Church Alley Sewerline Replacement

BID # 2019-666

Addendum #1

October 11, 2018

NOTICE TO BIDDERS

The following corrections, revisions, additions, and/or information for the above referenced project and shall be incorporated into the Plans, Specifications, and/or Contract Documents for the project as described below. The corrections, revisions, additions, and/or information shall henceforth be regarded as an integral part of the project, carrying the same weight and force as original sections of the plans, specifications, and/or contract documents.

Ensure that you indicate receipt of this Addendum on your Bid.

Questions Received during Mandatory Pre-Bid on October 2, 2018:

Q: Would the City consider pipe bursting for this project?

A: *The City will accept pipe bursting as an alternative method for this project. Only bidders who attended the MANDATORY pre-bid conference may submit a bid for this project. There was no requirement for potential sub-contractors to attend the mandatory pre-bid conference. The pre-bid attendance sheet is included with this addendum.*

Revisions and Clarifications:

A. Clarification: If paving is required the contract can be put on hold until spring when the asphalt plants are open.

B. Plans: All sheets have been re-issued. Additional sheets have been added for pipe bursting.

C. Bid Sheet: Use the attached revised Bid Sheet. Bidding now includes alternates for pipe bursting. Three Bid Sheets are attached:

1. Base Bid Open Cut
2. Alternate #1 Alley Pipe Bursting
3. Additive Alternate #1A West Line Pipe Bursting

The City will accept bids on Bid 1, or Bid 2 and Bid 3, or all three.

Bid Due Date: **Thursday, October 25, 2018 3:00 PM**

Revised documents included with this addendum:

Bid Submittal Forms (Base, Alternate 1, Alternate 1A)
Bidders Qualification Form – required if submitting bids for Alternate 1or Alternate 1A
Technical Specifications
Plan set

End Addendum #1

Issued 10/11/2018
Kathy Lamb
Finance Director

BID 2019-666 CHURCH ALLEY SEWER REPLACEMENT

BASE BID – OPEN CUT

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
1	Sawcut and Remove Existing Pavement	SY	27		
2	Base Course	SY	27		
3	HMA SPIII	SY	27		
4	Remove and Replace Curb	LF	10		
5	Locate Service Lines	LS	1		
6	Base Course -3" Placed and Compacted	SY	1250		
7	8" Sewer Line	LF	1090		
8	4" Sewer Service Line 5' minimum	EA	29		
9	4" Sewer Service Tap Saddle	EA	29		
10	Trenching and Backfill	LF	1380		
11	4' dia Type A Manhole with Collar	EA	5		
12	Remove or Abandon Manhole	EA	5		
13	Pumping Sewage	LS	1		
14	Irrigation Repair	LS	1		
15	Construction Staking by Contractor	LS	1		
12	Traffic Control	LS	1		
				BID TOTAL	

Total Written Amount of Base Bid – Open Cut (Excluding Tax)

_____

_____
SIGNATURE OF BIDDER

_____
Printed Name of Bidder

_____
Title

BID 2019-666 CHURCH ALLEY SEWER REPLACEMENT

BID ALTERNATE #1: PIPE BURST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
1	Sewer Main Cleaning	LF	1075		
2	Sewer Manhole Cleaning	EA	6		
3	Pre-Construction CCTV Inspection of Existing Sewer Line	LF	1075		
4	Post-Construction CCTV Inspection of Installed Sewer Line	LF	1075		
5	Bypass Sewage Pumping	LF	1075		
6	Pipe Burst with 8" HDPE Sewer Line	LF	1075		
7	4" Sewer Service Line 5' minimum	EA	29		
8	4" Sewer Service Tap Saddle	EA	29		
9	Epoxy Coating of Manhole	LF	45		
10	Epoxy Coating of Invert and Bench	EA	6		
11	Base Course – 3" Placed and Compacted	SY	1250		
12	Irrigation Repair	LS	1		
13	Traffic Control	LS	1		
				BID ALTERNATE #1: PIPE BURST TOTAL	

Total Written Amount of Bid Alternate #1 – Pipe Burst (Excluding Tax)

_____

_____
SIGNATURE OF BIDDER

_____
Printed Name of Bidder

_____
Title

BID 2019-666 CHURCH ALLEY SEWER REPLACEMENT

BID ADDITIVE ALTERNATE #1A: PIPE BURST

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
1	Sewer Main Cleaning	LF	275		
2	Sewer Manhole Cleaning	EA	1		
3	Pre-Construction CCTV Inspection of Existing Sewer Line	LF	275		
4	Post-Construction CCTV Inspection of Installed Sewer Line	LF	275		
5	Bypass Sewage Pumping	LF	275		
6	Pipe Burst with 8" HDPE Sewer Line	LF	275		
7	4" Sewer Service Line 5' minimum	EA	2		
8	4" Sewer Service Tap Saddle	EA	2		
9	Epoxy Coating of Manhole	LF	7		
10	Epoxy Coating of Invert and Bench	EA	1		
11	Traffic Control	LS	1		
12	Sawcut and Remove Existing Pavement	SY	12		
13	Base Course	SY	12		
14	HMA SPIII	SY	12		
				BID ADDITIVE ALTERNATE #1A: PIPE BURST TOTAL	

Total Written Amount of Bid Additive Alternate #1A – Pipe Burst (Excluding Tax)

_____

_____
SIGNATURE OF BIDDER

_____
Printed Name of Bidder

_____
Title

STATEMENT OF BIDDERS QUALIFICATIONS

This statement is required of the bidder and subcontractor if submitting bid for Alternate 1 or Alternate 1A and must be included with the bid submittal.

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires.

Name of Bidder and N.M. CONTRACTOR'S License Number.

Permanent main office address.

When organized?

If a corporation, where incorporated?

How many years have you been engaged in the contracting business under your present firm or trade name?

Contracts on hand. (Schedule these, showing amount of each contract and the approximate anticipated date of completion.)

General Character of work performed by your company.

Have you ever failed to complete any work awarded to you? If so, where and why?

Have you ever defaulted on a contract? If so, where and why?

List the more important projects recently completed by your company, stating the approximate cost for each and the month and year completed.

List your major equipment available for this contract.

Background and experience of the principal members of your organization, including the officers.

CONTRACTOR EXPERIENCE REQUIREMENTS: The Contractor's or Subcontractor's Superintendent shall have a minimum of two years experience in North America having rehabilitated in excess of 100,000 linear feet of the proposed on similar pipe bursting projects. The proposed system (materials, methods, workmanship) must be proven through previous installations to an extent and nature satisfactory to the Owner and Engineer that is commensurate with the size of the project being proposed. Provide references and previous experience for installation and operation of the proposed pipe bursting system.

The undersigned hereby authorizes any person, firm, or corporation to furnish any information requested by the OWNER in verification of this Statement of Bidder's Qualifications

Dated at _____this _____day of _____, 2018

Name of Bidder _____

By: _____

Title: _____

State of _____)

County of _____)

_____being duly sworn deposes and says that

he/she is _____ of _____

and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 2018

_____
(Notary Public)

My Commission expires _____, _____.

TECHNICAL SPECIFICATIONS

The 2006 New Mexico APWA standards for construction shall govern construction of this project unless otherwise noted on the plans or in the construction documents.

TABLE OF CONTENTS

SECTION 01 30 00
SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The work covered by this section includes the requirements for submittals and operating and maintenance manuals.

1.2 SUBMITTAL REQUIREMENTS

A. Review submittals prior to transmittal to determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittals with Specifications. To certify compliance with these Specifications:

1. Sign or initial each label on samples.
2. Stamp, sign or initial the cover sheet of each submittal.
3. Identify project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
4. Provide space for Contractor and Engineer review stamps.

For any proposed deviation from the Specifications, submit a written request to the Engineer.

B. Submit for review the following number of copies of submittals:

1. Signed Submittal emailed to Contractor and Engineer.
2. Sequentially number the transmittal form. Revise re-submittals with original number and a sequential alphabetical suffix.

A partial submittal consists of only a portion of the types required for a specified submittal. This is acceptable when it is prudent to submit for review, certain submittal types before the remaining types are available. Submit items concurrently for which, due to coordination concerns, a simultaneous review is required.

After review of the submittal package, the "Action Code" will be indicated and returned to the Contractor. After approval has been indicated on each copy by appropriate signature, stamp, and date, the number of copies of each submittal noted above for Engineer/Owner use will be retained and the balance will be returned to the Contractor. Allow a minimum of 5 business days for return of submittals.

C. The Engineer will utilize the following "Action Codes" to indicate the status of submittals resulting from the review, and the action required of the Contractor.

A - Approved as submitted.
B - Approved, except as noted. Resubmission not required.
C - Disapproved. Correct and resubmit.

D. Do not begin fabrication of products or begin work which requires submittals before such submittals are approved.

E. Submit at a minimum, shop drawings and material details of the following:

Item

Concrete Mix Design
Asphalt Mix Design
Backfill Gradation
Geogrid Reinforcement

PART 2 - MEASUREMENT AND PAYMENT

Work covered in this Section of the Specifications and associated costs therewith shall be included in the contract price for the item to which the work applies. No separate payment shall be made.

END OF SECTION

SECTION 01 40 00
QUALITY CONTROL

PART 1 - GENERAL

1.1_ SECTION INCLUDES

1. Quality control of installation.
2. References.
3. Field samples.
4. Inspection and testing laboratory services.
5. Manufacturers' field services and reports.
6. Tolerances

1.2 QUALITY CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarifications from Engineer before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent specified tolerances, codes, or requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

G. Document and keep records of quality control of installation.

1.3 REFERENCES

A. Conform to reference standard by date of issue current on date of Contract Documents. Dates specified in individual Sections supersede all other dates of issue.

B. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4 FIELD SAMPLES

A. Provide field samples at the site as required by individual Specification Sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Owner.

1.5 INSPECTION AND TESTING LABORATORY SERVICES

A. Contractor will provide and pay for Quality Control testing. The City will provide and pay an independent firm for Quality Assurance testing.

B. Materials are subject to inspection, sampling, and testing before Acceptance of the Work. The City will sample and test Materials for Acceptance unless otherwise specified in the Contract.

C. Reports will be submitted by the Quality Assurance independent firm to the Owner, and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

D. Contractor shall cooperate with Quality Assurance independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.

1. Notify Owner and Quality Assurance independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with Quality Assurance independent firm and pay for additional samples and tests required for Contractor's use.

E. Retesting required because of non-conformance to specified requirements shall be performed by the same Quality Assurance independent firm on instructions by the Owner. Payment for retesting will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.

F. TESTING FREQUENCY

1. EMBANKMENT AND STRUCTURAL FILL: A compaction test shall be taken a minimum of once a day, at minimum of three locations selected by the Testing Laboratory. Areas represented by non-complying test shall be reworked and re-tested for compliance.

2. SUBGRADE PREPARATION: A compaction test of sub-grade shall be taken within 24 hours of pouring concrete. Areas represented by non-complying test shall be reworked and re-tested for compliance.

3. CONCRETE: Testing shall be taken for each concrete structure or every third truck on larger pours. CONTRACTOR is responsible for tracking truck invoices to structures poured. Non complying slump tests will require rejection of concrete. Non-complying cylinder tests shall require the CONTRACTOR to core the non-compliant structure for testing. Remediation of non-compliant structures is the responsibility of the CONTRACTOR.

4. TRENCH BACKFILL: A compaction test shall be taken at a minimum of each 2 feet of depth per 200 feet of trench or as directed by the ENGINEER. A minimum of 2 tests shall be taken for lengths of trench less than 200 feet. Areas represented by non-complying test shall be reworked and re-tested for compliance.

5. BASE COURSE: A compaction test shall be taken a minimum of once a day, at minimum of three locations selected by the Testing Laboratory. A minimum of one sieve analysis shall be taken per 3000 CY.

6. HOT MIX ASPHALT: The field compaction at a location for Type B, C, D, E, SP-III, and SP-IV materials, shall be measured in accordance with the requirements of ASTM D2950 Density of Bituminous Concrete in Place by Nuclear Methods, at the minimum rate of three tests per lift of 500 sy, or fraction thereof, for each type of asphalt material placed in a day, as directed by the ENGINEER.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions and training of Owner's personnel when necessary.
B. Contractor to report to Owner material or product supplier's or manufacturer's observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
C. Submit report in duplicate within 14 days of observation to Owner and Engineer for review.

1.7 TOLERANCES

A. Monitor tolerance control of installed Products to produce acceptable work. Do not permit tolerances to accumulate.
B. Comply with manufacturers' tolerances. Should manufacturers tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
C. Adjust Products to appropriate dimensions; position before securing Products in place.

END OF SECTION

SECTION 01 60 00

MOBILIZATION

PART 1 - DESCRIPTION

A. This work shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of all offices, buildings and other facilities necessary for work on the project; and for all other work and operations which must be performed or costs incurred prior to beginning work on the project.

B. The property designated for such use as above is strictly for the purpose of the CONTRACTOR constructing the project and will be available only until said project construction is completed. The CONTRACTOR does not have the right to remove trees, bushes, fencing, undergrowth and any other obstacles or grade without the consent of the ENGINEER. The CONTRACTOR shall clean and restore the property at the conclusion of project construction to be as near the pre-project condition as possible.

PART 2 - MOBILIZATION ADMINISTRATION REQUIREMENTS

A. DEFINITIONS

The following definitions shall apply:

1. Total original contract amount shall mean the total amount bid as compensation for the contract.
2. Total original contract amount less mobilization shall mean the total amount bid as compensation for the contract less the amount bid for mobilization.

B. GENERAL

It is the intent of this specification to provide for the CONTRACTOR to receive 100% of the amount bid for mobilization by the time the CONTRACTOR has performed ten percent (10%) of the total original contract amount bid less the amount bid for mobilization.

If the CONTRACTOR's bid for mobilization is over ten percent (10%) of the total original contract amount bid less mobilization, payment for the amount over the ten percent (10%) of the total original contract amount bid less mobilization will be made upon completion of all work under the contract.

C. PAYMENT PROCEDURES

The following will apply in effecting mobilization payments:

(a) When the CONTRACTOR is eligible for payment of less than five percent (5%) of the total original contract amount bid less mobilization, the CONTRACTOR will be paid twenty-five percent (25%) of the amount bid for mobilization.

(b) When the CONTRACTOR is eligible for payment from five percent (5%) to less than ten percent (10%) of the total original amount bid less mobilization, the CONTRACTOR will be paid fifty percent (50%) of the amount bid for mobilization.

(c) When the CONTRACTOR is eligible for payment of ten percent (10%) or more of the total original contract amount less mobilization, the CONTRACTOR will be paid 100% of the amount bid for mobilization minus any mobilization amount already paid, except for the noted ten percent (10%) limitation.

PART 3 - METHOD OF MEASUREMENT

A. Mobilization will be measured by the lump sum unit.

PART 4 - BASIS OF PAYMENT

A. Mobilization will be paid for at the contract lump sum price per bid tab. The price for mobilization shall include costs for all demobilization activities once the project is complete. No additional payments will be made for demobilization and remobilization due to shutdowns or suspensions of the work or for other mobilization activities required to complete the contract satisfactorily.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1_ SECTION INCLUDES

A. Form work and cast-in-place concrete.

1.2 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

1.3 REFERENCES

A. The following publications are a part of this Specification.

B. American Concrete Institute (ACI) Publications:

1. ACI 211 “Recommended Practice for Selecting Proportions for Normal and Heavy Weight Concrete”
2. ACI 301 “Specifications for Structural Concrete for Buildings”
3. ACI 305 “Recommended Practice for Hot Weather Concreting”
4. ACI 306 “Recommended Practice for Cold Weather Concreting”
5. ACI SP-66 “Manual of Standard Practice for Detailing Reinforced Concrete Structures”
6. ACI 318 “Building Code Requirements for Reinforced Concrete”
7. ACI 347 “Recommended Practice for Concrete Formwork”

C. American Society for Testing and Materials (ASTM) Standards.

1. C-31 “Standard Method of Making and Curing Concrete Test Specimens in the Field”
2. C-33 “Standard Specification for Concrete Aggregates”
3. C-39 “Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens”
4. C-94 “Standard Specification for Ready-Mixed Concrete”
5. C-143 “Standard Method for Slump of Portland Cement Concrete”
6. C-150 “Standard Specifications for Portland Cement”
7. C-171 “Standard Specifications for Sheet Materials for Curing Concrete”
8. C-172 “Standard Method of Sampling Fresh Concrete”
9. C-173 “Standard Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method”
10. C-227 “Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)”
11. C-231 “Standard Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method”
12. C-260 “Standard Specification for Air-Entraining Admixtures for Concrete”
13. C-309 “Liquid Membrane - forming Compounds for Curing Concrete”
14. D-994 “Standard Specifications for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non- extruding and Resilient Bituminous Types)”
15. D-1751 “Standard Specifications for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non- extruding and Resilient Bituminous Types)”
16. D-1752 “Standard Specifications for Preformed Sponge Rubber and Cork Expansion Joints for Concrete Paving and Structural Construction”

D. New Mexico Standard Specifications for Public Works Construction

1. Section 101 - Portland Concrete Cement
2. Section 105 - Concrete Curing Compound
3. Section 510 - Concrete Structures

1.3 SUBMITTALS

B. All submittals shall be in accordance with Section 01300 of these specifications and be approved before work begins.

C. Mix Design: Submit a concrete mix design for mix that will be used on the job. Include water/cement ratio, size of coarse aggregate, and dosage of any admixture. Predict minimum compressive strength, maximum slump, and air content percent.

D. Laboratory Test Reports: Aggregates shall be tested in accordance with ASTM C33 and ASTM C227. Tests shall not be more than one year old.

E. Certificates: Submit a certificate that each of the following conform to the appropriate ASTM Standards:
1. Aggregates.
2. Admixtures.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Obtain materials from same source throughout the Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Concrete: Mix and deliver concrete in accordance with ASTM C-94. Each batch of concrete delivered at the job site shall be accompanied by a time slip bearing the departure time and the signature of the batch plant supervisor. Concrete shall be placed within 45 minutes after mixing.

1.6 JOB CONDITIONS

A. Hot Weather: When weather conditions such as excessive heat, wind, or low humidity prevail, place concrete in accordance with ACI 305. The concrete temperature shall not exceed 90 degrees F at the time of placement. Written approval by Owner or Owner's Representative is required before any retarding admixture is used. The Contractor shall protect the concrete against rapid curing during the first 7 days.

B. Cold Weather:

1. Place concrete in accordance with ACI 306 during cold weather.
2. When the air temperature is less than 40 degrees F, the temperature of the concrete shall not be less than 50 degrees F. The 50 degrees F temperature shall be obtained by heating the water or aggregates or both. The water and aggregates shall be heated uniformly and these materials shall not be heated to a temperature exceeding 150 degrees F.
3. Concrete shall not be placed on frozen ground. All snow and/or ice shall be removed from forms and reinforcing steel.
4. Concrete shall be protected from freezing temperatures for a period of five days after placement. When high-early-strength cement is used this period may be reduced to three days. Do not use salt or other chemicals for the prevention of freezing. The methods proposed for heating and protecting the concrete shall be approved by Owner's Representative. If combustion heaters are used, prevent

exposure of the concrete to exhaust gases which contain carbon dioxide.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

B. Cement shall be Type II and conform to ASTM C-150.

C. Fine and Coarse Aggregates shall conform to ASTM C33 and C227.

D. Water for mixing and curing shall be potable and free from deleterious matter.

2.2 ADMIXTURES

A. Air Entraining agents shall conform to ASTM C260.

B. No Calcium Chloride admixture shall be used.

2.3 ACCESSORIES

A. Curing materials shall conform to ASTM C-171 or ASTM C-309.

B. Joint filler shall conform to ASTM D-1752 or D-994.

C. Forms:

1. Construct forms in accordance with ACI 347.
2. Form oil shall be non-staining and shall not cause softening of the concrete or impede curing.
3. Upon approval of Owner's Representative, side forms for unexposed footings may be undisturbed earth.

