED WITH NATIVE ALLUVIUM AND WASH SIEVED IN 8" LIFTS TO FILL VOID SPACES.
6. MAXIMUM VOID SPACE BETWEEN BOULDERS IS 3" WHICH SHALL BE WASHED SIEVED WITH NATIVE ALLUVIUM.
7. ARMOR MIX SHALL BE INSTALLED AND COMPACTED IN 2' LIFTS. ALTERNATIVELY, LARGER AGGREGATE CAN BE PLACED AT THE DIRECTION OF THE ENGINEER IN SATURATED CONDITIONS.
8. BEDDING SHALL FORM A EVEN FLAT GRADE TO STACK BOULDERS.
9. SUBSEQUENT ROWS OF BOULDERS SHALL HAVE INTIMATE CONTACT WITH FOOTER BOULDERS. WASH SIEVE THE VOIDS AND COMPACT WITH TAMPER BAR.

ARMORED MIX		
APPROXIMATE PROPORTIONS (EXCAVATOR BUCKETS)	MATERIAL TYPE	MATERIAL DESCRIPTION
6	BOULDERS	>1' TO 2' BOULDERS
3	COBBLES	3" TO 1' ROCK
2	GRAVEL	<3" GRAVEL



FIGURE 1: EXAMPLE IMAGE OF ARMORED MIX

NATIVE ALLUVIUM MIX		
APPROXIMATE PROPORTIONS (EXCAVATOR BUCKETS)	MATERIAL TYPE	MATERIAL DESCRIPTION
1	BOULDERS	~1'
3	COBBLES	3" TO 1' ROCK
3	GRAVEL	<3" GRAVEL



FIGURE 2: EXAMPLE IMAGE OF NATIVE ALLUVIUM MIX

DESIGNED
DRAWN
CHECKED
DATE

MAH
MTT
MAH
02/13/2026

RESPEC
720 S COLORADO BLVD
SUITE 410S
DENVER, CO 80246
PHONE (303) 757-3855

STAMP

TOWN OF RIDGWAY
201 N RAILROAD ST
RIDGWAY, CO 81452
(970) 628-5308

BEAVER CREEK
DIVERSION
RESTORATION
INFILTRATION
GALLERY

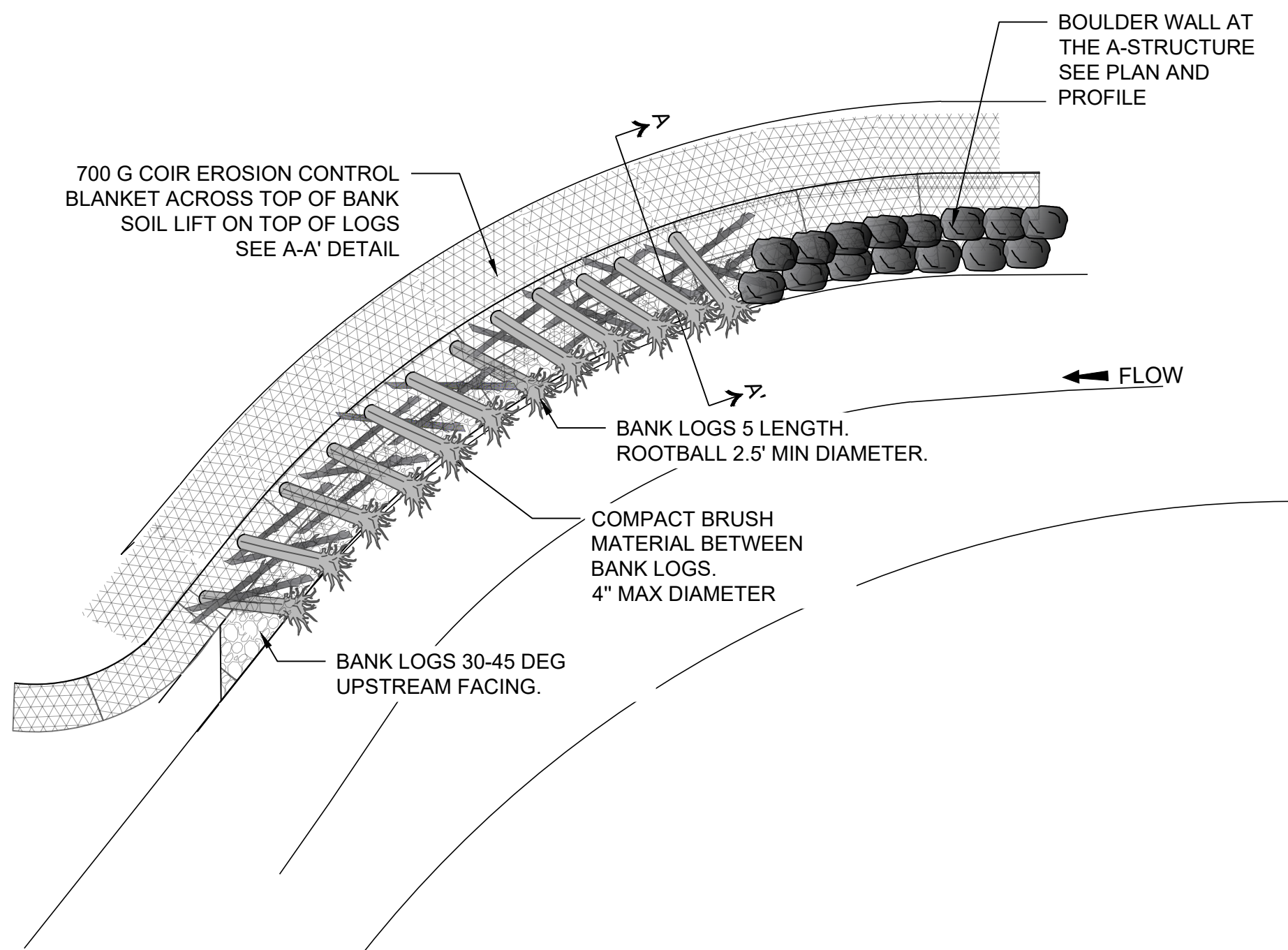
CIVIL DETAILS (3 OF 4)

DRAWING NUMBER:

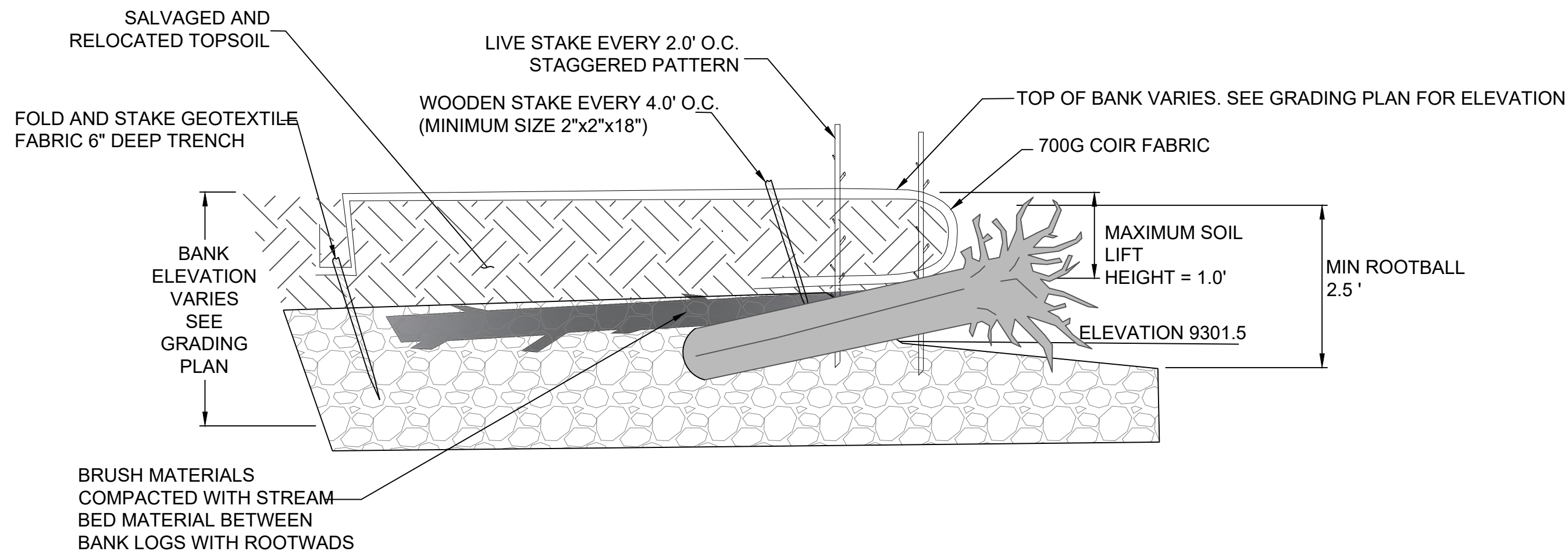
C-8
SHEET 10

REVISION

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708 25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-STREAM-DETAILS1.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS



PLAN VIEW BANK RESTORATION
NTS



TOE WOOD BANK RESTORATION A-A'
NTS

LIVE STAKES NOTES

PREPARATION

1. LIVE STAKE CUTTINGS SHALL BE GEYER WILLOW OR DOGWOOD SOURCED OFFSITE.

2. STAKES SHALL BE 4' FOOT IN LENGTH AND 0.5" TO 1" INCHES IN DIAMETER.

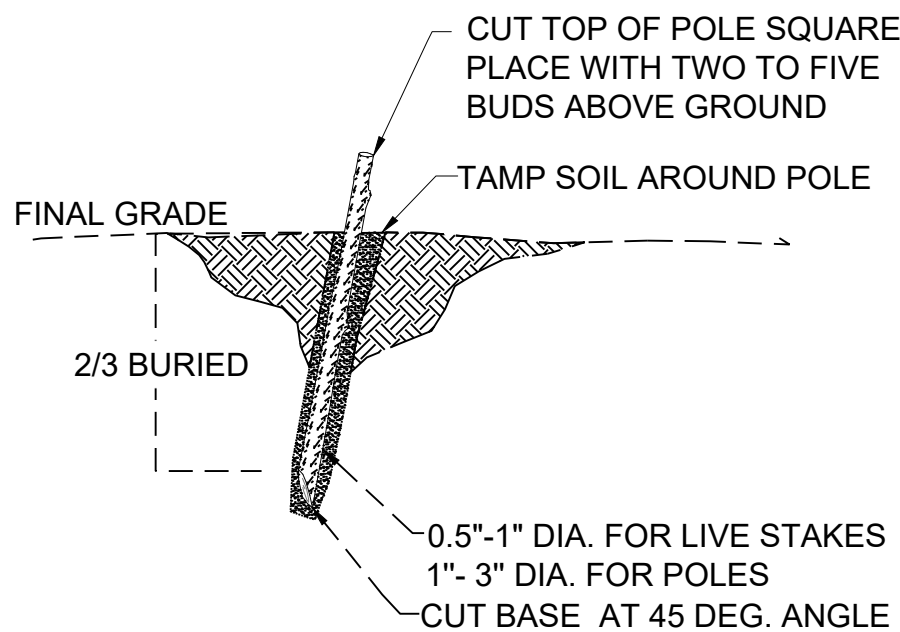
INSTALLATION

1. CUTTINGS SHALL SOAK FOR AT LEAST 24 HOURS PRIOR TO INSTALLATION AND NO MORE THAN 7 DAYS.

2. CUTTINGS SHALL BE INSTALLED TO THE DESIGN DEPTH OF THE CHANNEL BOTTOM, WITH 2/3 OF ITS LENGTH IN CONTACT WITH NATIVE SOIL, AND 1/3 ABOVE GROUND. USE OF A PILOT BAR MAY HELP WITH INSTALLATION.

