San Juan River Navajo Irrigation Projects
Hogback Irrigation Project
Helium Siphon Replacement

DESIGN-BUILD SPECIFICATIONS

Prepared for

Navajo Nation Department of Water Resources
Technical Construction and Operations Branch
P.O. 678
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PART 1 – GENERAL

1.01 WORK INCLUDED

A. This scope of work covers all design, material, and workmanship required to replace the Helium Siphon and appurtenances, install trash screen, turnouts, laterals, and construct the blowout and outlet structures per the Drawings and Specifications. This scope of work also covers abandonment of the existing siphon in certain locations in the event construction funding becomes available.

B. General. The existing Helium Siphon is a 40-inch steel coal tar pipeline that diverts water from the Hogback Canal to the Helium Lateral. The existing siphon is approximately 9,750 feet long, providing water to almost 1,000 acres on the south side of Shiprock, New Mexico.

C. This project replaces the current pipeline with a new 36-inch PVC pipe and installs new PVC laterals to serve historic demands. The new PVC siphon is 11,303 feet long and follows the existing alignment for approximately 5,200 feet. The siphon crosses the San Juan River and on the south edge of the floodplain, the new alignment diverts from the existing siphon to avoid new municipal and housing development. The new alignment continues along the edge of the developed area, and adjacent to agricultural land served by the siphon, until tying into the existing Helium Lateral about 380 feet north of Highway 64. The new siphon alignment generally follows the existing alignment until reaching the south side of the San Juan River floodplain. The project also installs a 6-inch PVC lateral pipeline from the outlet of Helium Siphon to the Central Consolidated School District irrigation pump located at the end of the existing siphon.

D. Scope. Work covered includes all design, design approval, demolition, disposal, earthwork, excavation, dewatering, handling, installation, mechanical work, electrical work, concrete work, structural work, backfill, and final grading to complete the work as shown in the conceptual design report and described in these specifications. All material, unless specified, are furnished by the Contractor.

1.02 GENERAL

A. All design work shall be completed under the direction of a Professional Engineer currently licensed to provide engineering services in the state of New Mexico and qualified to complete the scope of work.

B. All materials, unless otherwise noted, shall be of new, first-quality manufacture, free from defects and suitable for the intended use. Where manufacture's names are used in the Specifications it is for the purpose of establishing the standard for quality and general configuration. Products of other manufacturers will be considered, provided they meet the same standards and the manufacture's name and product specifications are submitted to the Engineer for approval.

C. The Owner has secured National Environmental Policy Act (NEPA) compliance for this project with the exception of the Clean Water Act Section 401 and 404 permits. The Contractor shall comply with all the contract specifications to ensure compliance with the NEPA. The Contractor shall assist NNDWR with applying for the 401 and 404 permits during the design phase of the project.

D. The Contractor shall be responsible for submitting a Notice of Intent (NOI) with the United States Environmental Protection Agency and be responsible for preparing and implementing a Storm Water Pollution Prevention Plan.

E. The Contractor shall be responsible for complying with New Mexico one-call requirements prior to completing any excavation work.

F. The Contractor shall provide all other permits, fees, materials, labor, and equipment necessary to complete the work.

G. All workmanship shall be of the highest quality.

H. All work shall be performed in strict accordance with these Specifications, and the applicable national, state and tribal law, codes and regulations. In addition, manufacturer's instructions for all materials shall be strictly followed. In the event of disagreement between national and tribal codes and these Specifications, the codes shall prevail. Such situations shall be discussed with the Engineer prior to proceeding with the work in question.

I. In the event of conflicts between Specifications, Drawings and field conditions, the Engineer shall be consulted. No changes in the design or construction method shall occur without the review and approval of the Engineer. If changes in the Drawings or Specifications are deemed necessary by the Contractor, details of such changes shall be submitted to the Engineer for review as soon as practical to allow time for review before installation.

J. Materials damaged in the course of installation shall be repaired or replaced at the discretion of the Engineer. The Contractor shall be liable for damage during handling or installation of all materials, whether provided as a part of this Contract or provided by others, and shall repair or replace the material at the option of the Engineer at the Contractor's expense.

K. Proper handling and storage of all materials and equipment prior to installation shall be the responsibility of the Contractor.

L. Cost. The cost of all materials furnished by the Contractor and the cost of all work performed by the Contractor necessary to complete the project as described by the drawings and these specifications and the material specifications shall be included in the prices listed in the Bid Schedule.

1.03 WARRANTY

A. Contractor warranty. Contractor shall warrant the work to be free from defects for a period of one year after completion of the project. Warranty shall cover all work performed by the Contractor and all materials provided by the Contractor.

B. Manufacturer warranties. All manufacturer warranties for materials furnished by this scope of work shall be transferred to:

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C. Costs. All costs associated with warranting the scope of work as described in the drawings and specifications shall be included in the bid schedule for each item applicable to the warranty.

PART 2 – DESIGN

2.01 GENERAL

A. Objective. The Contractor shall complete final design of the conceptual design approved by the Owner for replacing Helium Siphon. The conceptual design is described in the Conceptual Design Report.

B. Materials. The Contractor shall furnish all necessary materials, equipment, and labor necessary to install the 36-inch PVC pipe per Drawings and Specifications.

C. Qualifications. All work shall be completed under the direction of a Professional Engineer currently licensed in the state of New Mexico and qualified to complete the scope of work. All design documents completed for this scope of work shall be stamped by the Professional Engineer.

D. Geotechnical Investigation. The Owner has completed some geotechnical investigation of the site. This investigation is located in Appendix D of the conceptual design report. All additional geotechnical work shall be the responsibility of the Contractor.