2.4 CONCRETE MIX

A. Proportion concrete mixes in accordance with ACI 211 and the following requirements:

Description	Required Strength (psi)	Maximum Slump	Maximum Water/Cement Ratio	Maximum Aggregate Size	Air Content (%)
All concrete areas	3500	4"	<0.45	3/4"	6

B. Required strength shall be achieved at 28 days.

C. Mix concrete in accordance with ASTM C-94.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify anchors, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.

3.2 PREPARATION

A. Remove all wood scraps, debris, and water from the areas in which concrete will be placed. Thoroughly clean all transporting and handling equipment.

B. Thoroughly wet the forms, except in freezing weather, or oil them. Dampen subgrade to ensure that no moisture will be absorbed from the fresh concrete.

3.3 INSTALLATION

A. Placement:

1. Notify Owner's Representative minimum 48 hours prior to commencement of concreting operations.
2. Place concrete in accordance with ACI 301.
3. Convey concrete from the mixer to forms as rapidly as practicable by methods that will prevent separation or loss of materials.
4. Limit the free vertical drop of the concrete to 3 feet.
5. Deposit concrete as nearly as possible in its final position to avoid segregation due to rehandling and flowing.
6. Place concrete as dry as possible consistent with good workmanship, never exceeding the maximum specified slump. Place concrete at such a rate that concrete is at all times plastic and flows readily between bars.
7. Once placing is started, carry it on as a continuous operation until completed.
8. Place concrete continuously between construction joints.

B. Consolidation:

1. Thoroughly consolidate all concrete by suitable mechanical vibrators during placement, working it around all embedded fixtures and into corners of forms.
2. During placement, thoroughly consolidate the concrete by hand tamping and by mechanical vibration. Do not use vibrator to move concrete horizontally.

C. Expansion Joints:

1. Expansion joints shall be located and constructed as shown on the Drawings. In no case shall reinforcement or other embedded items run continuously through an expansion joint.
2. Expansion joint filler strips shall extend the full depth and width of the joint. Strips shall fill joints to within 1/4 inch of any surface that will be exposed.
3. Exposed edges of concrete at expansion joints shall be rounded to 1/4 inch radius.

D. Construction Joints:

1. Construction joints, other than those shown on the Drawings, shall not be allowed. The slab must be one continuous placement.

D. Curing: Curing may be done by using impervious sheeting or polyethylene curing membrane or liquid membrane forming compound.

1. Impervious-Sheeting Curing: The entire exposed surface shall be wetted thoroughly with a fine spray of water and then covered with
   a. Waterproofed paper
   b. Polyethylene-bonded waterproof paper sheeting
   c. Polyethylene-coated burlap sheeting
   d. Polyethylene sheeting

   Sheets shall be laid directly on the concrete surface and overlapped 12 inches when a continuous sheet is not used. The curing medium shall be not less than 18 inches wider than the concrete surface to be cured, and shall be weighted down by placing a bank of moist earth on the edges just outside the forms and over the transverse laps to form closed joints. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than seven days.
2. Polyethylene Membrane Curing: Immediately upon furnishing a slab area, apply a fog mist above the finished concrete surface to keep the air humid and to prevent loss of moisture from the concrete surface. Produce an appearance of wet sheen on the concrete but do not permit concentration of water in one place. Continue fogging until membrane has been installed. Immediately after finishing, install polyethylene curing membrane. Lap all joints four inches and securely joint together. Weight the covering down to prevent damage from the wind. Keep membrane intact and in place for at least seven days after placement of concrete.
3. Liquid Membrane-Forming Compound: Apply the compound according to the manufacturer's recommendations immediately after any water sheen developed by finishing has disappeared from concrete surface. Do not use on any surface which will have prevent bond.
4. The curing method shall be continued for at least 7 days or until concrete obtains 70 percent of the specified compressive strength.

F. Finishes:

1. Tamp slabs with suitable tools to force coarse aggregate down from the surface, then screed with straight edges and rough-float to the required finished level. Take care that the wet slab meets the screeds accurately.
2. Finish all exterior slab and ramps by lightly combing with a medium stiff broom after troweling is completed.
3. Removal time. The minimum time before removal of forms from foundation slab shall be 24 hours after placing of concrete.

3.4 FIELD TESTING

A. Responsibility:

1. Testing shall be performed by an independent testing laboratory approved by Owner. Concrete test specimens shall be taken and slump and air content tests performed in accordance with Section 01 40 00.
2. Contractor shall furnish labor required to obtain and handle specimens at the project site. Contractor shall provide adequate facilities for storage and proper curing of cylinders. Contractor is responsible for payment of the tests performed.

B. Standards:

1. Concrete shall be sampled in accordance with ASTM C-172.
2. Slump tests shall be made according to ASTM C-143.
3. Compression test specimens shall be made and cured according to ASTM C-31.
4. Specimens shall be tested according to ASTM C-39.

5. Air content tests shall be made according to ASTM Method C-173 or C-231.

C. Requirements:
   1. Test each batch for slump and air content.
   2. Test cylinders shall be field-cured in accordance with Section 7.3 of ASTM C-31.
   3. Seven days after molding, test one cylinder.
   4. Test two cylinders 28 days after molding. The concrete strength level will be considered satisfactory of the average of the two test results exceeds the required 28 days compressive strength and no result is 500 psi less than the required strength.
   5. The testing laboratory shall report the results of all tests to the Owner, Owner's Representative, Contractor, and the concrete supplier. When approved 28-day concrete cylinder tests fail to meet the strength requirements, the concrete shall be removed and replaced.

PART 4 - MEASUREMENT AND PAYMENT

Work covered under this Section of the Specifications and costs associated therewith shall be included in the contract price for the item to which the work applies. No separate payment will be made.

END OF SECTION

SECTION 31 37 01

GENERAL SITE EXCAVATION AND TRENCHING

PART 1 GENERAL EXCAVATION

1.1 DEFINITION

A. This section defines general site excavation and trenching.

1.2 PREPARATION

A. Call Local Utility Line Information service (NMOC) during regular weekday working hours at 1-800-321-ALERT statewide at least two working days before your dig is planned.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

1.3 CLEARING, REMOVAL AND PROTECTION

A. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

B. Do not burn or bury materials on site. Leave site in clean condition.

C. Remove the following materials:
   1. All Vegetation, topsoil, Asphalt, and concrete needed for trench construction.

D. Protect the following materials:
   1. Vegetation and all permanent facilities 15' each side of pipe centerline.
   2. Existing Underground and overhead utilities

1.4 SUBSOIL MATERIALS and SOURCE QUALITY CONTROL

A. Native material is generally acceptable for trench backfilling. Backfill shall be free of deleterious material, frozen fill, or rocks larger than 3". Place 3"-12" rocks (from trenched material) 3"-12" no more than 1' from top of pipe or 6" from finished grade. Rocks larger than 12" are not acceptable.

B. Perform compaction testing with ASTM D-1557.

C. When tests indicate materials do not meet specified requirements, change material and retest, and resubmit.

1.5 SUBMITTALS

A. Materials Source: Submit gradation test results for imported fill materials from the suppliers that meet NMDOT Base Course.

1.6 EROSION CONTROL

A. This project is considered exempt from NOI requirements.

B. Contractor will be responsible for keeping sediment on site to the maximum extent practicable until project is complete. Earthen stormwater diversion berms at the top of the trench are recommended.

C. Permanent erosion control, if any, is defined on the civil plan sheets.

UTILITY TRENCHING

Trench and trench backfill procedures shall be per New Mexico Standard Specifications for Public Works Construction 2006.

1.7 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.8 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.

1.9 TRENCHING

A. Remove lumped subsoil, boulders, as specified in PART 1 of this section.

B. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe.

C. When Project conditions permit, slope side walls of excavation starting 4 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil per OSHA requirements. [Refer to Geotech Report for OSHA Soil Types]

D. Cut out soft areas of subgrade not capable of compaction in place. Backfill with suitable native fill compact to density equal to or greater than requirements for subsequent backfill material, specified in Section 1.5.

E. Protect open trenches with orange construction fencing and with daily inspection/ maintenance.

1.10 BACKFILLING

A. Suitable native material shall be used for backfill. Material shall meet Unified Classification of SM, SM-SP, or SP per ASTM D-2487 and with no gravels larger than 2”.

B. Where required, imported Select Backfill shall be NMDOT Base Course.

C. Backfill testing shall be conducted in accordance with Section 01 40 00. Notify owner and engineer when these sections are available or complete testing just prior to project completion.

D. Employ placement method that does not disturb or damage finished pipelines, foundations, or other in-tact structures.

E. Maintain moisture content within 5% of optimum of fill materials to attain required compaction density.

F. Reshape and re-compact fills and AC pavement impacted during construction to existing condition.

G. Item for Rock Excavation will be paid according to the trench widths on City Standard D-112. The quantities shall be measured in the field by the Engineer for actual yardage. This pay item shall be in addition to the associated Trenching and Backfill Item.