3. LIVE STAKES SHALL BE INSTALLED BETWEEN THE LOG STRUCTURES AND ALONG THE BANKLINE

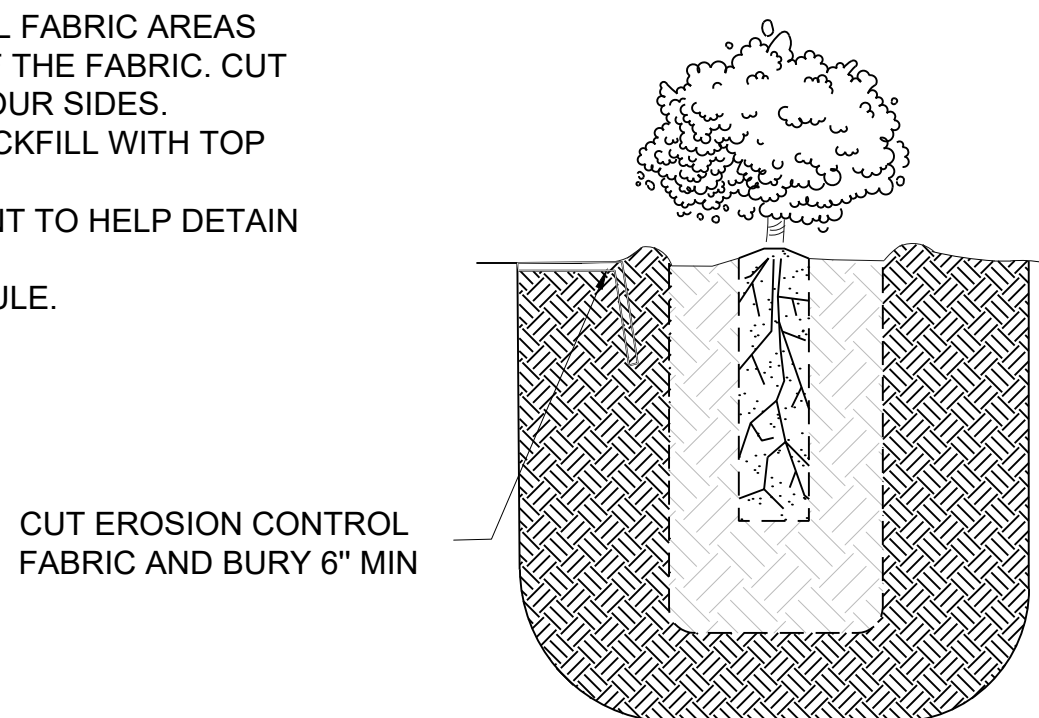
4. SPECIAL CARE SHALL BE TAKEN TO NOT DAMAGE THE BUDS, SPLIT POLE ENDS, OR STRIP THE BARK DURING INSTALLATION.



CONTAINER PLANTING

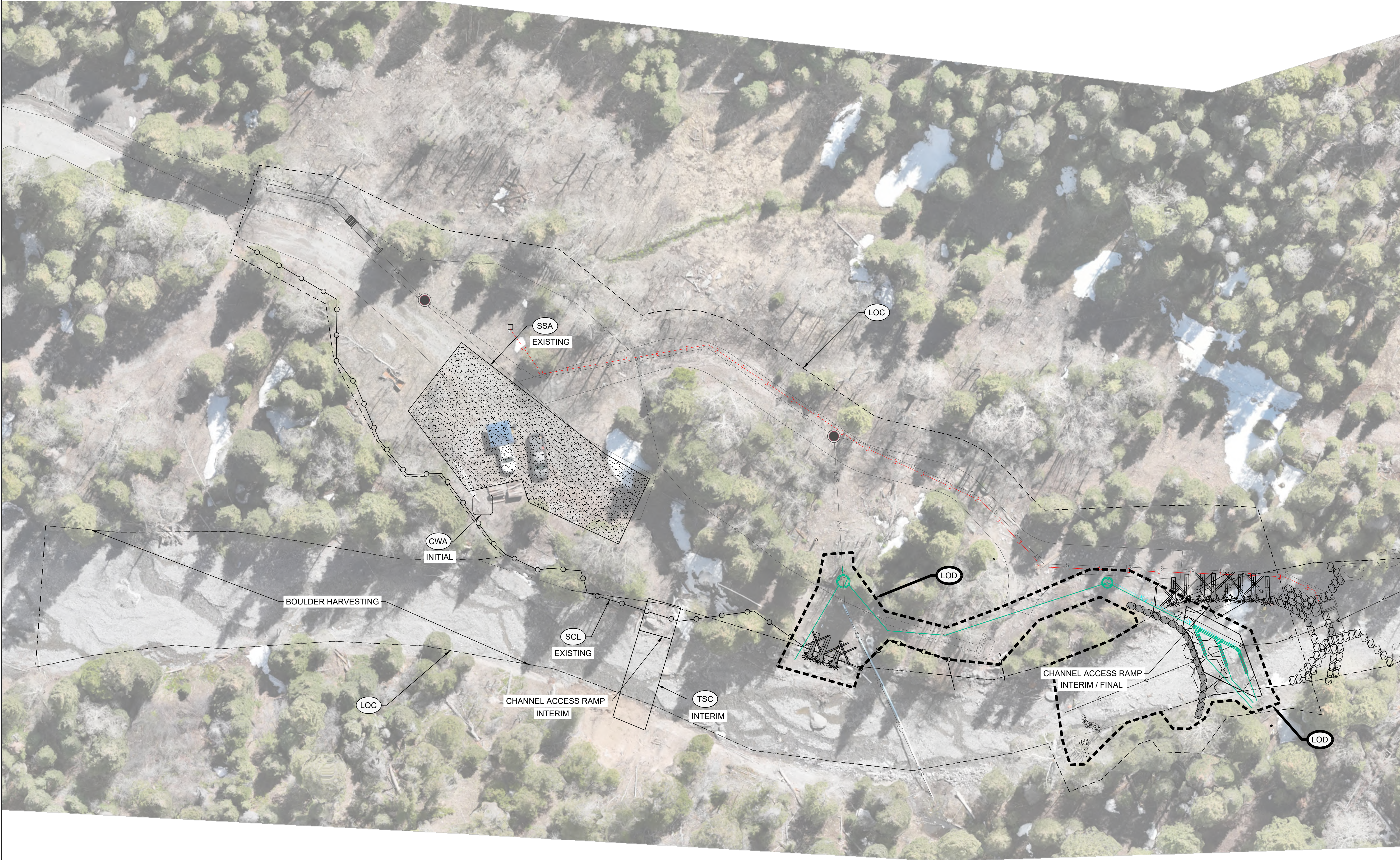
N.T.S.

1. PLANTINGS WITHIN THE EROSION CONTROL FABRIC AREAS WILL REQUIRE CUTTING AND SECURING OF THE FABRIC. CUT FABRIC IN AN X-PATTERN AND BURY ALL FOUR SIDES.
2. LOOSEN SOIL ONLY IN PLANTING HOLE. BACKFILL WITH TOP SOIL.
3. FORM A CONTINUOUS BASIN AROUND PLANT TO HELP DETAIN WATER.
4. NATIVE SPECIES ONLY. SEE PLANT SCHEDULE.



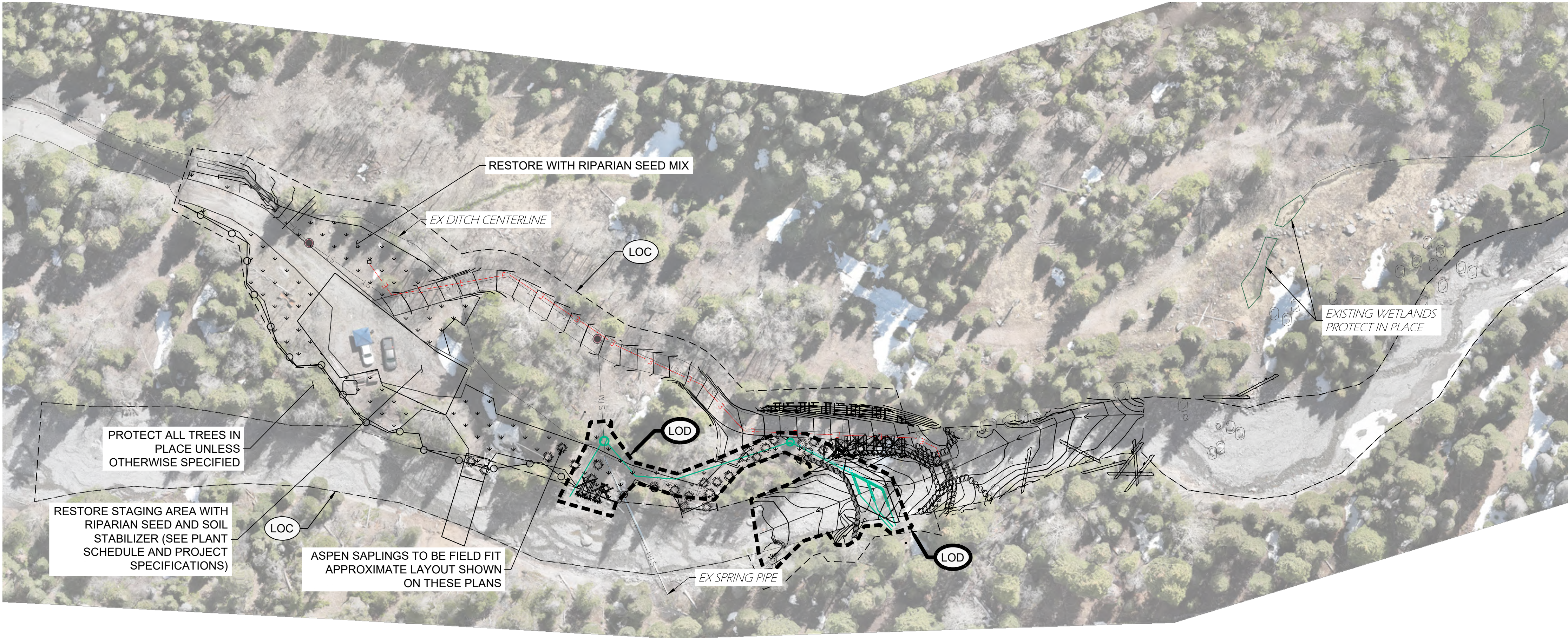
REVISION			
DESIGNED	MAH	MTT	
DRAWN	MAH	CHECKED	
DATE	02/13/2026		
RESPEC 720 S COLORADO BLVD SUITE 410S DENVER, CO 80246 PHONE (303) 757-3855			
STAMP			
811 Know what's below. Call before you dig.			
TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308			
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY			
CIVIL DETAILS (4 OF 4)			
DRAWING NUMBER: C-9 SHEET 11			