E. River Crossing Investigation. The Contractor shall investigate the possibility of using the existing Siphon as a sleeve to cross the San Juan River. The Contractor shall be responsible for all investigative work necessary to complete this investigation. If the existing siphon is found viable for completing the crossing, then the Contractor shall incorporate the river crossing into the design. If the existing siphon is not usable, then the Contractor shall design and assist the Owner with obtaining permits for making a new crossing across the San Juan River.

F. Survey Data. The Owner has completed a topographical survey of the project area. This may be found in Appendix C of the conceptual design report. All additional survey data shall be the responsibility of the Contractor.

G. Design Review. The Contractor shall submit to the Owner a design review schedule that includes reviews at:
   - 30% completion
   - 60% completion
   - 90% completion

   Each review shall consist of a meeting between the Contractor, the Owner, and the Bureau of Indian Affairs.

H. Approval. The Contractor shall obtain approval of the design by the Owner prior to any construction.

I. Design Standards. The Contractor shall comply with the following design standards or approved equivalent:

J. Minimum Documents. The Contractor shall furnish six (6) copies of the drawings, specifications, and the standard operation manual.

K. As Built Drawings. The Contractor shall furnish as-built drawings for the replacement within 30 days after construction completion.

L. Payment. The Contractor shall submit all costs associated with the design for the project and the river crossing investigation in Bid Item 1. This cost assumes that the existing siphon may be used to sleeve the new pipe across the San Juan River and pays for all investigations necessary to determine whether or not the existing siphon is suitable. If the investigations conclude that the siphon cannot be used, then the Contractor shall submit the costs for designing and permitting a new river crossing in Bid Item ADD 5 which will only be executed in the event the existing siphon is not suitable.

PART 3 – SITE CONDITIONS, PREPARATION & RESTORATION

3.01 GENERAL

A. During construction, disturbance of the area shall be minimized. Construction activity shall be kept to the right-of-way at all times. Activity outside the construction boundary shall be by permission from the owner only. Keep project area neat and orderly at all times, free of rubbish and excess construction materials.

B. Prevent contamination of the project area. Do not dump waste oil, fuel, rubbish or other similar contaminants on the ground or in any streambed. The Contractor shall avoid contamination of the aquifer, soil or streams with any contaminant and shall be liable for containment and cleanup of any such contamination at his own expense.

3.02 ENVIRONMENTAL QUALITY PROTECTION

A. Landscape Preservation. The Contractor shall be responsible for restoring any land disturbed by construction activities. This includes preserving the natural landscape by keeping construction impacts to a minimum, limiting all activity within the designated construction boundaries, cleaning the construction area during construction and after completion of the project, re-grading disturbed lands so natural contours are restored, and providing proper drainage to prevent erosion during and after construction. The remediation plan shall be submitted and approved by the Engineer.

B. Vegetation Preservation. The Contractor shall preserve and protect existing vegetation which is not required to be removed by construction activity

C. Water Quality Management. The Contractor shall be responsible for any sediment and erosion control, wastewater control, and storm water management for all land within the construction boundary and any drainage to and from the construction boundary during the duration of the project. All Federal, State, and Tribal requirements for maintaining water quality during construction activity shall be met. The Contractor shall prepare and submit a storm water pollution prevention plan and a Notice of Intent as required by the Clean Water Act section 402 permit 14 days prior to construction. The contractor shall submit a weekly inspection sheet of any measures implemented by the storm water pollution prevention plan.

D. Air Quality Management. The Contractor shall comply with any applicable Federal, State, or Tribal regulations governing air quality for construction activity for the duration

of the project. This includes all equipment emissions and dust abatement.

E. Cultural Preservation. The Contractor shall protect any sites identified by the Navajo Nation as having any historical, religious, scientific, pre-historical, or archeological significance warranting preservation. No such areas are currently known to be within the construction boundaries. Should the Contractor discover any additional historical, religious, scientific, pre-historical, or archeological findings, all work involving that site shall cease until clearance is obtained. Expenses incurred by the delay shall be negotiated between the Owner and the Contractor. Any excess disturbances by the Contractor or any individual associated with the Contractor as judged by the Navajo Nation shall be subject to the full extent of the law.

F. Submittals. The Contractor shall submit to the Owner a copy of any required permit to complete the scope of work two days prior to any construction activity.

G. Payment. All material and labor costs associated with preserving environmental quality shall be included in the bid schedule for the applicable items. The costs for preparing, submitting, and complying with a storm water pollution prevention plan shall be included in Bid Item 2.

3.03 SAFETY

A. General. The Contractor shall fully comply with all Federal, State and Tribal safety regulations.

B. Safety Program. The Contractor shall establish and maintain a safety program during the duration of the project. The Contractor shall submit the safety program to the Owner for approval 14 days prior to any construction activity. Minutes of weekly safety meetings shall be submitted to the Owner for the duration of the project

C. Payment. The costs for establishing and maintaining a safety program shall be included in Bid Item 2.

3.04 STAGING AND EQUIPMENT SERVICE AREA

A. The Owner will designate a suitable equipment staging and service area for the Contractor within 1/4 mile of the project area. The staging and service area may be used for parking of equipment and storage of materials prior to installation. The Contractor shall be responsible for security at the staging area. Servicing of equipment and vehicles will be allowed only at the designated service area, except in cases where the repair must be performed on site before the equipment can be moved.

B. Care shall be taken to avoid fuel and oil spills. All waste material, packaging and unused material shall be removed from the site upon completion of the Contract.

C. The staging area shall be free of debris and re-graded to its original surface contour upon completion of the Contract.

D. Costs associated with establishing and maintaining a staging area for the duration of the project shall be Bid Item 2.