H. Item for Backfill and Haul for Rock Excavation will be paid based on measured yardage of the Rock Excavation Item. The material from the Rock Excavation shall be hauled off the job and Select Backfill will be brought in to replace that material in the trench. This pay item shall be in addition to the associated Trenching and Backfill Item.

END OF SECTION

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 2 GENERAL

2.1 SUBMITTALS

A. Submit gradation test results for aggregate base to be used meets gradation requirements listed below in 2.1A

B. Submit compaction test results showing that in-place base course meets 3.2.C,D of this section.

PART 3 PRODUCTS

3.1 MATERIALS

A. Aggregate Base Course shall consist of a blend of sand and gravel that meets strict specifications for quality and gradation. ABC gradation shall follow Section 304 of NMDOT's Specifications for Highway and Bridge Construction.

PART 4 EXECUTION

4.1 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

4.2 AGGREGATE PLACEMENT

A. Aggregate placement shall follow Section 302 of *New Mexico Standard Specifications for Public Works Construction 2006.*

B. Level and contour surfaces to elevations and gradients indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Compact to 95% proctor ASTM D-698 no more than 4% below and 2% above optimum moisture.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

4.3 FIELD QUALITY CONTROL

A. Compaction and material testing and submittals will be performed in accordance with and Section 01 40 00.

B. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

C. Aggregate base course material should be tested to determine compliance with these specifications prior to importation to the site.

D. When tests indicate materials do not meet specified requirements, change material and retest.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 5 PRODUCTS

5.1 ASPHALT PAVING MIX

A. Asphalt paving mix and cement to be in accordance The New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction, 2007 Edition.

5.2 SOURCE QUALITY CONTROL AND TESTS

A. Perform inspections in accordance with Section 01 40 00

5.3 SUBMITTALS

A. Product Data: Submit product information and mix design.

PART 6 EXECUTION

6.1 BASE COURSE

A. Aggregate Base Course: Install as specified in Section 37 11 23

6.2 PREPARATION - TACK COAT

A. Apply tack coat to contact surfaces of concrete.

B. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

6.3 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Compact full course by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

B. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

6.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

6.5 PROTECTION OF FINISHED WORK

A. Immediately after placement, protect pavement from mechanical injury for 24 hours or until surface temperature is less than 140 degrees F (60 degrees C).

END OF SECTION

SECTION 33 05 08

PIPE BURSTING AND TRENCHLESS PIPE REPLACEMENT METHOD

1.1 SCOPE: The work covered by this section includes the furnishing of all plant, labor, tools, equipment, materials, and performing all operations in connection with the rehabilitation of existing sanitary sewer lines using the pipe bursting trenchless pipe replacement method and removal of all internal pipe beads. The existing pipe sizes and materials to be burst and the proposed replacement pipe are shown on the drawings. Contractor shall verify pipe sizes before bidding the project. Methods employing entry via an existing manhole or insertion pits are allowed.

1.2 GENERAL: This specification addresses the rehabilitation of existing gravity sanitary sewers. Pipe bursting is a system by which a pneumatic burster unit splits the existing pipe while simultaneously installing a new high density polyethylene pipe (HDPE) of the same size or larger size pipe where the old pipe existed. The existing service line connections are reconnected and the rehabilitated sewer television inspected to complete the installation in accordance with the contract documents. The burster tool shall be used in conjunction with a constant tension-variable speed winch. The size of the winch shall depend on the diameter of the pipe to be replaced.

A. Applicable Specifications
   1. Section 8.1 Sewer Line and Manhole Cleaning
   2. Section 8.2 Sewer Line Inspection
   3. Section 8.3 By-pass Pumping
   4. Section 28 High Density Polyethylene (HDPE) Pipe & Fittings

B. Cleaning, inspection, and by-pass pumping shall be in accordance with the referenced sections unless specifically altered under other requirements of this specification section.

C. Collection system shall be closed-circuit television video (CCTV) inspected prior to beginning rehabilitation work. Refer to the drawings for the sewer lines that have been identified for cleaning and inspection. Attached is the sewer main inspection report.

1.3 CONTRACTOR QUALIFICATION REQUIREMENTS:

A. The Contractor shall be certified by the particular pipe bursting system manufacturer such that the company is a fully trained user of the pipe bursting system.

B. High density polyethylene pipe jointing shall be performed by personnel trained in the use of butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the high density polyethylene pipe. Training shall be performed by qualified representative.

C. The Contractor shall "Hold Harmless" the Owner and Engineer in any legal action resulting from patent infringements.

1.4 CONTRACTOR EXPERIENCE REQUIREMENTS: The Contractor's or Subcontractor's Superintendent shall have a minimum of two years experience in North America having rehabilitated in excess of 100,000 linear feet of the proposed on similar pipe bursting projects. The proposed system (materials, methods, workmanship) must be proven through previous installations to an extent and nature satisfactory to the Owner and Engineer that is commensurate with the size of the project being proposed. If requested by the Owner, the Contractor shall provide references and previous experience for installation and operation of the proposed pipe bursting system.

1.5 SUBMITTALS: The Contractor shall submit the following information:

A. Shop drawings, catalog data, and manufacturer's technical data showing complete information on material composition, physical properties, and dimensions of new pipe and fittings. Include manufacturer's recommendations for handling, storage, and repair of pipe and fittings damaged.

B. Inserta Tee or equal

C. Electrofusion Coupling

D. Method of construction and restoration of existing sewer service connections. This shall include:

1. Detail drawings and written descriptions of the entire construction procedure to install pipe, bypass sewage flow and reconnection of sewer service connections.

E. Certification of workmen training for installing and joining HDPE pipe.

F. Television inspection reports and video tapes made after new pipe installation.

G. Method of noise control for the pipe bursting tool. The Contractor shall submit a "Sound Attenuation Plan" to preclude complaints by tribal members. The plan shall detail how the Contractor intends to attenuate nuisance noise generated by operating equipment if noise levels specified in 1.7 cannot be met.

H. Confined space entry plan

I. Debeading tool

1.6 MATERIALS:

A. High Density Polyethylene Pipe (HDPE) shall be in accordance with these Specifications.

B. Sizes of the insertions to be used shall be such to renew the sewer to its original or greater than flow capacity as shown on the drawings.

C. All pipes shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used.

D. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

E. Material color shall be white, black or whatever is specified with interior of pipe having a light reflective color to allow easier/better viewing for television inspection.

F. Other pipe materials may be considered, the pipe bursting equipment manufacturer shall be consulted for feasibility. Tests for compliance with this specification shall be made as specific herein and in accordance with the applicable ASTM specification. A certificate with this specification shall be furnished, upon request, by the manufacturer for all material furnished under this specification. PE plastic pipe and fittings may be rejected if it fails to meet any requirements of this specification.

G. Sewer service connection shall be made by Inserta Wye or equal product. The model used shall be the “Universal FATBOY” which will consist of the following:

1. Hub adaptor – made of PCV SDR35 and follows ASTM D3034
2. Rubber Gasket – follows ASTM F477
3. Securing Clamp – comprised of one (1) stainless steel band, SS #301, one (1) stainless steel screw, SS #305, and stainless steel housing, SS #301
4. Rubber Sleeve – with upper and lower segments and follows ASTM F477

1.7 EQUIPMENT: The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate sufficient force to burst and compact the existing pipe line. See manufacturer’s specifications for the size tool to be used in for the pipe to be rehabilitated, as well as the parameters for the size tool for percentage of upsize allowed.

The pipe bursting tool shall be pulled through the sewer by a winch located at the either upstream or downstream manhole. The bursting unit shall pull the high density polyethylene pipe with it as it moves forward. The bursting head shall incorporate a shield/expander to prevent collapse of the hole ahead of the PE pipe insertion. The pipe bursting unit shall be remotely controlled.

The pipe bursting tool shall be pneumatic. The pipe bursting tool shall have noise levels to less than 50db or 10 db above ambient noise levels when measured at the property lines closest the noise source. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time expanding the surrounding ground. This action shall not only break the pipe but also create the void into which the burster can be winched and enables forward progress to be made. At the same time the high density polyethylene pipe, directly attached to the sleeve on the rear of the burster, shall also move forward.

The burster shall have its own forward momentum while being assisted by winching. A hydraulic winch shall give the burster friction by which it can be move forward. To form a complete operating system, the burster must be matched to a constant tension hydraulic winching system.

1.8 WINCH UNIT:

A. The winch shall be attached to the front of the bursting unit, connecting to or through the advanced guide head technology. The winch shall provide a constant tension to the burster in order that it may operate in an efficient manner. The winch shall have twin capstans with twin hydraulic drive motors and twin gear boxes for independent operation. In no case shall the winch cable storage spool be considered part of the twin capstan pulling system.

B. The winch shall be hydraulically operated providing a constant tension throughout the operation. The winch shall be of the constant tension type but shall be fitted with a direct reading load gauge to measure the winching load. The winch must automatically maintain a constant tension at a set tonnage reading. The constant tension winch shall supply sufficient cable in one continuous length so that the pull may be continuous between approved winching points.

C. The winch, cable and cable drum must be provided with safety cage and supports so that it may be operated safely without injury to persons or property. The contractor shall provide a system of guide pulleys and bracing at the exit pit to minimize cable contact with the existing line between launch and exit pits. The supports to the trench shoring in the insertion pit shall remain completely separate from the winch boom support system and shall be so designed that neither the pipe nor the winch cable shall be in contact with them.

1.9 PRE – INSTALLATION WORK:

A. The Contract Documents sets forth the following requirements: Sewer Line Cleaning; Sewer Line Inspection; and Bypass Pumping. Satisfactory completion of these items must be attained before any installation Work can be initiated. The Contractor is responsible for taking field measurements of the inside pipe diameter of the sewer lines to be rehabilitated using the pipe bursting method. In addition, Contractor shall investigate what modifications are required at the manhole wall in order to be able to pull the pipe into the manhole. The existing manhole pipe entrances shall be made larger by core drilling.