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-EROSION.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS



DRAWING NUMBER: ER-1 SHEET 12	INITIAL & INTERIM EROSION CONTROL PLAN	BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY	TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308		STAMP		RESPEC 720 S COLORADO BLVD SUITE 410S DENVER, CO 80246 PHONE (303) 757-3655	DESIGNED	MAMH	REVISION
								DRAWN	MTT	
								CHECKED	MAMH	
								DATE	02/13/2026	

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\70825-1-S-EROSION.DWG
PLOT DATE: March 20, 2026 4:13 PM, BY: MICHELLE HOPKINS



NOTES:

1. ALL MATERIALS SHALL BE FREE OF WEEDS AND NATIVE STRANDS.
2. ALL SEEDED AREAS SHALL BE DRILL SEED AND COVERED WITH SOIL STABILIZER.
3. SOIL STABILIZER SHALL BE MULCH TACKIFIER APPROVED BY THE ENGINEER.
4. CONTAINER PLANTS SHALL BE FIELD PLACED AND PLANTED IN DESIGNATED AREAS OUTSIDE OF THE PERMANENT MAINTENANCE ACCESS ROAD AND CHANNEL ACCESS LOCATIONS.
5. CONTAINER PLANTS SHALL BE PLANTED IN CLUSTERS OF 3-5 AND SPACED 3 FT O.C.
6. FINAL PLANTS ARE BASED ON AVAILABILITY TO BE APPROVED BY ENGINEER.
7. LIVE STAKES SHALL BE GEYER WILLOW OR RED OSIER DOG WOOD AND SOURCED OFFSITE.

Containerized Riparian Shrubs:		
Species	Common Name	Size
Prunus virginiana	Chokeberry	55"
Acer glabrum	Rocky Mountain Maple	55"
Salix monicola	Rocky Mountain willow	55"
Alnus incana ssp. tenuifolia	Thimbleleaf alder	55"
Cornus sericea	Red osier dogwood	55"
Sambucus racemosa	Redberry elder	55"

Zone A Riparian Transitional Seed Mix 11 lbs/acre		
Species	Common Name	% MIX
Bromus carinatus	Mountain Brome	20
Pascopyrum	Western wheatgrass	20
Arizona Fescue	Western fescue	20
Elymus glaucus	Blue wildrye	15
Achillea lanulosa	White Yarrow	5
Lupinus argeneus	Rocky Mountain Lupine	10
Geum triflorum	Rocky Mountain Geum	10



RESPEC

720 S COLORADO BLVD

SUITE 410S

DENVER, CO 80246

PHONE (303) 757-3855

DESIGNED

MTT

DRAWN

MTT

CHECKED

MTT

DATE

02/13/2026

REVISION

811

Know what's below.
Call before you dig.

TOWN OF RIDGWAY
201 N RAILROAD ST
RIDGWAY, CO 81452
(970) 628-5308

BEAVER CREEK
DIVERSION
RESTORATION
INFILTRATION
GALLERY

FINAL EROSION
CONTROL PLAN

DRAWING NUMBER:

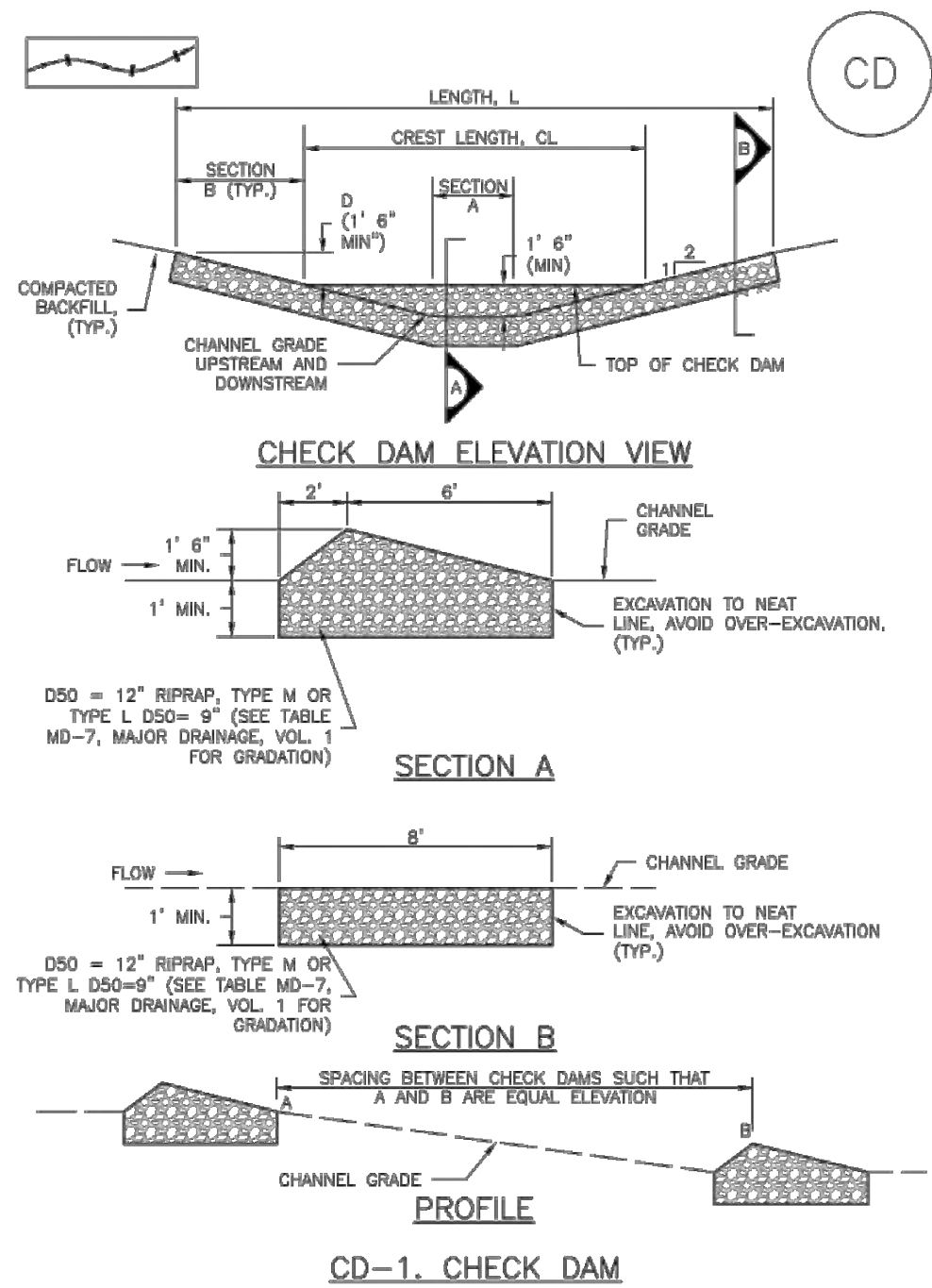
ER-2

SHEET 13

NAME: N:\PROJECTS\W0708- RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CADD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-EROSION-DETAILS.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS

Check Dams (CD)

EC-12



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 CD-3

EC-12

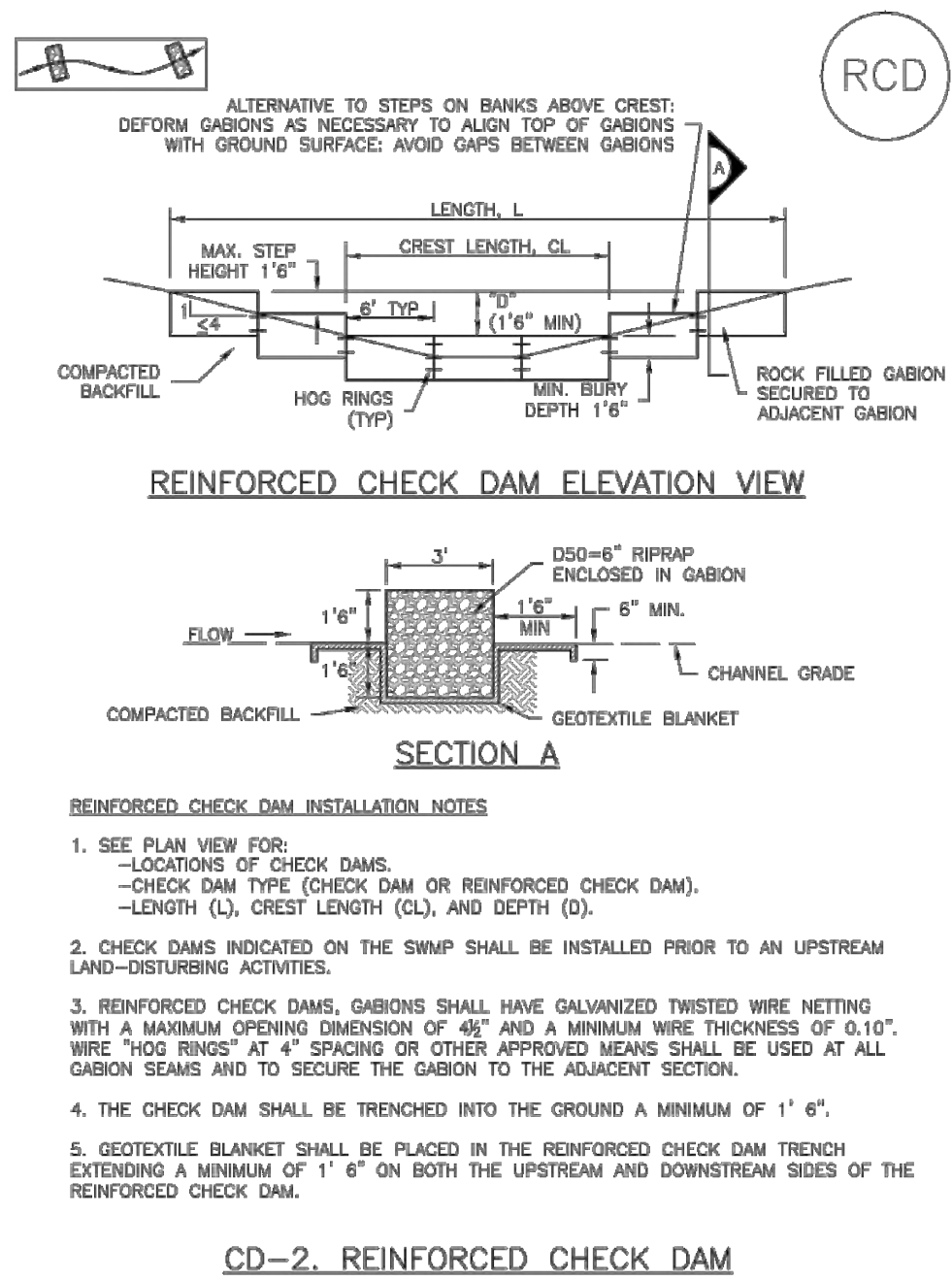
Check Dams (CD)