3.05 UTILITIES

A. General. Existing utilities may be located at the site. The Contractor shall identify all utilities, mark them during the duration of the project, and protect them from all construction activity. Any damage to existing utilities by the Contractor or their sub-contractors shall be repaired as directed by the utility owner at the Contractor's expense.

B. NM One Call. The Contractor or any sub-contractor shall submit a confirmation number to the Owner at least two days prior to any excavation at the site. The Contractor shall maintain the confirmation number for the duration of the excavation.

C. Electricity. The Contractor is responsible for all required electrical requirements necessary to complete construction of the project.

D. Water. The Contractor is responsible for all required water requirements necessary to complete the project.

E. Payment. The costs for working with utilities shall be included in Bid Item 2.

PART 4 – MATERIALS

4.01 GENERAL

A. General. All materials, unless otherwise noted, shall be of new, first-quality manufacture, free from defects and suited for the intended use. Where manufacturer's names are used in the Specifications it is for the purpose of establishing the standard for quality and general configuration. Products of other manufacturers will be considered, provided they meet the same standards and the manufacture's name and product specifications are submitted to the Engineer for approval.

B. Handling. Materials damaged in the course of transportation or installation shall be repaired or replaced at the option of the Engineer.

C. Warranties. All material manufacture warranties shall be transferred to the Owner at the completion of the project.

D. Storage and security. The Contractor is responsible for storing all material including the security of all material for the duration of the project. Any damage or loss shall be repaired or replaced by the Contractor at the Contractor's expense. This is to include any salvage material in the Contractor's care between the time of demolition and transport to the Owner.

E. Payment. All costs associated with furnishing, handling, storing, and the security of all material furnished by this contract are to be included in the applicable cost in the bid schedule.

4.02 PVC PIPE

A. Material Furnished by the Contractor. The Contractor shall furnish all PVC pipe required to complete the scope of work.

B. Material Specifications for 36-inch PVC Pipe. Pipe shall conform to AWWA C905 specification with gaskets meeting ASTM F477 and joints in compliance with ASTM D3139. Pipe shall conform with DR 41 cast-iron pipe outside diameter.

C. Material Specification for PVC less than 36-inch (for Turnouts). All 12-inch, 8-inch, and 6-inch PVC pipe shall be rigid polyvinyl chloride (PVC) extruded from Type 1, Grade 1 or 2 PVC resin with a hydrostatic design stress of 2,000 psi for water at 73.4□F, designated as PVC 1120 or PVC 1220 conforming to ASTM Standard D1784. Pipe included shall be either12-inch, 8-inch, and 6-inch diameter PIP PVC, class 100 with a Standard Dimension Ratio (diameter over thickness) of not more than 41. All pipe shall be furnished with integral bell gasket joints, conforming to ASTM Standard D3139, "Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals." The recommended lubricant for joining the pipe joints shall be furnished.

D. C905 PVC Fabricated Fittings. Fittings shall be fabricated from C905 PVC pipe conforming to AWWA C905. All C905 fittings shall have a dimension ratio of DR25. Fittings shall be manufactured with gasketed bell "push-on" ends.

E. PIP PVC Fabricated Fittings. All PIP PVC fittings shall comply with ASTM D1784, D2564, D2855, and F477. The pressure rating for the fittings is SDR 41 (100 psi). The pressure rating shall be maximum internal pressure ratings, non-shock at 73˚F. All PIP PVC fittings shall be manufactured with gasketed bell "push-on" ends.

F. Payment. Costs for handling, transporting, and storing material furnished by the Owner shall be included in Bid Item 3 for 36-inch PVC Helium Siphon and in Bid Item 10 for 6-inch PVC School Lateral Pipeline.

4.03 HDPE PIPE

A. Material Furnished by the Contractor. The Contractor shall furnish all HDPE pipe required to complete the scope of work. HDPE pipe shall be used for road crossings and the river crossing.

B. Material Specifications Smooth Walled Pressurized Pipe. Black PE materials used for the manufacture of polyethylene pipe, tube and fittings shall be PE 3408 high density polyethylene meeting ASTM D3350 cell classification 445574C (formerly PE 2406 meeting 345464C per ASTM D3350-02) and shall be listed in the name of the pipe and fitting Manufacturer in PPI (Plastics Pipe Institute) TR-4 with a standard grade HDB rating of 1600 psi at 73°F. The material shall be listed and approved for potable water in accordance with NSF/ANSI 61.

C. Fabricated Fittings. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe. Fabricated fittings shall be tested in accordance with AWWA C906.

D. Payment. Costs for handling, transporting, and storing material furnished by the Owner shall be included in Bid Item 3. Costs for furnishing additional material shall also be included in Bid Item 3.

4.04 BLOW-OUT STRUCTURES

A. General. Two blow-out structures, with associated 6-inch PVC branch saddle, 6-inch PVC tee and blind flange, 6-inch gate valve and steel discharge pipe, and 48-inch manhole is required. The blow-out structures will be used to empty the siphon by gravity flow using the gate valve. The remaining water can be pumped out by accessing the siphon via the blind flange.

B. Drain Valve. The blow-out structure attached to the 36-inch PVC pipe with a 6-inch weld-on PVC branch saddle that is flanged to tie into a 6-inch PVC tee with blind flange. The 6-inch gate valve attaches to the tee at the tee at 90 degrees as shown in the Drawings. A 6-inch steel discharge pipe is attached to the discharge of the gate valve.

C. Payment. Costs for furnishing the manholes, drain and associated elements shall be included in Bid Item 4.

4.05 PIPELINE CONCRETE WEIGHT

A. General. These precast concrete weights shall be cast to the outside diameter of the 36-inch PVC pipe as shown in the Drawings.