B. Upon approval of and when directed by the Engineer, the Contractor may be required to excavate and perform a point repair for damaged sections of line, protruding services, or other obstructions that cannot be removed internally. This Work is not incidental to the other Work and will be considered as separate pay items as identified in the Bid Schedule.

1.10 INSTALLATION:

A. The Contractor shall carry out his operations in strict accordance with all OSHA and manufacturer's safety requirements. Particular attention is drawn to those safety requirements involving entering confined spaces, work on elevated platforms, and working with winching mechanisms.

B. Equipment used to perform the Work shall be located away from buildings so as not to create noise impact. Provide a silent engine compartment with the winch to reduce machine noise as required to meet local requirements.

C. The Contractor shall install all pulleys, rollers, bumpers, alignment control devices and other equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances will the pipe be stressed beyond its elastic limit. Winch line is to be centered in pipe to be burst with adjustable boom.

D. All sewer service connections shall be identified and located prior to the pipe insertion to expedite reconnection. Upon commencement, pipe insertion shall be continuous and without interruption from one manhole to another, except as approved by the Engineer and/or his representative. Upon completion of insertion of the new pipe, the contractor shall expedite the reconnection of sewer service lines so as to minimize any inconvenience to the residential and tribal building users. The reconnection shall be made by the end of the construction day. Approved connections to the sewer main shall be by the Inserta Wye or equal. The Inserta Wye shall be installed at a 45 degree angle from top of new HDPE sewer main pipe. Inserta Wyes shall be installed in accordance with the manufacture's recommended installation procedures. The Contractor shall verify the sewer service line are in use by pouring tracing dye in the sewer service cleanout prior to reinstating the existing sewer service lateral. The Contractor shall reinstate the active sewer service line replacing a maximum of 10 feet. The Contractor shall install the sewer service line according to Plans and Specifications. Actual length to be replaced shall be field determined by Owner or Owner's Representative.

E. The installed pipe shall be allowed the manufacturer's recommended amount of time, but not less than four (4) hours, for cooling and relaxation due to tensile stressing prior to any reconnection of service lines, sealing of the annulus or backfilling of the insertion pit. Sufficient excess length of new pipe, but not less than four (4) inches, shall be allowed to protrude into the manhole to compensate for any changes in pipe length during this period. Restraint of pipe ends shall be achieved by means of Central Plastics Electrofusion couplings, (800) 654-3872. The Electrofusion couplings shall be slipped over pipe ends against manhole wall and fused in place. The Electrofusion couplings shall not be moved during the cooling period as provided by the manufacturer. The cooling period shall be submitted to the Owner and Engineer before the installation. Installation of Electrofusion couplings shall be done in accordance with the manufacturers recommended procedures.

F. Following the relaxation period, the annular space shall be sealed. Sealing shall be made with material approved by the Engineer and shall extend a minimum of eight (8) inches into the manhole wall in such a manner as to form a smooth, uniform, watertight joint.

G. The terminating pipe ends in manholes shall be connected by Central Plastics Electrofusion couplings to eliminate groundwater infiltration. Installations of Electrofusion couplings shall be done in accordance with the manufacturers recommended procedures.

H. The Launch and Receiving Excavations: Launch pits need to be long enough to properly align the bursting tool with the existing pipe and to allow the HDPE pipe to make a graceful "S" bend out of the pit and transition to the existing grade or street above.

I. When new pipe is pulled through an existing manhole, the contractor shall reform the manhole inverts channel to the original shape to provide the required normal flow conditions.

1.11 FIELD TESTING:

A. After the existing sewer is completely replaced, internally inspect with television camera and video tape as required. The finished tape shall be continuous over the entire length of the sewer between two manholes to be free from visual defects.

B. Defects which may affect the integrity or strength of the pipe in the opinion of the Engineer shall be repaired or the pipe replaced at the Contractor's expense.

1.12 PIPE JOINING:

A. The high density polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints and connections are not permitted. All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by a manufacturer of high density polyethylene pipe and/or fusing equipment.

B. The butt-fused joint shall be true aligned and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All joints shall be subject to acceptance by the Engineer and/or his representative prior to insertion.
All defective joints shall be cut out and replaced at no cost to the Owner. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Engineer and/or his representative shall be discarded and not used.

C. The internal beads shall be removed by the method as recommended by the internal debeader manufacturer. The internal debeader tool shall be Beadtrimmer II as manufactured by R&L Manufacturing, Inc. or equal.

D. Terminal sections of pipe that are joined within the insertion pit shall be connected with Central Plastics Electro fusion Couplings or connectors with tensile strength equivalent to that of the pipe being joined.

1.13 WORKMANSHIP AND ACCEPTANCE:

A. The finished installation shall be continuous over the entire length of the insertion. Visual inspection shall be accomplished by review of post rehabilitation CCTV per Section 8.2 – Sewer Line Inspection. Should defects occur, the entire pipe installation between manholes shall be removed and replaced at no cost to the Owner.

B. If the post-construction CCTV shows standing water, the Contractor shall remove the sag in the new HDPE pipe. The Contractor shall excavate and add bedding material under the pipe and compact. The construction inspector will verify the sag removal prior to backfilling.

1.14 MEASUREMENT AND PAYMENT:

A. All measurements and payments will be based on completed and accepted Work performed in strict accordance with the drawings and specifications.

B. Pipe Bursting: The contract unit price for this bid item included in the Bid Schedule shall be full compensation for all labor, materials, and equipment required for the satisfactory sewer line rehabilitation including sewage flow control and testing of materials, internal bead removal, pipe bursting installation, manhole and manhole invert repair resulting from pipe bursting, and leakage testing. Measurement for payment shall be along the intervening distance in linear feet between the centers of manholes along a line parallel to the pipe invert. The Contractor shall provide to the Owner an original color video tape showing the completed Work including the condition of the restored service connections and the corresponding, complete post-construction CCTV logs before payment is made for the line segment.

C. Reinstatement of Existing Service Laterals: Service lateral connections 6 inches and less in diameter shall be measured for payment as the number of connections (each) that are satisfactorily reconnected and accepted. This bid item includes all labor, material, equipment required to verify and reinstate active sewer service lines.

D. Point Repairs: Measurement and payment for performing point repairs on existing sanitary sewer lines and new HDPE sanitary sewer lines shall constitute all labor, materials, and equipment necessary to remove, dispose, and replace damaged sewer line including pipe, fittings, trench and compacted backfill, and pavement removal, disposal, and restoration in accordance with the Bid Schedule. Measurement and payment for by-pass pumping is stated in Technical Provisions, Section 8.3 – By-pass pumping.

End of Section

SECTION 33 05 08.01

SEWER LINE AND MANHOLE CLEANING

1.1 SCOPE: This section includes sewer line cleaning, manhole cleaning, and internal obstruction removal by hydraulic, high-pressure washing, or mechanical means. Owner shall locate and open manholes on sewer lines. Access into manholes shall be the sole responsibility of the Contractor. Sewer lines and manholes to be cleaned are identified on the drawings.

A. The Contractor shall remove all foreign materials from the interior of the sewer and manholes including but not limited to sediment, roots, debris, solids, sand, grit, mud, and grease accumulations and other obstructions from the length of the sewer section for facilitating the television inspection and to prevent foreign intrusions from causing dimples, folds, bumps and other imperfections in the flexible liner. Contractor shall repeat the cleaning procedure for sections of sewer that are shown by closed circuit television video (CCTV) inspection to have remaining debris, grit, grease, etc.

B. The manhole washing and cleaning by high-pressure water jet shall include vertical walls, inverts, and benches. Experienced personnel shall operate all cleaning equipment and devices. Satisfactory precautions shall be taken to protect the sanitary sewer mains and manholes from damage that might be inflicted by the improper use of the cleaning process or equipment. Any damage done to the sewer or manhole by the Contractor shall be repaired by the Contractor at no additional cost to the Owner and to the satisfaction of the Engineer.

C. The Contractor, when instructed by the Engineer, will be required to demonstrate the performance capabilities of the cleaning equipment proposed for use on the project. If the results obtained by the proposed sanitary sewer cleaning equipment are not satisfactory, the Contractor shall use different equipment and/or attachments, as required, to meet specifications. More than one type of equipment/attachments may be required at a location. When hydraulic or high velocity cleaning equipment is used a suitable sand trap, weir, dam, or suction shall be constructed in the downstream manhole in such a manner that all the solids and debris are trapped for removal.

1.2 SUBMITTALS: Contractor shall submit to the Owner 10 days after being given his/her Notice to Proceed, the following:

A. A schedule for cleaning each sewer line/manhole segment shown on the drawings and a letter identifying the methods(s) that he/her intends to use for cleaning same. Include plan for traffic control.

B. List of equipment to be used. Include as minimum the manufacturer, model number(s) age of equipment, relevant technical data and the number of units to be dedicated to the project.

C. List of all clients served by the Contractor within the previous 24-month period preceding the Bid. Include the names and telephone numbers of contacts.

D. List actions to mitigate impact to sewer system users in areas affected by the rehabilitation Work during cleaning operations. Refer to Section 8.5, Sanitary Sewer Rehabilitation – Public Relations Program

1.3 WATER USAGE: Contractor shall not utilize any water source until it has been approved by Owner. When an additional quantity of water from fire hydrant(s) or other approved sources is necessary to meet the requirements of the equipment, care shall be taken not to waste water from hydrants or selected source inadvertently or intentionally. The Contractor shall be responsible for providing double check valve/water meter(s) installation at fire hydrant(s). All related charges for the set-up and the associated water bill shall be considered incidental to the cleaning of the existing sewer lines and manholes. The Contractor shall remove the water meter(s)/piping/appurtenances from all fire hydrants at the end of each working day.