- CHECK DAM INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - LOCATION OF CHECK DAMS.
 - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
 - LENGTH (L), CREST LENGTH (CL), AND DEPTH (D).
 - CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
 - RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (DSO 12") OR TYPE L (DSO 9").
 - RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.
 - THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1' 6" HIGHER THAN THE CENTER OF THE CHECK DAM.
- CHECK DAM MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN $\frac{1}{2}$ OF THE HEIGHT OF THE CREST.
 - CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
 - WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.
- (DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

CD-4 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Check Dams (CD)

EC-12



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 CD-5

EC-12

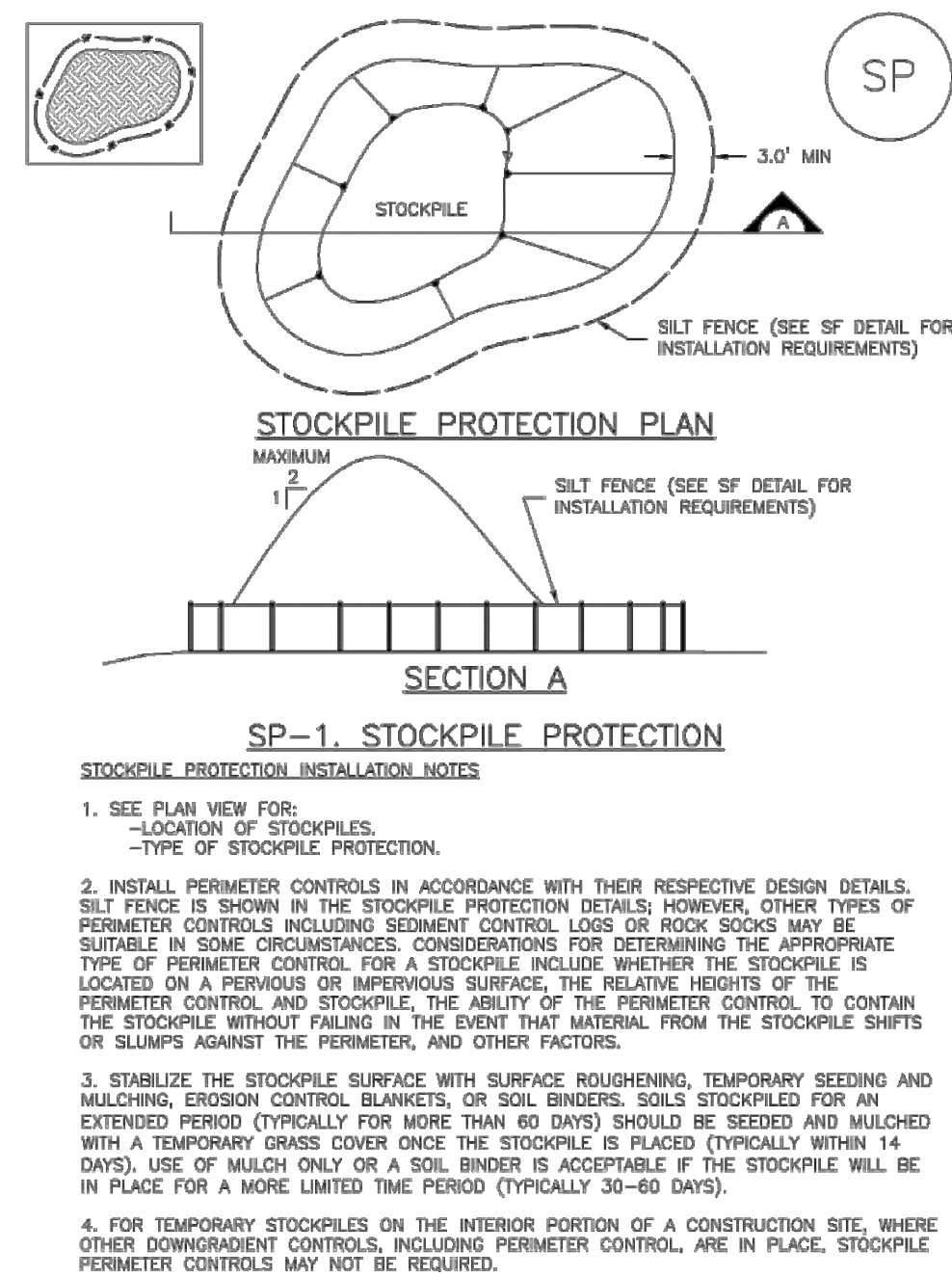
Check Dams (CD)

- REINFORCED CHECK DAM MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - SEDIMENT ACCUMULATED UPSTREAM OF REINFORCED CHECK DAMS SHALL BE REMOVED AS NEEDED TO MAINTAIN THE EFFECTIVENESS OF BMP, TYPICALLY WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN $\frac{1}{2}$ THE HEIGHT OF THE CREST.
 - REPAIR OR REPLACE REINFORCED CHECK DAMS WHEN THERE ARE SIGNS OF DAMAGE SUCH AS HOLES IN THE GABION OR UNDERCUTTING.
 - REINFORCED CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
 - WHEN REINFORCED CHECK DAMS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEED, AND MULCH, AND COVERED WITH A GEOTEXTILE BLANKET, OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.
- (DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

CD-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Stockpile Management (SP)

MM-2



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SP-3

MM-2

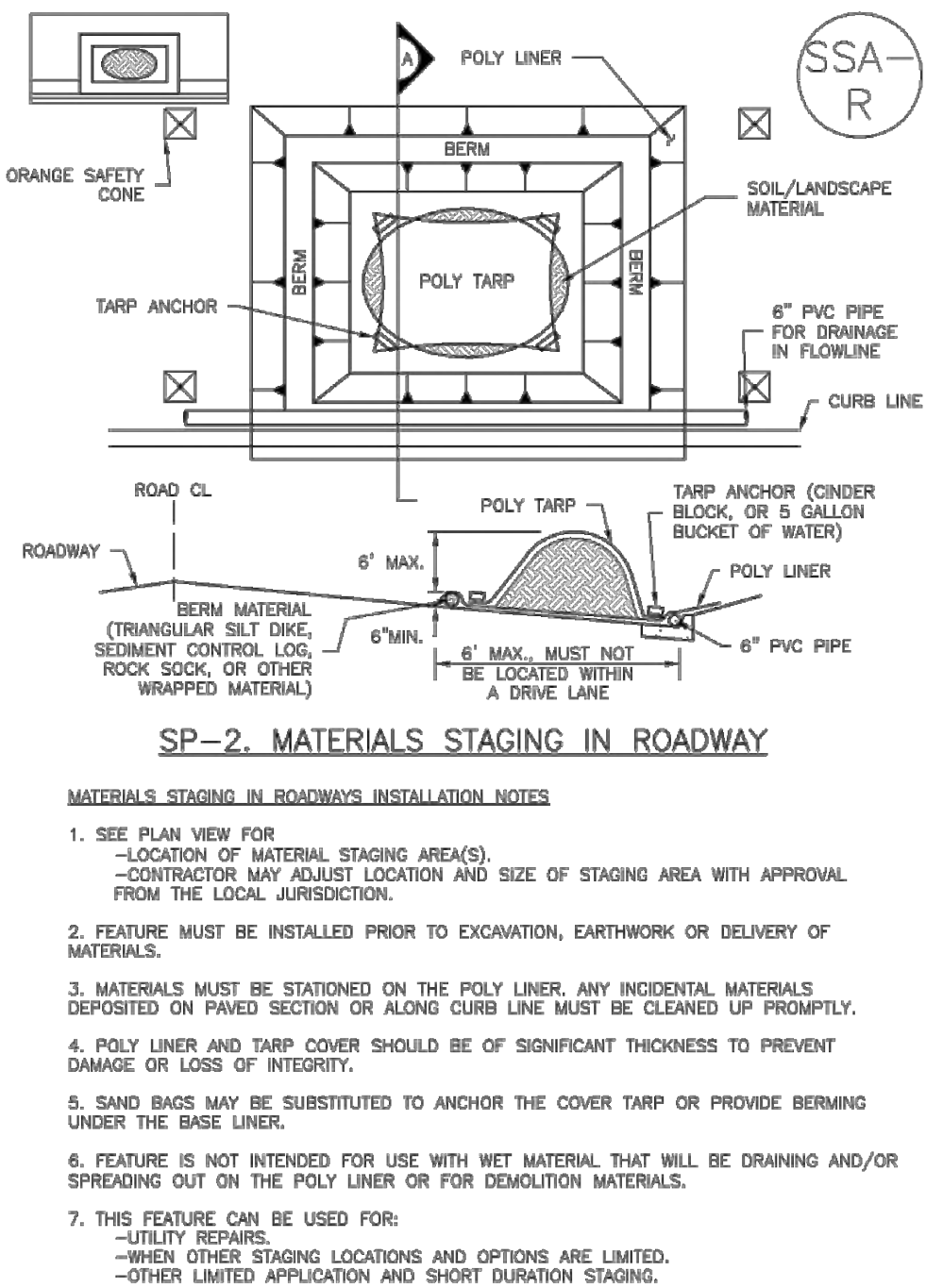
Stockpile Management (SM)

- STOCKPILE PROTECTION MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - IF PERIMETER PROTECTION MUST BE MOVED TO ACCESS SOIL STOCKPILE, REPLACE PERIMETER CONTROLS BY THE END OF THE WORKDAY.
 - STOCKPILE PERIMETER CONTROLS CAN BE REMOVED ONCE ALL THE MATERIAL FROM THE STOCKPILE HAS BEEN USED.
- (DETAILS ADAPTED FROM PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD)
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

SP-4 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Stockpile Management (SP)

MM-2



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SP-5

MM-2

Stockpile Management (SM)