B. Concrete Weight. The external dimensions of the concrete weight shall be conform to the width of the pipe. The length shall be adequate to maintain a weight of now less than 300 lbs. The weight shall be reinforced with #4 rebar at 8" OC throughout. Maintaining a minimum of 2 inches of concrete depth to rebar. Except for the #6 epoxy coated rebar lifting ring.

C. Payment. Costs for furnishing the pipeline concrete weights shall be included in Bid Item 5.

4.06 CONCRETE

A. Cement. The cement to be used shall conform to the "Standard Specification for Portland Cement" designation C.150 of the American Society for Testing Materials (ASTM). The recommended cement is Type II Normal Portland Cement. Any request to deviate from this will be subject to approval by the Engineer. No rapid hardening (Type III) cement types will be allowed.

B. Water. Water to be used for concrete mixing shall be potable water.

C. Aggregate. Aggregate proposed for concrete shall be subject to inspection and approval by the Engineer. The dust content, measured as the percentage of material passing a 75µm sieve shall not exceed 5% in the case of fine aggregate and 1.5% in the case of coarse aggregate. The fineness modulus shall fall in the range of 1.6 to 3.5 (inclusive). The chloride content of the aggregates shall not exceed 0.03% by mass and the aggregate shall be free of organic materials.

D. Admixtures. The use of accelerating admixtures will not be allowed. The use of water reducing admixtures is encouraged in order to lower the water/cement ratio.

E. Mixture Design. The mix shall be designed to conform to the following parameters:

1. 28-day minimum compressive strength f'c = 4000 psi
2. Maximum water/cement ration = 0.45 (by weight)
3. Total entrained air = 5% (-1% to +1%)
4. Maximum size of aggregate = 3/4-inch
5. Minimum slump = 2-inch and maximum slump = 4-inch

F. Mixing, Transporting and Placing. All work shall be conducted in accordance with ACI 212.2, "Guide for Use of Admixtures in Concrete," ACI 211.1. "Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete," ACI 304. "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."

G. Curing. Minimum times for stripping formwork shall be 48 hours. No concrete shall be backfilled until after a 48-hour curing period. Should cement other than Type I be used, formwork/backfilling times shall be subject to review by the Engineer.

H. Reinforcement. Reinforcement shall conform to ASTM 615 or ASTM 616 or A617. The minimum characteristic yield strength f_y=60 ksi unless noted otherwise. All reinforcement bars shall be #4 deformed placed on 12-inch centers each way unless noted otherwise. Footings shall have two rows of #4 rebar. Dowel pins 12-inch on center extending at least 12 inches into the vertical walls shall be placed in all footings or

slabs used as footings and tied to the reinforcement steel of the walls. Where required, transition bars between walls and the footings shall be bent to conform to the shape of the structure. All reinforcement plans shall be submitted to the Engineer for approval 15 days prior to forming any structures. Ties for reinforcement shall be black annealed wire not less than 1/16-inch in diameter.

I. Cover. The minimum cover to any reinforcing bar shall be two inches for 6-inch thick slabs and walls and three inches for 8-inch or greater slabs and walls.

J. Embedded Items. All items to be embedded in the concrete shall be securely fastened to the reinforcement in the correct positions. No concrete shall be placed before the Engineer has inspected the reinforcement, built-in items and formwork and certified them as ready for concrete placement. Such inspection and certification shall in no way relieve the Contractor of any liabilities due to errors and/or omissions of any part of the construction.

K. Tolerances

Compressive Strengths. No more than 5% of the random samples collected shall yield strengths less than the specified strength and no individual test shall yield a strength more than 10% below the specified strength.

Dimensional Tolerances. Variation in cross sectional sizes, positions of built-in items, plan dimensions, levels and any linear structural dimensions shall be -1/4 inches to +1/2 inches.

L. Quality Control. All concrete and reinforced concrete work will be subject to inspection and testing according to the provisions of the applicable ASTM standards as listed under Section 1, Volume 01.04, “Steel-Structural, Reinforcing, Pressure Vessel, Railway” and Section 4, Volumes 04.01 “Cement; Lime; Gypsum” and 04.02, “Concrete and Aggregates,” without compromising the requirements of other standards and specifications as mentioned elsewhere within this document.

i. The frequency of casting test cylinders for concrete compressive strength tests will be determined by the Engineer. Generally, one set of three will be taken per pour over 5 cubic yards and a minimum of one set per 30 cubic yards placed.

ii. No backfill on top of reinforced concrete shall commence before the concrete has reach a minimum of 70% of its design compressive strength.

iii. Inspection by the Engineer will be required before re-commencing work after completion of each of the following concreting stages:

1. Placing rebar and built-in items
2. Erecting formwork
3. Placing concrete
4. Stripping formwork
5. Backfilling against the structure

M. Payment. All costs associated with furnishing concrete included in the applicable bid item.

4.07 SECURITY FENCE

A. General. A commercial grade chain link fence should be installed for security and safety purposes.

B. Round Steel Pipe. The pipe shall be Schedule 40 standard weight pipe, in accordance with ASTM F1083.

C. Fence Fabric. The material shall be manufactured from galvanized steel wire. The size of the steel wire core shall be 9 gauge.

D. Fittings. The fittings shall meet the requirements for ASTM F626.

E. Gates. The swing gates shall meet the requirement of ASTM F900.

F. Payment. All costs associated with furnishing the power supply included in Bid Item 5.

4.08 VALVES

A. General. All pipe valves shall be wafer style steel valves designed to be installed between two ½-inch steel flanges with 150 lb. bolt patterns. Each valve shall include the required bolts, nuts, and washers to install the valve. All bolts, nuts, and washers shall be a minimum of grade 5 and zinc coated steel.