1.4 HYDRAULIC CLEANING: Hydraulically propelled devices that require a head of water to operate when cleaning sewers must utilize a collapsible dam. The dam must be easily collapsible to prevent damage to the sewer and adjacent property. When using hydraulically propelled devices, precautions shall be taken to insure that the water pressure created does not cause damage or flooding to public or private property. The Contractor shall not increase the hydraulic gradient of the sanitary sewers beyond the elevation that could cause overflow of sewage into area waterways. The flow of wastewater present in the sanitary sewer main shall be utilized to provide necessary fluid for hydraulic cleaning devices whenever possible.

1.5 HIGH VELOCITY CLEANING: Equipment shall be truck mounted, carry its own 1,200 gallon water tank with hydraulically driven hose reel, and shall have a minimum of 500 feet of 1-inch high pressure hose with a selection of two or more high velocity nozzles. Nozzles shall be capable of producing scouring action from 15 to 45 degrees in all size sewer lines to be cleaned, with nozzles capable of producing fine spray to solid stream. Cleaning equipment that uses a high velocity water jet for moving debris shall be capable of producing a minimum volume of 50 gallons per minute (gpm) with a pressure of 1,500 pounds per square inch (psi) at the pump. The Engineer must approve any variations to this pumping rate in advance. A working pressure gauge shall be used on the discharge of all high pressure water pumps. The Contractor shall operate the equipment so that the pressurized nozzle continues to move at all times. The pressure nozzle shall be turned off or reduced anytime the hose is held or delayed in order to prevent damage to the sewer line.

1.6 MECHANICAL CLEANING: Mechanical cleaning, in addition to normal cleaning when required by the Engineer, shall be approved equipment and accessories driven by power winching devices. The Contractor shall submit the equipment manufacturer's operational manual and guidelines to the Engineer, which shall be strictly followed unless modified by the Engineer. Experienced operators shall operate all equipment and devices so that they do not damage the pipe in the process of cleaning. Buckets, scrapers, scooters, porcupines, kites, heavy duty brushes, metal pigs and other debris removing equipment/accessories shall be used as appropriate and necessary in the field, in conjunction with the approved power machine(s). Bucket machines shall operate in pairs with sufficient power to perform the Work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. The use of cleaning devices such as rods, metal pigs, porcupines, root saws, snakes, scooters, sewer balls, kite and other approved equipment, in conjunction with hand winching device, and/or gas, electric rod propelled devices shall be considered normal cleaning equipment.

1.7 REMOVAL AND DISPOSAL OF DEBRIS:

A. All sludge, roots, dirt, sand, rocks, grease, and other solid or semi-solid material resulting from the cleaning operation shall be removed at the downstream manhole of the sewer section being cleaned. Passing of debris from upstream manhole section to downstream manhole section is not allowed. Under no circumstances shall sewage or solids removed in the cleaning process be dumped onto streets or into ditches, catch basins, storm drains, sanitary sewer manholes, cleanouts, or non-approved storage containers or landfills.

B. All solids or semi-solids resulting from the cleaning operations shall be removed from the work site at the end of each work day and disposed of at no additional cost to the Owner. The Contractor shall not be allowed to accumulate debris, and/or liquid waste, sludge, etc. at the work site except in totally enclosed containers approved by the New Mexico Environment Department. Temporary earthen holding basins are not allowed for storing liquid/solids wastes. For reducing liquid waste hauling volumes Contractor may propose method(s) to the Engineer for how he/she intends to decant excess water from the liquid/solid material removed from sewer lines. Decanted liquid may be returned to the collection system adjacent to the work site provided it contains no sand, grease, grit, sludge, or solid material larger than ¼ inch in diameter. All semi-solid and solid material shall be loaded into an enclosed container, approved by the New Mexico Environment Department, and disposed off site by the Contractor at a State approved disposal site.

C. If the Contractor elects not to decant excess liquid at the work site, he/she will be allowed to use the Owner's wastewater facilities for disposing of decanted liquid wastes. Contractor shall be responsible for loading, transporting, and unloading material and will not be charged a dump fee by the Owner for use of the lagoons for liquid waste disposal. The cost for loading, decanting, transporting, dumping, and any other activities associated with the handling and disposal of the liquid material is considered to be incidental to the cleaning of the sanitary sewer lines and as such no separate payment will be made. The remaining semi-solid and solid material shall be disposed off site at a State approved disposal site.

1.8 MEASUREMENT AND PAYMENT: The Owner shall locate and open manholes on sewer lines to be cleaned. Acceptance of sewer cleaning Work shall be made upon the successful completion of the television inspection and shall be to the satisfaction of the Owner and Engineer. If later television inspections show the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and CCTV re-inspect the sewer line until the cleaning is shown to be satisfactory. The Contractor at no additional cost shall do all such re-cleaning and re-inspection to the satisfaction of the Owner.

A. Sewer Main Cleaning: The unit price bid for cleaning sewer mains shall be full compensation for all labor, water, equipment, and incidental materials required to clean the sewer prior to television inspection. Further washing/cleaning of sewer lines required prior to actual trenchless rehabilitation efforts shall be incidental to the sewer main installation. Unit price shall be based on the linear feet of sewer line actually cleaned and accepted. This includes the collection, removal, transportation, and disposal of all sand, debris and wastes to legal disposal site(s).

B. Manhole Cleaning: The unit price bid for cleaning and washing manholes shall be full compensation for all labor, water, equipment, and incidental materials required to clean and wash the manholes prior to performing any rehabilitation and repair Work. Cleaning shall also include manhole washing and cleaning by high-pressure water hose. Any manhole and/or frame and cover that is dismantled or damaged during the cleaning process shall be repaired at no additional cost and shall be incidental to cleaning.

End of Section

SECTION 33 05 08.03

BY-PASS PUMPING

1.1 SCOPE:

A. The Work covered by this item consists of furnishing all labor, supervision, tools, plant, equipment appliances, and materials to implement a temporary pumping system for the purpose of diverting existing sewage flow around the sewer rehabilitation work area. By-pass pumping shall allow users of the sanitary sewer system to continue to use the sewer system at all times and to prevent backup and/or overflow into adjacent ditches, storm sewers, and waterways. Additionally, by-pass pumping shall facilitate cleaning, television inspection, and/or rehabilitation of sewer lines.

B. The design, installation, and operation of the by-pass pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the Owner and Engineer that he/she specializes in the design and operation of temporary by-pass pumping systems. The vendor shall provide at least three (3) references of projects of a similar size and complexity as this project performed by his/her firm within the past three years. The by-pass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

C. Contractor shall make his own determination as to average and peak flow quantity when sizing the by-pass pumping system. All pumps used shall be fully automatic and self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be diesel or electric powered and have noise suppressor exhaust systems to mitigate noise levels to less than 50 db or 10 db above ambient noise levels when measured at the property lines closest the noise source. All pumps used must be designed for dry running over long periods of time to accommodate the cyclical nature of sewage flows. The by-pass pumping system will require full supervision by Contractor's personnel during the performance of rehabilitation Work. Contractor shall inspect the by-pass pumping system every two hours to ensure that the system is working properly. A responsible operator shall be on hand at all times when pumps are operating. Contractor shall have adequate standby pumping equipment available and ready for immediate operation and use in the event of an emergency, breakdown of the primary pumping system, or unanticipated wet weather flows. The Contractor shall provide the necessary stop-start controls for each pump include one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line, isolated from the primary system by a valve.

D. All piping(s), joints and accessories shall be designed to withstand at least twice the maximum system, pressure or a minimum of 50 pounds per square inch (psi), whichever is greater. In order to prevent the accidental spillage of sewage by-pass system shall be constructed of rigid pipe with positive, restrained joints. Under no circumstances will aluminum irrigation type piping or glued PVC pipe/joints be allowed. Discharge hoses will only be allowed in short sections and with specific permission from the Engineer. The Contractor shall perform leakage and pressure tests of the by-pass pumping discharge piping using clean water prior to actual operation. The Engineer shall be given 24 hours notice prior to testing. During by-pass pumping, no sewage shall be leaked, dumped, or spilled in or onto, any area outside of the existing sanitary sewer system. When by-pass pumping operations are complete all piping shall be drained into the sanitary sewer prior to disassembly.

E. The Contractor shall maintain sewage flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding. Contractor shall be liable for all property and environmental damages should the temporary bypass pumping system fail resulting in overflows, sewage backups, or discharges into the adjacent water resources, wetlands, or other natural resources.

F. Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of Work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing major disturbances to existing sewage pumping facilities downstream.

G. Large sections of the sewer rehabilitation Work will occur in residential neighborhoods requiring a temporary sound attenuating system to be furnished and installed near and around bypass pumping facilities. Contractor shall develop a “Sound Attenuation Plan”, the details of which shall be presented to the Engineer for review and approval by him prior to the beginning of renovation Work.

1.2 SUBMITTALS: The Contractor shall provide in writing, a by-pass pumping plan, the sequence of construction and a list of all piping, pumps, plugs, etc., for review and approval by the Engineer. The Contractor shall be responsible for all required bulkheads, pumping, equipment, piping, etc. to accomplish by-pass pumping operations. The plan shall include but not be limited to details of the following:

A. By-pass pumping vendor references

B. Proposed staging area for pumps as rehabilitation work proceeds within tribal areas.

C. Sewer plugging method and types of plugs.

D. Schedule for installation of by-pass pumping lines. Furnish the number, size, material, method of installation and location of installation of discharge piping.