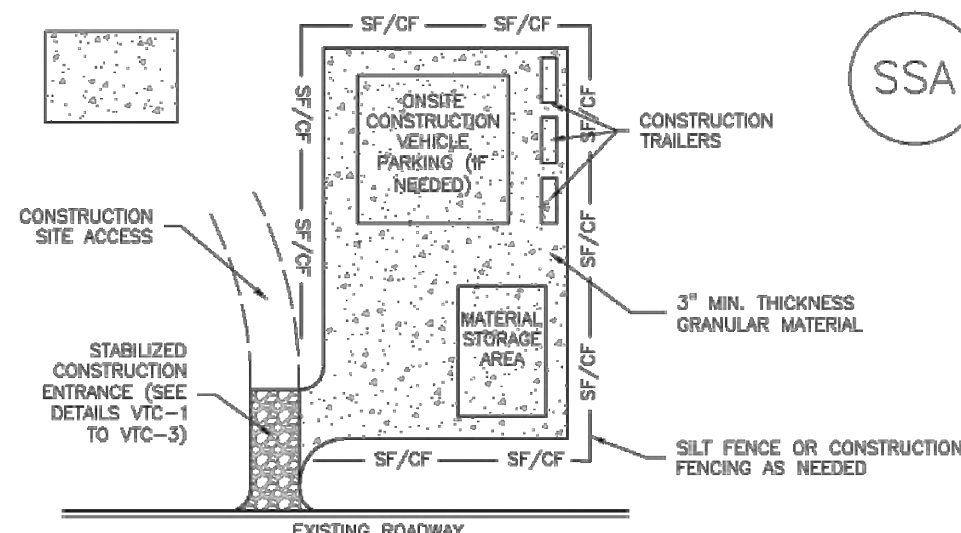
- MATERIALS STAGING IN ROADWAY MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - INSPECT PVC PIPE ALONG CURB LINE FOR CLOGGING AND DEBRIS. REMOVE OBSTRUCTIONS PROMPTLY.
 - CLEAN MATERIAL FROM PAVED SURFACES BY SWEEPING OR VACUUMING.
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.
- (DETAILS ADAPTED FROM AURORA, COLORADO)

SP-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

DESIGNED	MAINT	REVISION
DRAWN	MTT	
CHECKED	MAINT	
DATE	02/13/2026	
RESPEC		
720 S COLORADO BLVD		
SUITE 410S		
DENVER, CO 80246		
PHONE (303) 757-3855		
STAMP		
811		
Know what's below. Call before you dig.		
TOWN OF RIDGWAY		
201 N RAILROAD ST		
RIDGWAY, CO 81452		
(970) 628-5308		
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY		
EROSION CONTROL DETAILS (2 OF 4)		
DRAWING NUMBER:		
ER-4		
SHEET 15		

NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-EROSION-DETAILS.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS

Stabilized Staging Area (SSA) SM-6



SSA-1. STABILIZED STAGING AREA

STABILIZED STAGING AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
-LOCATION OF STAGING AREA(S).
-CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
2. STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
3. STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
4. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
5. UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
6. ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

November 2010 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 SSA-3

SM-6 Stabilized Staging Area (SSA)

STABILIZED STAGING AREA MAINTENANCE NOTES

5. STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING/LADING OPERATIONS.
 6. THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDS, AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.
- NOTE: MANY MUNICIPALITIES PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.
- NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.
- (DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO, NOT AVAILABLE IN AUTOCAD)

SSA-4 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 November 2010

SM-8 Temporary Diversion Methods (TDM)

in accordance with the *Major Drainage* chapter in Volume 1.

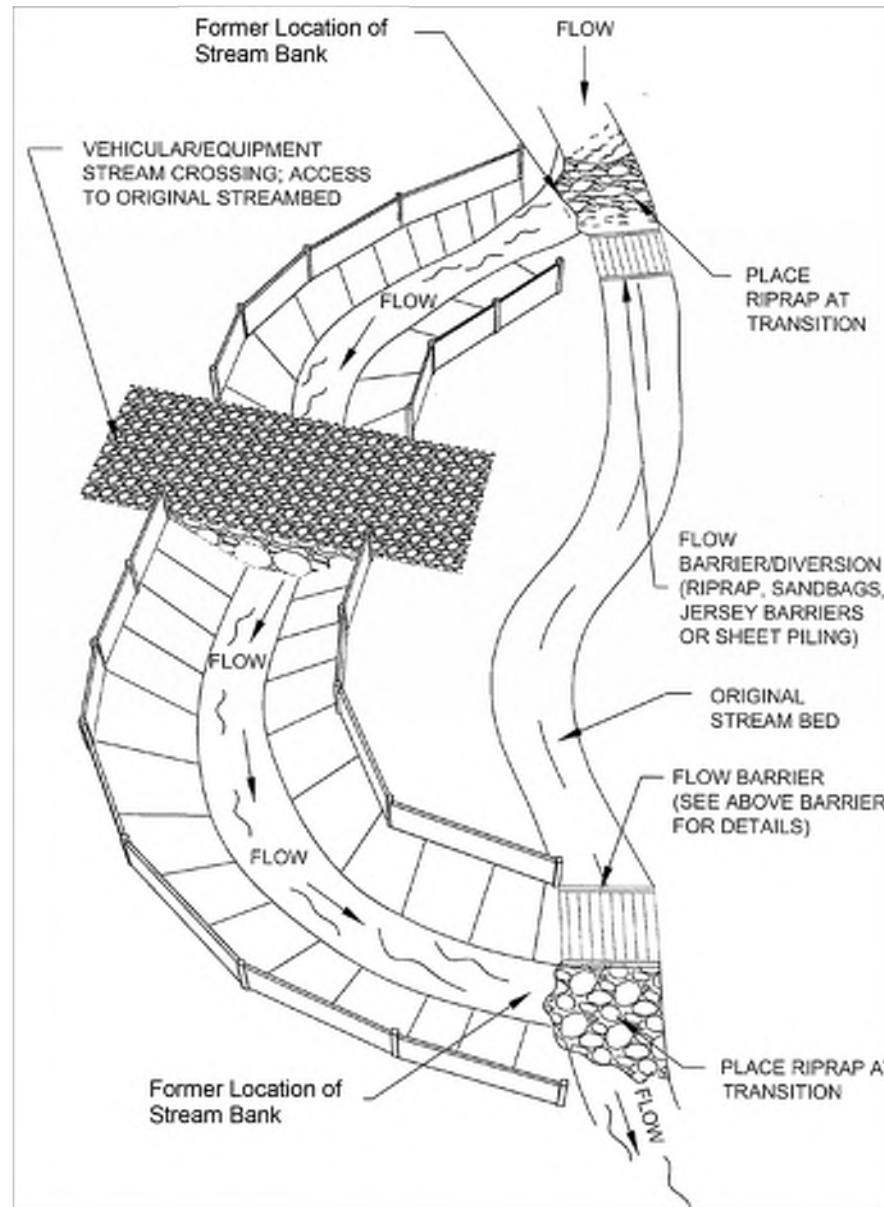


Figure TDM-1. Typical Temporary Diversion Channel

TDM-10 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

Temporary Diversion Methods (TDM) SM-8

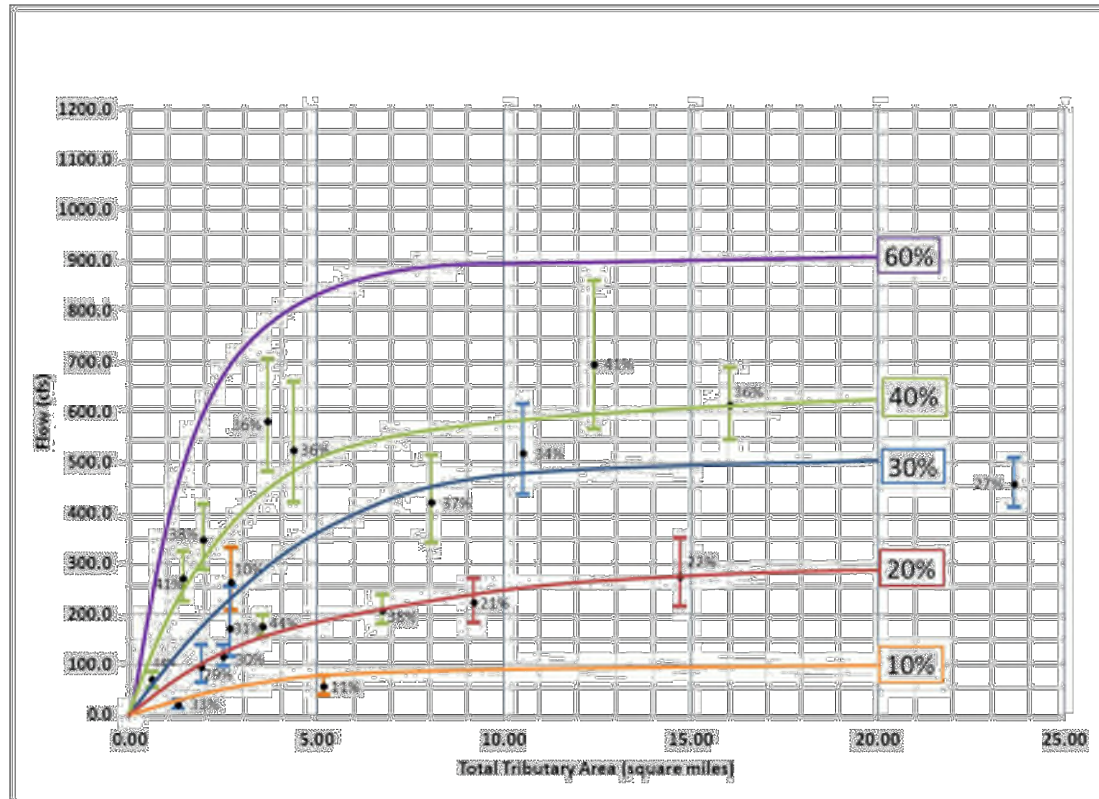
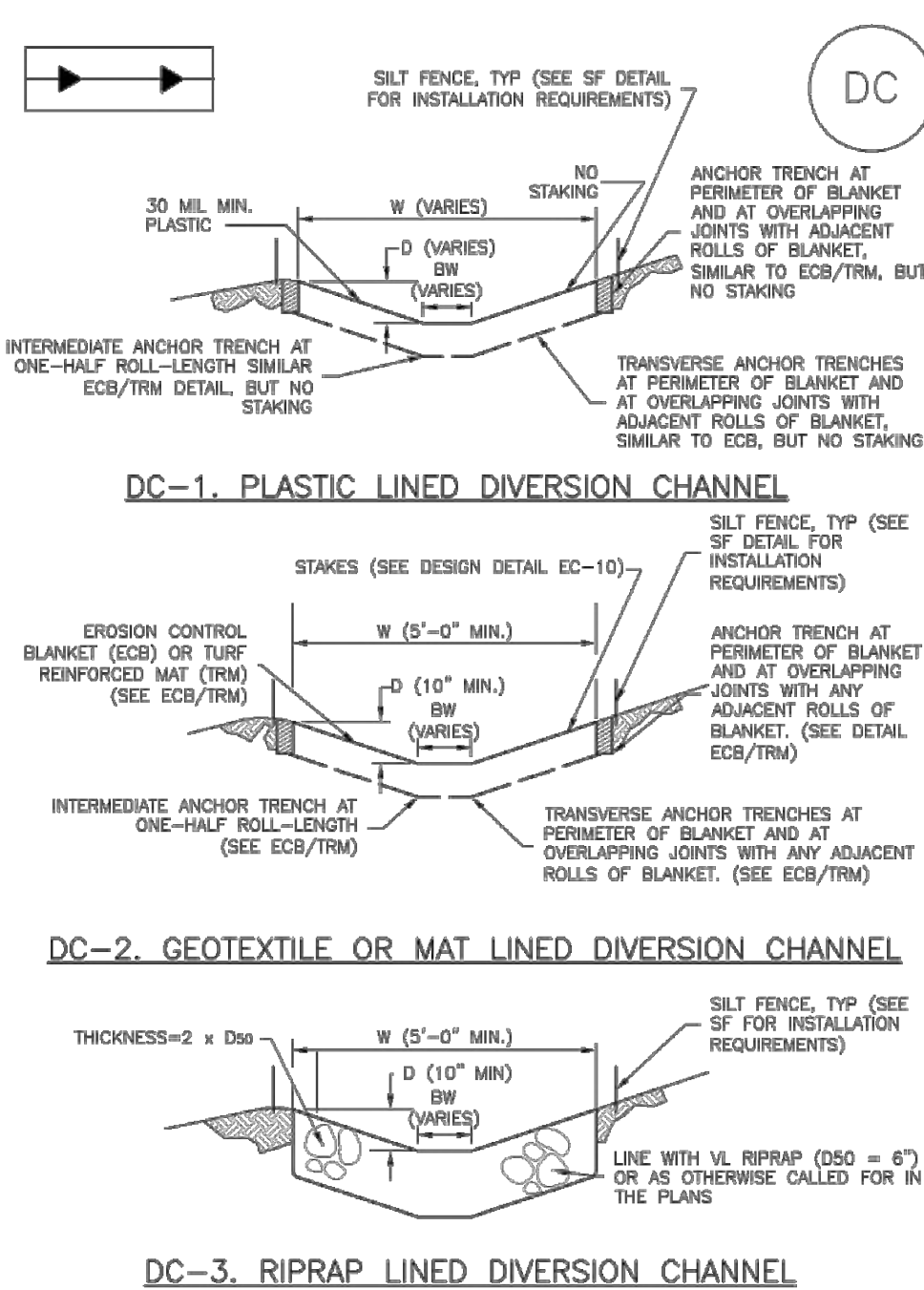