B. Butterfly Valve. All butterfly valves shall be a wafer style valve. The valve shall have an epoxy coated cast iron body with locating lugs. The resilient seal shall consist of a stainless steel disc with Buna N liner. The shafts shall be fabricated from stainless steel. The bearings shall be bronze. The valve shall be gear operated with a hand wheel.

C. Continuous Acting Air Vent. Air/vacuum relief valves shall be sized as shown on the Drawings, designed to discharge air until the line is filled and then continuously discharge air once pressurized.

D. Turnout Air Vent. Air/vacuum relief valves shall be sized as shown on the Drawings, designed to discharge air until the line is filled and then opened once the

E. Gate Valve. The gate shall be a double disk line gate valve capable of a 60 ft. head. The body shall be epoxy coated cast iron with iron seats that slip onto a CL 80 PIP PVC valve. The operator nut shall be a 2-inch operating nut on a non-rising bronze stem suitable for underground service. The valve shall come with a 4-inch PVC access tube, cap, and operating key.

F. Riser Valve. All tee riser valves for the turnouts shall be a PIP by O.D steel tee riser valve with a 60-inch riser as manufactured by Gheen Irrigation Works, Inc. Model No. 7015 or approved equal. The fitting shall be epoxy coated.

G. Valve Opener. All valve openers shall be 90 degree aluminum valve opener with a ring lock that connects to the riser valve. Each turnout shall have one valve opener.

H. Payment. Costs for providing the valves and hardware to install the valves shall be included in the applicable bid item where a valve has been specified.

PART 5 – WORKMANSHIP

5.01 EXCAVATION

A. General. The Contractor shall be responsible for obtaining a One Call confirmation number from NM One Call prior to any excavation. A trench shall be excavated in accordance with the Drawings and Specifications.

B. Safety. All safety procedures shall be followed during excavation including adequate trench shoring, personnel safety, and barricades on open trenches.

C. Survey. Two elevation benchmarks are provided on each end of the project. All survey requirements are furnished by the Contractor.

D. Trench Width. The trench shall have a minimum width of the pipe diameter plus 8-inches on each side with the pipe centered in the trench. Up to the top of the pipe, the trench shall not be wider than the diameter of the pipe plus 12 inches on each side.

E. Trench Depth. Unless otherwise specified, all pipe shall have a minimum cover depth of 3 feet.

F. Grade. Grade shall be controlled such that when the pipe is installed the invert elevation shall not deviate from that shown on Drawings by more than 0.1 ft.

G. Dewatering. If dewatering is necessary in order to keep the bottom of the trench free of water, a pump shall be used to pump water out of the trench and disposed of into as allowed by permitting. In areas requiring dewatering, the contractor shall over-excavate the trench by 6-inches to allow for the placement of clean, washed gravel foundation to support the pipe

H. Trench Bottom Preparation. The bottom of the trench shall be clean and free from protruding stones larger than ½ inch in diameter, hard lumps, angular stones, or abrasive material, to allow the pipe to lie directly on earth in the bottom of the trench.

I. Safety. All appropriate and applicable safety precautions and regulations shall be followed during excavation, including trench shoring or sloped trench walls for protection of workers where required. Open trenches shall be clearly marked with appropriate barricades when close to public access. All national, state and tribal safety regulations shall be followed.

J. Payment. All costs associated with excavation per the Specifications and the Drawings shall be included in the applicable bid item.

5.02 HDPE PIPE INSTALLATION

A. Handling. During installation, pipe shall be handled carefully to avoid any damage. Any damaged pipe during trenching and installation shall be replaced by the Contractor at the expense of the Contractor. Any debris in the pipe shall be removed prior to installation. During assembly, pipe ends shall not be left open when installation is not active at the open end. Keep the pipe ends blocked to prevent entry of foreign matter that might clog the system when flushing.

B. Heat Fusion Joining. Joints between plain end pipes and fittings shall be made by butt fusion. The butt fusion procedures used shall be procedures that are recommended by the pipe and fitting Manufacturer. The Contractor shall have a minimum of one year experience installing large diameter HDPE pipe and shall ensure that persons making heat fusion joints have received training in the Manufacturer's recommended procedure. The Contractor shall maintain records of trained personnel, and shall certify that training was received not more than 12 months before commencing construction. External and internal beads shall not be removed.

C. Butt Fusion of Unlike Wall Thickness. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets that have the same outside diameter and are not different in wall thickness by more than one Standard DR, for example, SDR 13.5 to SDR 17, or SDR 11 to SDR 13.5. Transitions between unlike wall thickness greater than one SDR shall be made with a transition nipple (a short length of the heavier wall pipe with one end machined to the lighter wall). SDR's for polyethylene pipe are 7.3, 9, 11, 13.5, 17, 21, 26, 32.5 and 41.

D. Field Cutting. Pipe ends should be squarely cut to 90°± 5°. Do not use bar chain lubrication if cutting pipe with a chainsaw.

E. Pipe Joining. The joining of the pipe shall be accomplished according to the manufacturer's specifications. Assemble the joints in as straight an alignment as possible. The manufacturer's recommended maximum joint deflection shall not be exceeded at any time. ASTM standards say that fusion is generally not recommended below -4°F without special provisions. Follow all guidelines set forth in ASTM F2620.

F. Pipe Repair. Damaged portions of the HDPE pipe may be repaired using electrofusion repair saddles, or if the damage is sufficiently extensive a section of pipe may be cut out and removed.