E. By-pass pump sizes, capacity, number of each size to be on site and power requirements.

F. Standby power generator size and location if electrically powered pumps are to be utilized.

G. Methods of restraining bends and fittings (thrust blocks, mechanical restraints, etc.). Details of any temporary pipe supports and anchoring required.

H. Method of noise control for each pump and/or generator system. The Contractor shall submit a "Sound Attenuation Plan" to preclude complaints by tribal members. The plan shall detail how he intends to attenuate nuisance noise generated by operating equipment if noise levels specified in 1.1C, cannot be met.

1.3 SEWAGE OVERFLOW: In the event sewage accidentally drains into the storm drainage system or street the Contractor shall immediately stop the overflow, notify the Owner and Engineer, and take the necessary action to clean up and disinfect the spillage to the satisfaction of the Owner and Engineer. If sewage is spilled onto public or private property, the Contractor shall wash down, clean up and disinfect the spillage to the satisfaction of the Engineer. Any and all overflows shall be reported to the Owner and Engineer by the Contractor within 24 hours.

1.4 PAYMENT: The unit bid price for by-pass pumping system shall be full compensation for all labor, equipment, and incidental materials required for the set-up, removal, installation, and operation and maintenance of the system during sewer rehabilitation. Unit price shall be for actual linear feet of sewer line to be bypass pumped. The Contractor will not be compensated for by-pass pumping when utilizing inferior and/or deficient equipment.

End of Section

SECTION 33 05 13

MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Monolithic concrete manholes with [masonry] transition to cover frame, covers, anchorage, and accessories.
   2. Modular precast concrete manhole with tongue-and-groove joints [with masonry transition to cover frame,] covers, anchorage, and accessories.
   3. Bedding and cover materials.

B. Related Sections:
   1. Section 03 30 00 - Cast-In-Place Concrete: Concrete type for manhole base pad construction.
   2. Section 31 37 01 – General Site Excavation and Trenching.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Manhole:
   1. Basis of Measurement: By each unit.

1.3 REFERENCES

A. American Concrete Institute:
   1. ACI 318 - Building Code Requirements for Structural Concrete.
   2. ACI 530/530.1 - Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.

B. ASTM International:
   1. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
   2. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
   3. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.

1.4 DESIGN REQUIREMENTS

A. Equivalent strength: Based on structural design of reinforced concrete as outlined in ACI 318.

B. Design of Lifting Devices for Precast Components: In accordance with ASTM C913.

C. Design of Joints for Precast Components: In accordance with ASTM C913; maximum leakage of 0.025 gallons per hour per foot of joint at 3 feet of head.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the current New Mexico APWA standards.

1.7 DELIVERY, STORAGE AND HANDLING

A. Store precast concrete manholes to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.

B. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

PART 2 PRODUCTS

2.1 MANHOLES [AND STRUCTURES]

A. Manhole Sections: Reinforced precast concrete in accordance with ASTM C478 with gaskets in accordance with ASTM C923.

2.2 FRAMES AND COVERS

A. Manufacturers:
   1. Neenah Foundry Co. Model R-1596.
   2. Substitutions: City Approved Equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify built-in items are in proper location, and ready for roughing into Work.

C. Verify correct size of manhole excavation.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION

A. Excavation and Backfill:
   1. Excavate for manholes in accordance with Section 31 23 16 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
   2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes in dry trench.
   3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.

B. Place base pad, trowel top surface level.

C. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad.

3.4 PRECAST CONCRETE MANHOLE INSTALLATION

A. Lift precast components at lifting points designated by manufacturer.

B. When lowering manholes into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remains clean.

C. Set precast structures bearing firmly and fully on crushed stone bedding, compacted in accordance with provisions of Section 31 37 01 – General Site Excavation and Trenching or on other support system shown on Drawings.

D. Assemble multi-section structures by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections.

E. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.

F. Joint sealing materials may be installed on site or at manufacturer’s plant.

G. Verify manholes installed satisfy required alignment and grade.

H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.

I. Cut pipe to finish flush with interior of structure.

J. Shape inverts through manhole as shown on Drawings.

3.5 CAST-IN-PLACE CONCRETE MANHOLE INSTALLATION

A. Prepare crushed stone bedding or other support system shown on Drawings, to receive base slab as specified for precast structures.

B. Place and cure concrete in accordance with Section 03 30 00.

3.6 FRAME AND COVER INSTALLATION

A. Set frames using mortar and masonry. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Where more than one course of concrete brick is required, stagger vertical joints.

B. Set frame and cover 2 inches above finished grade for manholes with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test concrete manhole and structure sections in accordance with ASTM C497.

C. Test cast-in-place concrete in accordance with Section 03 30 00.

D. Vertical Adjustment of Existing Manholes [and Structures]:
   1. Where required, adjust top elevation of existing manholes to finished grades shown on Drawings.
   2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.
   3. Remove concrete without damaging existing vertical reinforcing bars when removal of existing concrete wall is required. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated Drawings.
   4. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete in accordance with Section 03 30 00.

END OF SECTION

SECTION 33 05 87

SEWER STRUCTURES COATING

1.1 DESCRIPTION:

A. The Contractor shall coordinate and furnish all labor, materials, equipment and services necessary to complete the installation of corrosion protection for concrete wastewater structures and manholes and ductile iron piping in the community sewer system. The protective lining system shall be Zebron lining system or equal.

B. Definitions

1. The term “paint”, “coatings”, or “finishes” as used herein, shall include all surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective linings, excepting galvanizing or anodizing, whether used a pretreatment, primer, intermediate coat, or finish coat.

1.2 REFERENCE DOCUMENTS:

A. ASTM B499 – Standard Test Method for Measurement of Coating Thickness by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals.

B. ASTM C109 – Compressive Strength Hydraulic Cement Mortars.

C. ASTM D638 – Tensile Properties of Plastics.

D. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.

E. ASTM D695 - Compressive Properties of Rigid Plastics.

F. ASTM D2369 – Standard Test Method for Volatile Content of Coatings

G. ASTM D2584 - Volatile Matter Content.

H. ASTM D2240 - Durometer Hardness, Type D.

I. ASTM D4138 - Standard Test Methods for Measurement Dry Film Thickness of Protective Coating Systems by Destructive Means.

J. ASTM D4262 – Standard Test Method of pH of Chemically cleaned or Acid Etched Concrete Surfaces.

K. ASTM D4787 – Standard Practice for Continuity Verifications of Liquid or Sheet Linings Applied to Concrete Subtrates

L. ASTM D4541 – Pull-off Strength of Coatings Using a Portable Adhesion Tester.

M. ASTM D5162 – Standard Practice for Discontinuity Testing of Nonconductive Protective Coating on Metallic Substrates.

N. ASTM D7234 - Adhesion, Concrete

O. ASTM D543 - Resistance of Plastics to Chemical Reagents.

P. ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of Shotcrete.

Q. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.

R. SSPC SP-13/NACE No. 6 - Surface Preparation of Concrete.

S. ASTM - The published standards of the American Society for Testing and Materials, West Conshohocken, PA.

T. NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.

U. SSPC - The published standards of the Society of Protective Coatings, Pittsburgh, PA.

V. Los Angeles County Sanitation District - Evaluation of Protective Coatings for Concrete.

W. SSPWC 210-2.3.3 - Chemical resistance testing published in the Standard Specifications for Public Works Construction (otherwise known as "The Greenbook").

1.3 SUBMITTALS: Submittals shall be made in accordance with the standard general conditions and the general requirements in the project specifications:

A. Product Data:

1. Technical data sheet on each product used.
2. Material Safety Data Sheet (MSDS) for each product used.
3. Copies of independent testing performed on the coating product indicating the product meets the requirements as specified herein.
4. Technical data sheet and project specific data for repair materials to be topcoated with the coating product(s) including application, cure time and surface preparation procedures.
5. Detailed sequence of work for protective lining work.
6. Protective lining manufacturer’s instructions and recommendations on surface preparation and application.
7. Certification of compatibility from all product manufactures of protective linings, concrete rehabilitation products, grouts, sealants, or other materials used in the manhole rehabilitation process.
8. Safety Data Sheet for each product used.

B. Contractor Data:

1. Current documentation from coating product manufacturer certifying Contractor's training and equipment complies with the Quality Assurance requirements specified herein.
2. Contractor shall have a minimum of three (3) years experience in successful application of coating product(s) with in the municipal wastewater environment. Five (5) recent references of Contractor indicating successful application of coating product(s) of the same material type as specified herein, applied by spray application within the municipal wastewater environment. The “Performance History”, which is attached to these Technical Specification, shall be submitted to the project engineer after the bid opening for approval and verification.

1.4 PRODUCTS:

A. Quality Assurance:

1. Coating product(s) shall be capable of being installed and cured properly within the specified environment(s). Coating product(s) shall be resistant to all forms of chemical or bacteriological attack found in municipal sanitary sewer systems; and, capable of adhering to the substrates and repair product(s).

2. Repair product(s) shall be fully compatible with coating product(s) including ability to bond effectively to the host substrate and coating product(s) forming a composite system.

3. Contractor shall utilize equipment for the spray application of the coating product(s) which has been approved by the coating product manufacturer; and, Contractor shall have received training on the operation and maintenance of said equipment from the coating product manufacturer.

4. The Protective Lining Applicator shall conform to all local, State, and Federal regulations including those set forth by OSHA, RCRA, and the EPA and any other applicable authorities.

5. Contractor shall be trained by, or have their training approved and certified by, the coating product manufacturer for the handling, mixing, application and inspection of the coating product(s) to be used as specified herein.

6. Contractor shall be trained in the use of testing or inspection instrumentation and knowledgeable of the proper use, preparation and installation of the coating product(s) to be used as specified herein.

7. Contractor shall initiate and enforce quality control procedures consistent with the coating product(s) manufacturer recommendations and applicable NACE or SSPC standards as referenced herein.