Figure TDM-2. Temporary Diversion Facility Sizing Nomograph for Long Duration Projects (Duration in excess of three months) Based on 2-year Peak Flows - Denver Metropolitan and Adjacent Areas, Updated April 2012

June 2012 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 TDM-11

SM-8 Temporary Diversion Methods (TDM)



TDM-12 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

Temporary Diversion Methods (TDM) SM-8

CHANNEL DIVERSION INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
-LOCATION OF DIVERSION CHANNEL
-TYPE OF CHANNEL (UNLINED, GEOTEXTILE OR MAT LINED, PLASTIC LINE, OR RIPRAP LINED)
-LENGTH OF EACH TYPE OF CHANNEL
-DEPTH, D, WIDTH, W, AND BOTTOM WIDTH, BW
-FOR RIPRAP LINED CHANNEL, SIZE OF RIPRAP, D50, SHALL BE SHOWN ON PLANS.
2. SEE DRAINAGE PLANS FOR DETAILS OF PERMANENT CONVEYANCE FACILITIES.
3. DIVERSION CHANNELS INDICATED ON THE SWMP PLAN SHALL BE INSTALLED PRIOR TO WORK IN DOWNGRADIENT AREAS OR NATURAL CHANNELS.
4. FOR GEOTEXTILE OR MAT LINED CHANNELS, INSTALLATION OF GEOTEXTILE OR MAT SHALL CONFORM TO THE REQUIREMENTS OF DETAIL ECB, FOR PLASTIC LINED CHANNELS, INSTALLATION OF ANCHOR TRENCHES SHALL CONFORM TO THE REQUIREMENTS OF DETAIL ECB.
5. WHERE CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION CHANNEL, THE PERMITTEE SHALL INSTALL A TEMPORARY STREAM CROSSING CONFORMING TO THE REQUIREMENTS OF DETAIL TSC.

DIVERSION CHANNEL MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. DIVERSION CHANNELS ARE TO REMAIN IN PLACE UNTIL WORK IN THE DOWNGRADIENT AREA OR NATURAL CHANNEL, IS NO LONGER REQUIRED. IF APPROVED BY LOCAL JURISDICTION DIVERSION CHANNEL MAY BE LEFT IN PLACE.
5. IF DIVERSION CHANNELS ARE REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, SEEDS, AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO)

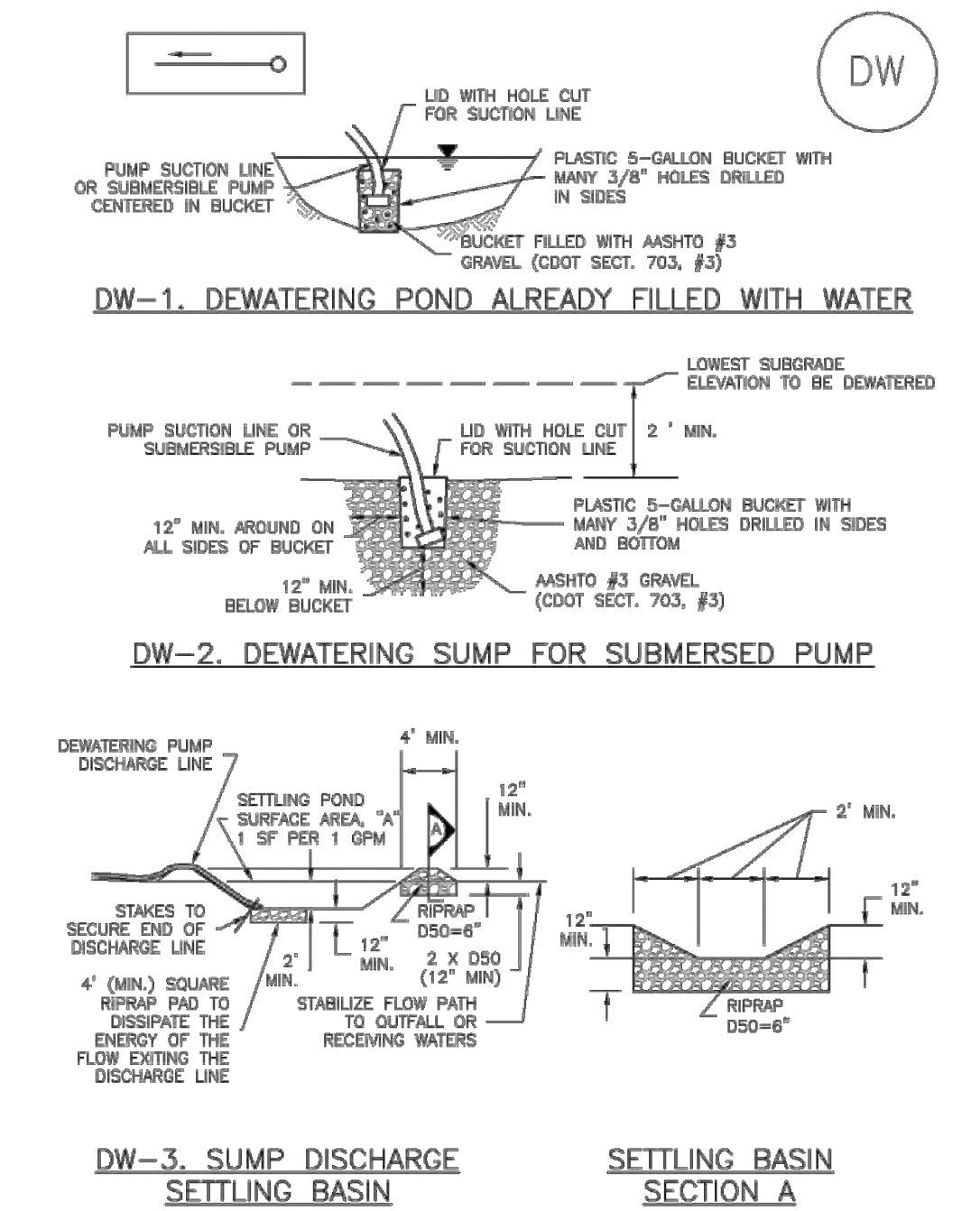
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

June 2012 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 TDM-13

REVISION			
DESIGNED	MAI/H		
DRAWN	MTT		
CHECKED	MAI/H		
DATE	02/13/2026		
STAMP			
811			
Know what's below. Call before you dig.			
TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308			
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY			
EROSION CONTROL DETAILS (3 OF 4)			
DRAWING NUMBER: ER-5 SHEET 16			