G. Transition to PVC Pipe. HDPE pipe shall be connected to PVC pipe using steel reducing couplings such as the Romac Style RC400 or approved equal. The coupling shall be wrapped in plastic visqueen sealed on the ends with duct tape.

H. Payment. All costs associated with pipe installation per the Specifications and Drawings shall be included in Bid Item 3.

5.03 PVC PIPE INSTALLATION

A. Handling. During installation, pipe shall be handled carefully to avoid any damage. Any damaged pipe during trenching and installation shall be replaced by the Contractor at the expense of the Contractor. Any debris in the pipe shall be removed prior to installation. During assembly, pipe ends shall not be left open when installation is not active at the open end. Keep the pipe ends blocked to prevent entry of foreign matter that might clog the system when flushing.

B. Field Cutting. Where it is necessary to make field cuts in the pipe at fitting locations, the pipe may be cut using a hand saw, or power saw with a fine toothed blade or abrasive disk. Care should be taken to avoid chipping the pipe. If the pipe is chipped

or cracked, it shall be re-cut to remove the damage area. After cutting, the pipe end shall be beveled to match the factory provided spigot end using a beveling tool, wood rasp, or power grinder. Prior to cutting or beveling, the pipe should be marked on its entire cut line to assure a straight cut. After cutting and beveling, the proper spigot penetration depth shall be marked on the pipe prior to assembly.

C. Pipe Assembly. The assembly of the gasket jointed pipe shall be accomplished according to the manufacturer's specifications. Only manufacturer recommended lubricant shall be used. The gasket race, gasket, bell and spigot shall be thoroughly cleaned before assembly. Install the gasket prior to lubrication. Lubricate and assemble according to manufacturer's recommendations. Do not "bottom" the spigot in the bell during assembly. The proper depth of penetration will be marked on the pipe by the manufacturer. Assemble the joints in as straight an alignment as possible. The manufacturer's recommended maximum joint deflection shall not be exceeded at any time.

D. Elbows. Unless specified, all direction changes shall be accomplished with a pre-fabricated steel elbow. Turnouts shall be accomplished as shown on the drawings.

E. Fitting Installation. Manufacturer directions shall be followed. All fittings shall be inspected prior to back fill.

F. Thrust Blocks. Thrust blocks are required for all horizontal tees, elbows, and termination ends. Concrete used for thrust blocks shall be a minimum 3,000 psi mix. The thrust block shall be poured so that the specified bearing area specified is achieved. A minimum distance of 1 ft between the pipe and the undisturbed trench wall shall be maintained. Thrust blocks shall not be backfilled until 24 hours after they have been poured. .

G. Payment. All costs associated with installation of the 36-inch PVC Helium Siphon shall be included in Bid Item 3. All costs associated with installation of the 6-inch PVC School Lateral shall be included in Bid Item 10.

5.04 PVC PIPE CONNECTION TO EXISTING SIPHON INLET TRANSITION STRUCTURE

A. General. At the siphon inlet on the east side of the arroyo, new 36-inch PVC pipe will be connected to the existing concrete structure.

B. Connect Pipe to Siphon Inlet. The Contractor will design the connection of the new PVC pipe to the existing concrete structure.

C. Trash screen. The Contractor shall design, fabricate and install a trash screen on the upstream side of the inlet that matches the existing inlet structure.

D. Backfill. The new connection shall be backfilled and compacted to 95 percent density a standard proctor.

E. Payment. All costs associated with pipe installation per the Specifications and

Drawings shall be included in Bid Item 8.

5.05 NEW SIPHON OUTLET TRANSITION STRUCTURE AND CONNECTION TO PVC PIPE

A. General. A new siphon outlet transition structure shall be constructed that will be the connection between the termination of the PVC pipe and the beginning of the existing earthen canal.

B. Construct Outlet Transition Structure. The structure as shown on the drawings shall include a 36-inch to 24-inch reducer, a 24-inch shut-off valve, a 14-inch diameter orifice plate for reducing pressure, a 24-inch compression coupler, a 36-inch to 24-inch reducer and a pipe that is inserted into the new concrete structure. The 24-inch pipe shall be carbon steel properly protected underground from corrosion.

C. Concrete structure. The concrete structure shall be designed, furnished and installed by the contractor on a suitable foundation and with an energy dissipation wall as shown on the drawings. The concrete structure shall be configured provide a safe transition for flow to the earthen canal.

D. Payment. All costs associated with the outlet transition structure per the Specifications and Drawings shall be included in Bid Item 6.

5.06 BACKFILL

A. General. Backfill shall follow shortly after the installation of the PVC pipe. The bedding material placed within the haunches of the pipe and at least 12 inches above the top of the pipe shall be free from stones larger than 1 inch in diameter, angular stones, abrasive or frozen material, and free of debris or other organic materials. The backfill material shall be placed in a manner that minimizes voids throughout the trench but particularly around the pipe. Backfill below the haunches shall be compacted in 6-inch lifts to 85% of standard proctor. The final backfill (from at least 12" above the crown of the pipe to the top of the trench) shall be free from stones larger than 4 inches in diameter, clumps of frozen soil, rubble or other such material. In most cases, the material that was originally excavated can be used for final backfill. Following backfill of the trench, the surface shall be re-graded to the original ground surface with the trenched area mounded to allow for backfill settlement.

B. Saturated Area. For locations where the PVC pipe is in saturated areas, the bedding shall be clean crushed 1-inch gravel or chips, with a gradation as follows:

Passing 1-inch Sieve……..100%
Passing ¾-inch Sieve…….90-100%
Passing 38-inch sieve…….20-55%
Passing #4 Sieve…….0-10%
Passing #8 Sieve…….0-8%

C. Unsaturated Area. For locations where the PVC pipe is in unsaturated areas, the backfill shall be compacted to 85% of standard proctor below the haunches, and 80% of standard proctor above the haunches.