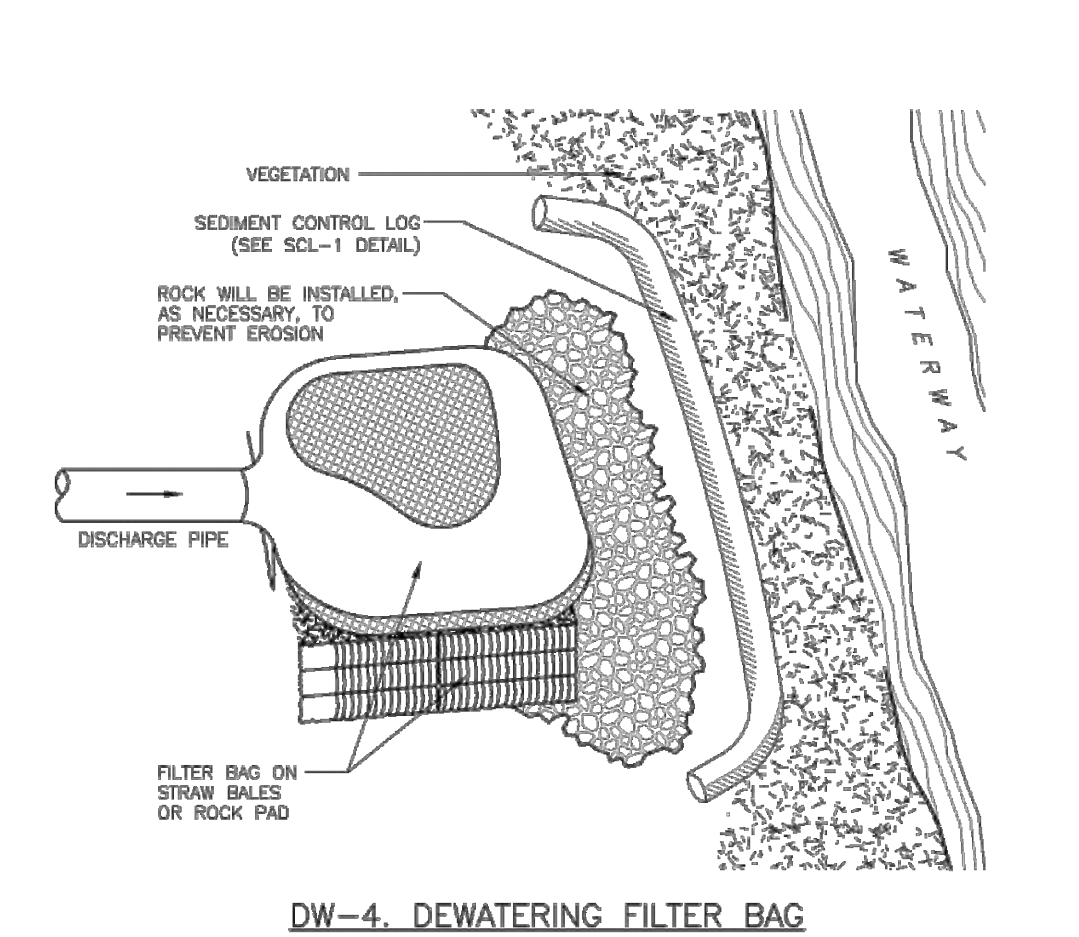
NAME: N:\PROJECTS\W0708 - RIDGWAY\W0708.25001 - BEAVER CREEK DIVERSION\CAD\2 SHEETS\INFILTRATION GALLERY SET\T0825-1-S-EROSION-DETAILS.DWG
PLOT DATE: March 18, 2026 3:48 PM, BY: MICHELLE HOPKINS

Dewatering Operations (DW) SM-9



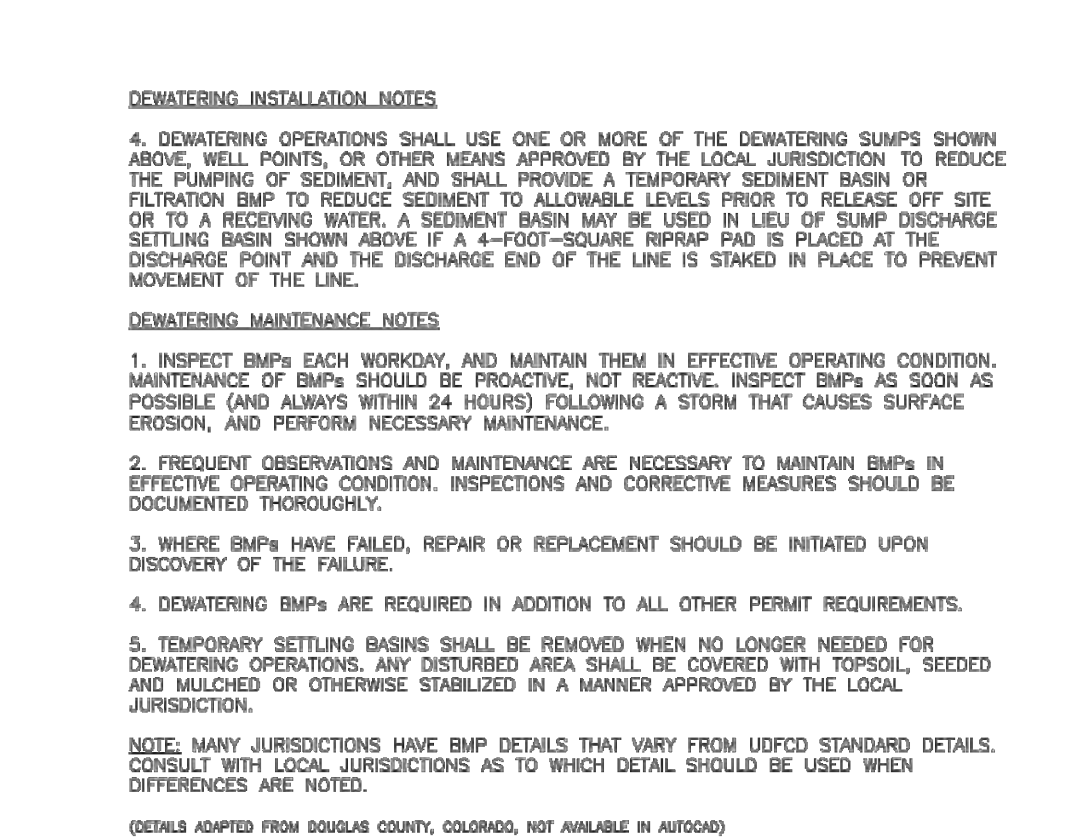
November 2010 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 DW-3

SM-9 Dewatering Operations (DW)



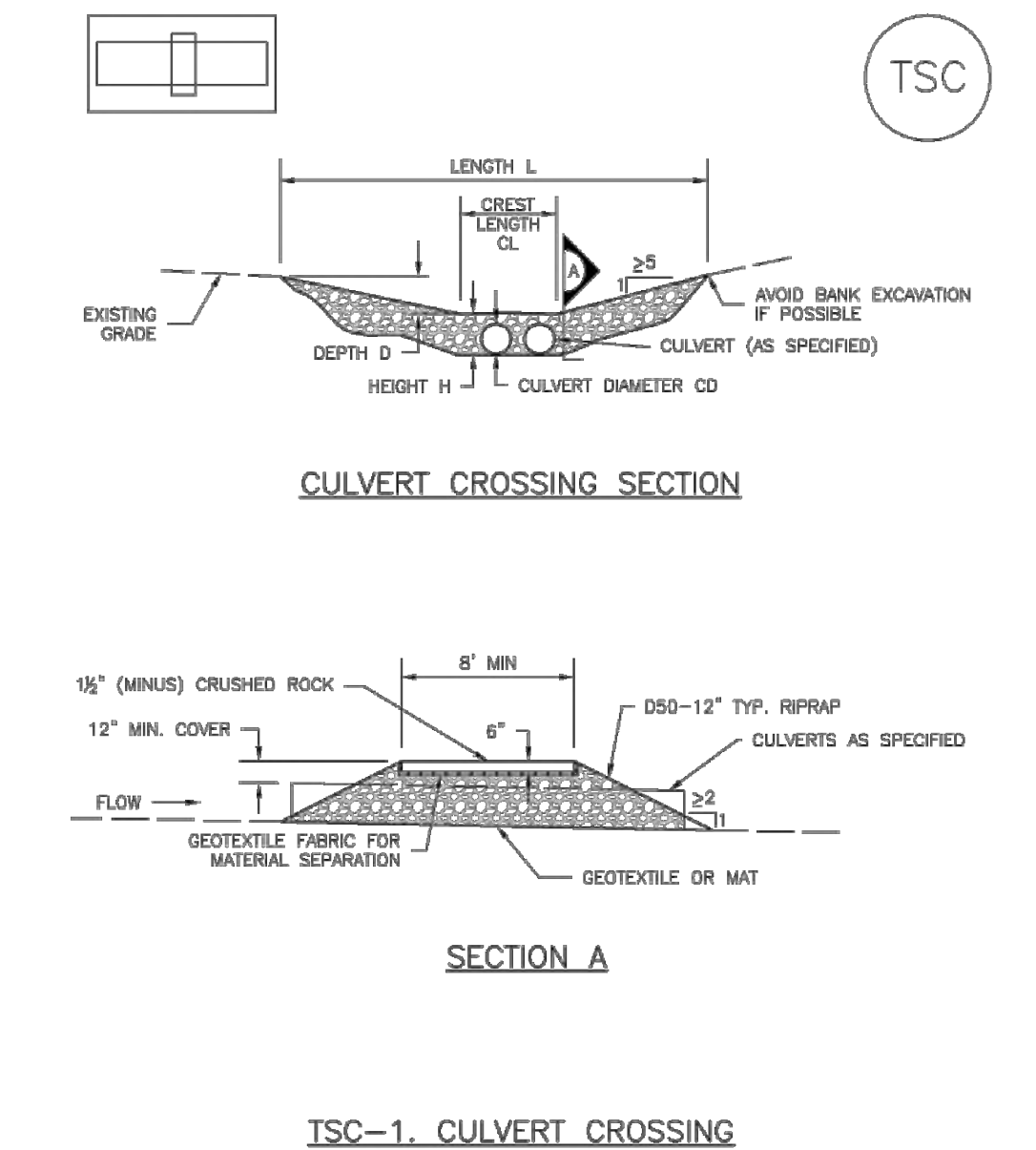
DW-4 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 November 2010

Dewatering Operations (DW) SM-9



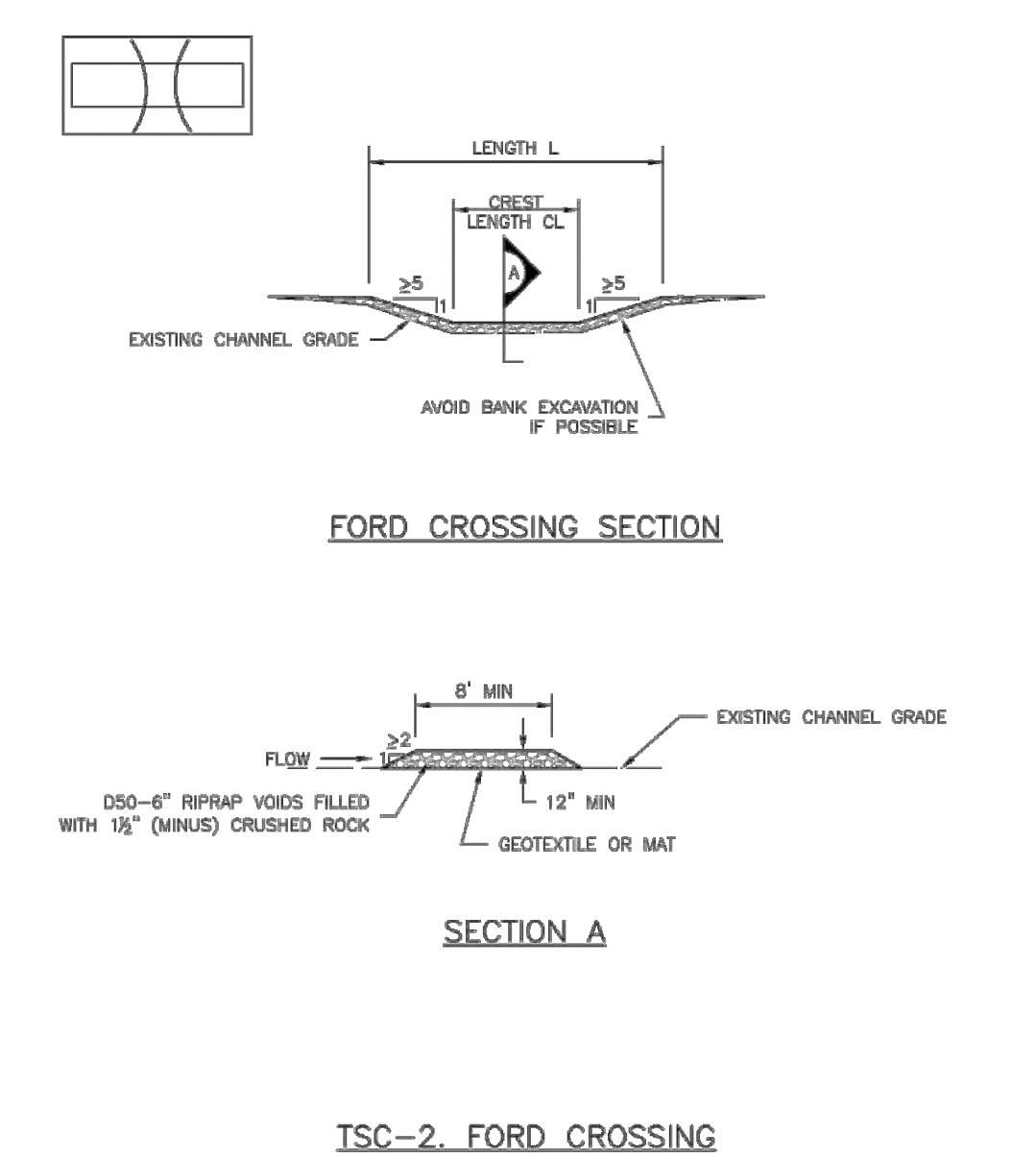
November 2010 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 DW-5

Temporary Stream Crossing (TSC) SM-10



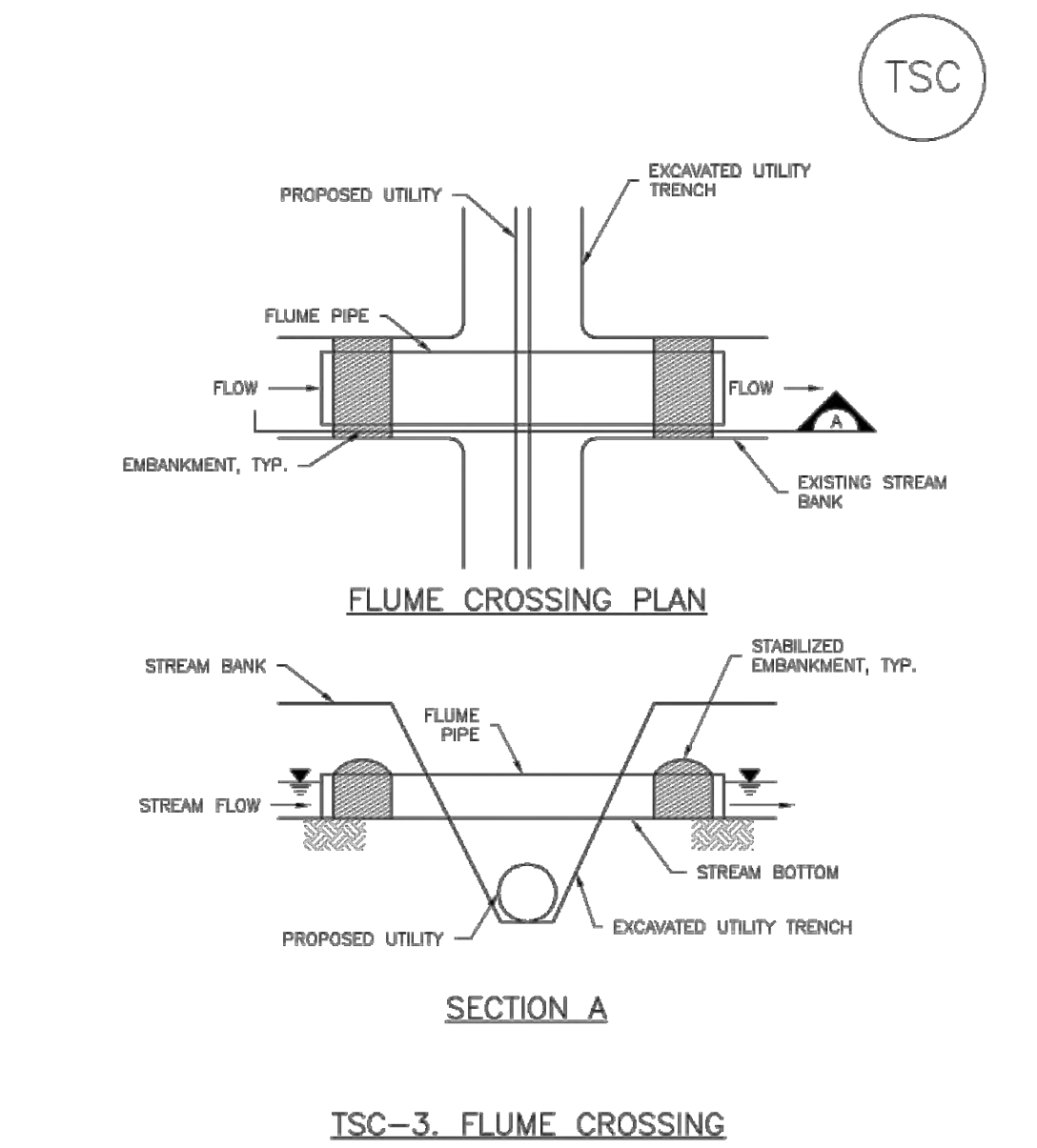
June 2012 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 TSC-3

SM-10 Temporary Stream Crossing (TSC)



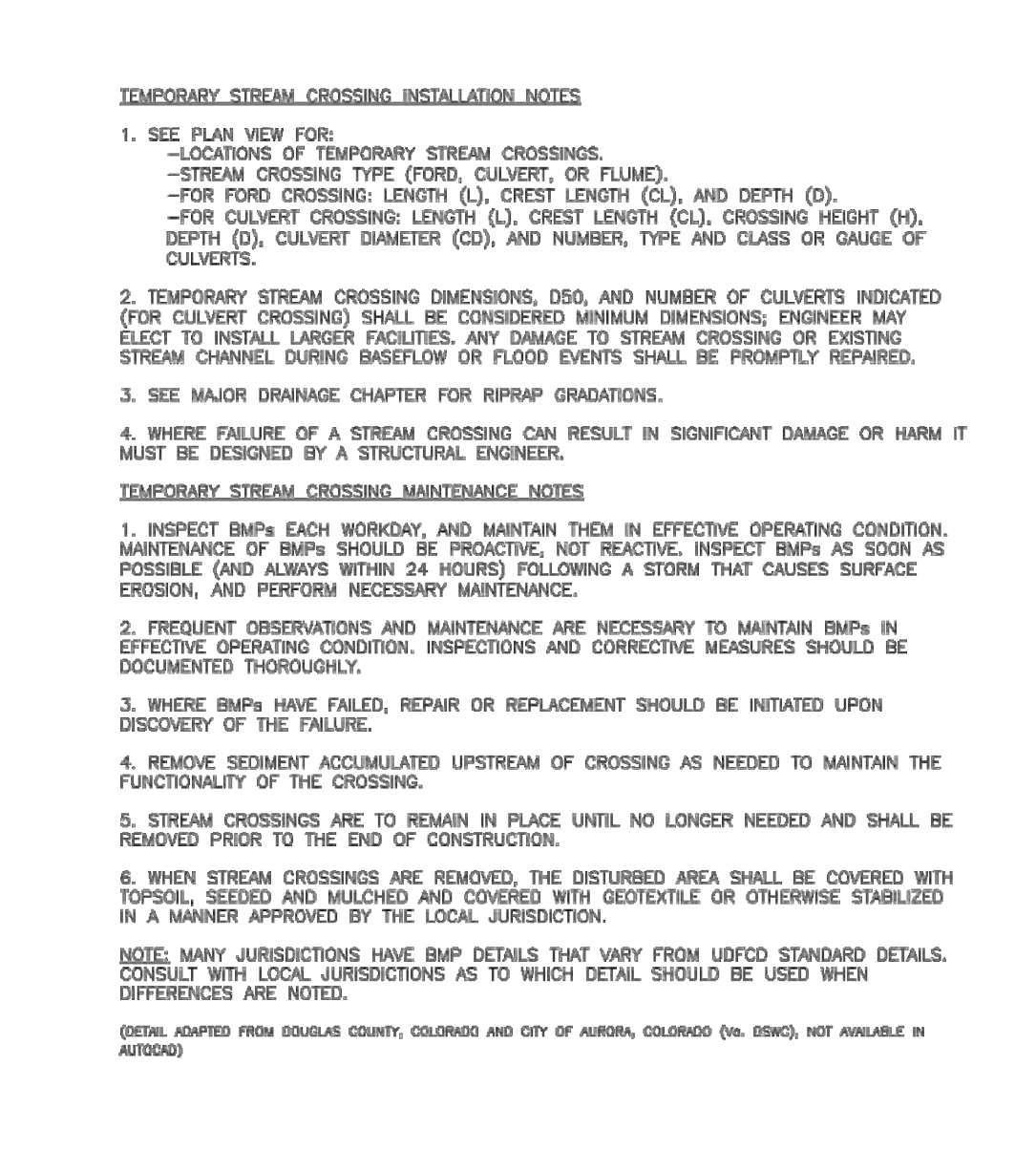
TSC-4 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

Temporary Stream Crossing (TSC) SM-10



June 2012 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 TSC-5

SM-10 Temporary Stream Crossing (TSC)



TSC-6 Urban Drainage and Flood Control District
Urban Storm Drainage Criteria Manual Volume 3 June 2012

DESIGNED DRAWN CHECKED DATE	MAINH MTT MAINH 02/13/2026	REVISION
RESPEC 720 S COLORADO BLVD SUITE 410S DENVER, CO 80246 PHONE (303) 757-3855		
STAMP		
811 Know what's below. Call before you dig.		
TOWN OF RIDGWAY 201 N RAILROAD ST RIDGWAY, CO 81452 (970) 628-5308		
BEAVER CREEK DIVERSION RESTORATION INFILTRATION GALLERY		
EROSION CONTROL DETAILS (4 OF 4)		
DRAWING NUMBER: ER-6 SHEET 17		