D. Structural Backfill. All structural backfill shall be compacted to a density of 95% of standard proctor.

E. Payment. The cost for backfilling and surface re-grading shall be included in the applicable bid item.

5.07 BLOW-OUT STRUCTURE

A. General. Two blowout structures for draining and accessing the pipe shall be installed. The structure shall be able to gravity discharge the siphon for water located above the ground elevation of the drain. The remaining water in the drain below the ground elevation shall be pumped out.

B. Payment. The cost for the drain shall be included in Bid Item 3.

5.08 PIPELINE CONCRETE WEIGHT

A. General. A precast concrete weight shall be placed every 10 feet throughout the San Juan River crossing and the secondary channel crossing. The purpose of the weight is to prevent the pipe from floating when empty.

B. Payment. The cost for concrete cap shall be included in Bid Item 6.

5.09 SITE RESTORATION

A. General. The entire construction site shall be restored to original or better conditions.

B. Fields. Locations within fields shall be graded to original condition so that the pipe does not form a barrier to surface irrigation operations. The Contractor shall disk the disturbed ground once completed.

C. Payment. The cost for site restoration shall be included in Bid Item 3.

5.10 ROAD CROSSINGS

A. General. Helium Lateral Pipeline crosses Bluff Road as shown on the Drawings. All workmanship and materials shall conform to the Bureau of Indian Affairs Road Department standards. If the geology allows for it, the crossing shall be accomplished by direct boring the road to the grades and elevations shown in the approved design. Pipe that is damaged during unloading, handling or installation shall be replaced as directed by the Engineer at the expense of the Contractor.

B. Permit. The Contractor shall apply to the Bureau of Indian Affairs for a road crossing permit. The Contractor shall comply with the road crossing permit.

C. Bore Installation. The steel casing pipe shall be installed to the proper alignment and grade as shown in the approved design by direct boring. No open cut installation will be allowed within the highway right-of-way if a bore can be reasonably accomplished. The steel pipe shall be installed such that there is no annular space between the pipe and the ground through which the pipe is installed.

D. HDPE Pipe Installation. Once the steel casing has been installed, the Contractor shall insert the 36-inch HDPE pipe through the steel casing. All fuses joints shall be completed and visually inspected to ensure the joint has been fused prior to installation.

E. Transition to PVC pipe. The HDPE pipe shall be joined to the PVC pipe on each side of the steel casing five feet from the end of the casing. The pipes shall be joined by a repair coupler specifically designed to join two pipes with different diameters and materials. The coupling shall be wrapped and sealed with plastic visqueen and duct tape.

F. Utility Markers. 60-inch long by 3.75-inch fiberglass purple posts (for irrigation) shall be placed on the edge of the highway right-of-way marking the location of the pipeline once the pipeline has been backfilled and graded.

G. Payment. All costs associated with installation of the road crossing per the Specifications and Drawings shall be included in Bid Item 8.

5.11 RIVER CROSSING

A. General. Helium Siphon Pipeline crosses the San Juan River as shown on the Drawings. The existing siphon has a 40-inch coal tar epoxy lined steel pipe. It is NNDWR's intent that this section of pipe may be utilized as a sleeve to insert a new 36-inch HDPE pipe through, thus avoiding the permitting and costs of constructing a new crossing. If this is not possible, then the Contractor shall design and install a new crossing.

B. Investigation. During the design process, the Contractor shall excavate each end of the existing siphon on the river and investigate the integrity of the existing steel pipe. If the steel pipe is found to be usable, then it may be used as a sleeve. If the steel pipe remains uncertain, then the pipe will be abandoned and a new crossing is to be designed by the Contractor.

C. Permits. The Contractor shall be responsible for obtaining a Section 401 permit from Navajo EPA and a Section 404 permit from the US Corps of Army Engineers if a new crossing has to be completed.

D. Crossing. The Contractor may design either a bore or an open cut crossing based on geology and permitting. The Contractor shall select a sleeve suitable for slipping the 36-inch HDPE pipe.

E. HDPE Pipe Installation. Once the sleeve has been installed, the Contractor shall insert the 36-inch HDPE pipe through the sleeve. All fuses joints shall be completed and visually inspected to ensure the joint has been fused prior to installation. HDPE pipe shall be installed for the length of the river crossing plus 200 feet on each side of the river.

F. Transition to PVC pipe. The HDPE pipe shall be joined to the PVC pipe on each side of the sleeve five feet from the end of the sleeve. The pipes shall be joined by a repair

coupler specifically designed to join two pipes with different diameters and materials. The coupling shall be wrapped and sealed with plastic visqueen and duct tape.

G. Dewatering. The Contractor shall be responsible for all dewatering of the project area for the duration of the project.

H. Payment. The Contractor shall submit all costs associated with completing the river crossing investigation and then subsequent insertion of the HDPE pipe into the existing sleeve in Bid Item 5. If the investigations conclude that the siphon cannot be used, then the Contractor shall submit the costs for designing, permitting, and completing a new river crossing in Bid Item ADD 5. Bid Item ADD 5 is only implemented in addition to Bid Item 5 in the event a new crossing is installed.

5.12 TURNOUTS

A. General. The Contractor shall design and install turnouts as shown on the Drawings. All turnout locations shall be finalized during the design process in consultation with the permit holder whom is served by the turnout.

B. A turnout consists of a reducing tee, an isolation gate valve, conveyance pipe to the field, an air vent on a riser, and a riser valve with a valve turner.

C. Fitting Installation. Manufacturer directions shall be followed. All fittings shall be inspected prior to back fill.

D. Thrust Blocks. Thrust blocks are required for all horizontal tees, elbows, and termination ends. Concrete used for thrust blocks shall be a minimum 3,000 psi mix. The thrust block shall be poured so that the specified bearing area specified is achieved. A minimum distance of 1 ft between the pipe and the undisturbed trench wall shall be maintained. Thrust blocks shall not be backfilled until 24 hours after they have been poured. .

E. Payment. All costs associated with installation of the turnouts shall be included in Bid Item 9

5.13 SAFETY

A. Safety rope. A safety rope upstream of the trash screen with floating buoys shall be installed to prevent persons who have fallen into the canal from floating onto the screen.

B. Safety ladder. A ladder shall be installed upstream of the trash screen in conjunction of the safety rope to allow a person to climb out of the canal without venturing onto the trash screen.

C. Payment. The cost for the safety rope and safety ladder shall be included in the applicable Bid Item.

5.11 SECURITY FENCE

A. General. For security and safety purposes, a commercial grade fence should be designed and installed around the new outlet structure and the existing intake channel

and intake channel. The security fences shall be installed, in accordance with the ASTM F567 standards.

B. Payment. The cost for the security fence shall be included in the applicable Bid Item.

END OF SECTION

PART 6 – PIPE ABANDONMENT (IF AUTHORIZED BY THE OWNER)

6.01 GENERAL

A. General. Abandoning the pipe in certain locations may be authorized under this scope of work if construction funding is available. The Owner shall notify the Contractor in writing if this scope of work is to be executed.

B. Scope of Work. The scope of work to abandon pipe includes all mobilization, traffic control, barriers, excavation,, cutting, welding, concrete pumping, backfill, and restoration necessary to abandon the pipe as shown in the drawings and specifications.

C. Public Safety. The Contractor is to safe-guard the safety of the public during the completion of this scope of work. This includes all traffic control, barriers, and access to the works. Any damage to individuals and property associated with this scope of work shall be the responsibility of the Contractor.

D. Site Conditions, Preparations, and Restorations. All provisions of Section 3 of these Specifications apply.

E. Payment. All costs associated with abandoning the pipe as described by the specifications and drawings (See Appendix G of the Conceptual Design Report) shall be included in ADD 10 of the Bid Schedule.

6.02 FINAL DESIGN

A. General. The Contractor shall complete the final design of the Pipe Abandonment according to the Conceptual Design (See Appendix G of the Conceptual Design Report) per Section 2 of these specifications.

B. Payment. All costs associated with abandoning the pipe as described by the specifications and drawings shall be included in ADD 10 of the Bid Schedule.

6.03 MATERIALS

A. General. 4.01 of these Specifications apply.

B. Cellular Concrete. Cellular Concrete used to seal the pipe sections shall adhere to ASTM C869 and texted according to ASTM C796. The specifications shall be:
   a. Cast Density: 32 PCF
   b. 28 day minimum compressive strength: 120 psi
   c. Minimum Bearing Capacity: 8.6 tons/ft^2
   d. Elastizill PS or approved equal.

C. Payment. All costs associated with abandoning the pipe as described by the specifications and drawings shall be included in ADD 10 of the Bid Schedule.

6.04 WORKMANSHIP

A. Excavation. 5.01 of these Specifications shall apply.

B. Backfill. 5.06 of these Specifications shall apply.

C. Workmanship. Pipe shall be abandoned in maximum 600 ft sections. Each section shall be filled in one continuous process until the cellular concrete is observed at the proper level in both vents. The Contractor shall maintain proper cast density throughout the entire grouting process. The density shall be checked as least once per hour during concrete pumping. The Contractor shall verify void filling by monitoring the volume and density placed.

D. Payment. All costs associated with abandoning the pipe as described by the specifications and drawings shall be included in ADD 10 of the Bid Schedule.

6.05 RESTORATION

A. The Contractor shall dispose of all debris removed from pipe demolition and material used to abandon the pipe. All material removed shall be disposed of at a municipal landfill.

B. All site features such as concrete or asphalt disturbed by the scope of work shall be restored at least existing conditions.

C. All ground work shall be graded to match adjacent grounds.

D. All utilities damaged during the scope of work shall be restored as directed by the utility company.

E. Payment. All costs associated with abandoning the pipe as described by the specifications and drawings shall be included in ADD 10 of the Bid Schedule.

END OF SECTION

Form **W-9**
(Rev. November 2017)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

► **Go to *www.irs.gov/FormW9* for instructions and the latest information.**

Give Form to the requester. Do not send to the IRS.

Print or type. See **Specific Instructions** on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ► _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ►

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN,* later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

			–			–				

or

Employer identification number

		–							

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	**Signature of U.S. person** ►	**Date** ►

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9.*

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

NAVAJO NATION CERTIFICATION
Regarding Debarment and
Suspension

Applicant acknowledges that to the best of his/her knowledge that their company and principal participants on this contract:

1. Are not debarred, suspended, or otherwise slated for debarment, ineligible and/or excluded from participation on Federal, State, and Tribal Government contracts etc.

2. Are not presently nor have been under criminal indictment or civilly charged by a governmental entity (Federal, State, and Tribal Government) for fraud, forgery, falsification, theft, bribery, destruction of records, receiving stolen property and other criminal offenses in the administration of a government contract.

3. Have not been terminated for cause or convenience by a governmental entity in the administration of a government contract (Federal, State, and Tribal Government).

4. If the Navajo Nation determines that the Certificate provided herein is not true, it will be grounds to terminate the contract and pursue other legal remedies.

Applicant's Address

Name & Signature of Applicant

Type or Print Name

Signature Date