B. Delivery, Storage, and Handling:

1. Materials are to be kept dry, protected from weather and stored under cover.

2. Protective coating materials are to be stored between 50° F and 90° F. Do not store near flame, heat or strong oxidants.

3. Protective coating materials are to be handled according to their material safety data sheets.

C. Site Conditions:

1. Contractor shall conform with all local, state and federal regulations including those set forth by OSHA, RCRA and the EPA and any other applicable authorities.

2. Confined space entry, flow diversion and/or bypass plans shall be presented by Contractor to Owner as necessary to perform the specified work.

D. Special Warranty: Contractor shall warrant all work against defects in materials and workmanship for a period of one (1) year, unless otherwise noted, from the date of final acceptance of the project. Contractor shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said one (1) year period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

E. Existing Products:

1. Standard Portland cement or new concrete (not quick setting high strength cement) must cure a minimum of 28 days prior to application of the coating product(s).

2. Remove existing coatings which may affect the performance and adhesion of the coating product(s) prior to application of the coating product(s). For existing coatings which are well bonded to the existing concrete or piping, surface shall be roughened to provide adequate surface profile for mechanical bond by the new protective coating.

3. Thoroughly clean and prepare existing products to effect a seal with the coating product(s).

4. Maintain strict adherence to the protective coating manufacturer's recommendations with regard to proper surface preparation and compatibility with existing coatings.

F. Repair and Resurfacing Products:

1. Repair products shall be used to fill voids, fill inverts of abandon pipe, fill bugholes, and/or smooth transitions between components prior to the installation of the coating product(s). Repair materials must be compatible with the specified coating product(s) and shall be used and applied in accordance with the manufacturer's recommendations.

2. For Concrete Surfaces: Resurfacing products shall be used to fill large voids, lost mortar in masonry structures, smooth deteriorated surfaces and rebuild severely deteriorated structures.

3. For Concrete Surfaces: The following products may be accepted and approved if approved by the manufacturer(s) for suitability and compatibility in topcoating with the specified coating product(s) for use within the specifications:

a) 100% solids, solvent-free epoxy grout, including the specified coating product(s)

b) Factory blended, rapid setting, high early strength, fiber reinforced, non- shrink repair mortar that can be trowelled or pneumatically spray applied, such as Quadex Inc. Aluminaliner or Hyperform.

c) Polymer modified or enhanced cementitious patch and repair materials, including Quadex Inc. Hyperform.

d) At the discretion of the applicator, Zebron Low Temperature Epoxy (ZLTE) Flash Point 110 C (230 F) is approved for Zebron 386. This prime is highly recommended for newly constructed pre-cast concrete structures.

G. Coating Products:

1. Manufacturer: Raven Liner, or Engineer approved equal.

2. Product: Primer materials shall be 100% solids, moisture tolerant epoxy capable of equal spray application of 1-3 mils thickness in one continuous coat.

The lining material shall be a plural-component, 3 - 1 mix ratio, 100% solid, non-solvented hybrid polyurethane coating with a shore “D” hardness of 57 at 77 degrees Fahrenheit such as Raven Liner. The material shall be the high-build type capable of application thickness, as specified, without runs or sags and shall be capable of passing ASTM D-1737 for flexibility using cylinder mandrel of 0.5 inch (12.7 millimeter). The flash point of the fluid mixture shall be 450 degrees Fahrenheit.

The coating material shall meet the following:

a) VOC Content (ASTM D2584): 0%

b) Compressive Strength, psi (ASTM D695): 16,000 (minimum)

c) Tensile Strength, psi (ASTM D638): 7,600 (minimum)

d) Flexural Strength, psi (ASTM D790): 13,000 (minimum)

e) Adhesion to Concrete, mode of failure (ASTM D4541): Substrate (concrete) failure

f) Chemical Resistance (ASTM D543/G20) all types of service for:

i) Municipal sanitary sewer environment

ii) Acetic Acid, 5%

iii) Sulfuric acid, 30%

iv) Sodium hydroxide, 5%

v) Ammonium Hydroxide, 5%

vi) Nitric Acid, 1%

vii) Ferric Acid, 1%

viii) Bacteriological – BOD not less than 700 PPM

g) Successful Pass: Sanitation District of L.A. County Coating Evaluation Study or SSPWC 210.2.3.3 (Greenbook "Pickle Jar" Chemical Resistance test)

H. Coating Application Equipment:

1. Manufacturer approved heated plural component spray equipment.

2. Hard to reach areas, primer application and touch-up may be performed using hand tools.

I. Examination:

1. Appropriate actions shall be taken by Contractor to comply with local, state and federal regulatory and other applicable agencies with regard to environment, health and safety during work.

2. All structures to be coated shall be readily accessible to Contractor.

3. New Portland cement concrete structures shall have endured a minimum of 28 days since manufacture prior to commencing coating installation.

4. Any active flows shall be dammed, plugged or diverted as required to ensure all liquids are maintained below or away from the surfaces to be coated. Any equipment shall be locked-out according to site safety and OSHA requirements.

5. Temperature of the surface to be coated should be maintained between 40° F and 120° F.

6. Specified surfaces should be shielded to avoid exposure of direct sunlight or other intense heat source. Where varying surface temperatures do exist, coating installation should be scheduled when the temperature is cooling.

7. Prior to commencing surface preparation, Contractor shall inspect all surfaces specified to receive the coating and notify Owner, in writing, of any noticeable disparity in the site, structure or surfaces which may interfere with the work, use of materials or procedures as specified herein.

1.5 EXECUTION:

A. Surface Preparation:

1. Concrete Surfaces:

a) Oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants which may affect the performance and adhesion of the coating to the substrate shall be removed.

b) Concrete and/or mortar damaged by corrosion, chemical attack or other means of degradation shall be removed so that sound substrate remains.

c) Choice of surface preparation method(s) should be based upon the condition of the structure and concrete or masonry surface, potential contaminants present, access to perform work, and required cleanliness and profile of the prepared surface to receive the coating product(s).

d) Surface preparation method, or combination of methods, that may be used include high pressure water cleaning, water jetting, abrasive blasting, shotblasting, grinding, scarifying, detergent water cleaning, hot water blasting and others as referenced in NACE No. 6/SSPC SP-13.

Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface suitable for the specified coating product(s).

e) Infiltration shall be stopped by using a material which is compatible with the repair products and is suitable for topcoating with the coating product(s).

B. Application of Repair and Resurfacing Products:

a) Areas where rebar has been exposed and is corroded shall be first prepared in accordance with Section 3 Reinforcing Steel in the Technical Provisions. The exposed rebar shall then be abrasive blasted and coated with coating product specified.

b) Repair products shall be used to fill voids, fill inverts of abandoned pipe, fill bugholes, and other surface defects which may affect the performance or adhesion of the coating product(s).

c) For concrete surfaces: Resurfacing products shall be used to repair, smooth or rebuild surfaces with rough profiles to provide a concrete or masonry substrate suitable for the coating product(s) to be applied. These products shall be installed to minimum thickness as recommended within manufacturers published guidelines. Should structural rebuild be necessary, these products shall be installed to a thickness as specified by the Engineer.

d) Repair and resurfacing products shall be handled, mixed, installed and cured in accordance with manufacturer guidelines.

e) All repaired or resurfaced surfaces shall be inspected for cleanliness and suitability to receive the coating product(s). Additional surface preparation may be required prior to coating application.

C. Application of Coating Products:

a) Application procedures shall conform to the recommendations of the coating product(s) manufacturer, including environmental controls, product handling, mixing, application equipment and methods.

b) Spray equipment shall be specifically designed to provide optimum proportioning and mixing of the coating product(s) while applying the coating product(s) and shall be in proper working order.

c) Contractors qualified in accordance with Section 1.4 of these specifications shall perform all aspects of coating product(s) installation.

d) Prepared surfaces shall be coated by spray application of the coating product(s) described herein to a minimum wet film thickness of 125 mils. Follow manufacturer's recommendations for project specific coating thickness recommendations.

e) Subsequent topcoating or additional coats of the coating product(s) shall occur within the product's recoat window. Additional surface preparation procedures will be required if this recoat window is exceeded.

f) Coating product(s) shall interface with adjoining construction materials throughout the manhole structure to effectively seal and protect concrete or

g) Masonry substrates from infiltration and attack by corrosive elements. Procedures and materials necessary to affect this interface shall be as recommended by the coating product(s) manufacturer.

h) For concrete surfaces: Termination points of the coating product(s) shall be made at the manhole chimney joint, 1"below normal flow levels at the bench or within the invert, and a minimum of 1" interfacing with each pipe penetration.

i) Sewage flow shall be stopped, bypassed or diverted for application of the coating product(s) to the invert and interface with pipe materials.

D. Testing and Inspection:

a) During application a wet film thickness gauge, meeting ASTM D44 l4 - Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used. Measurements shall be taken, documented and attested to by Contractor for submission to Owner.

b) After the coating product(s) have set in accordance with manufacturer instructions, all surfaces shall be inspected for holidays with high-voltage holiday detection equipment. Reference NACE RPO 188-99 for performing holiday detection. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional coating can be hand applied to the repair area. All touch- up/repair procedures shall follow the coating manufacturer's recommendations. Documentation on areas tested, results and repairs made shall be provided to Owner by Contractor.

c) For concrete surfaces: A minimum of 10% of the manholes or structures coated shall be tested for adhesion/bond of the coating to the substrate. Testing shall be conducted in accordance with ASTM D4541 as modified herein. Owner's representative shall select the manholes to be tested. A minimum of three 20 mm dollies shall be affixed to the coated surface at the cone area, mid-section and at the bottom of the structure. The adhesive used to attach the dollies to the coating shall be rapid setting with tensile strengths in excess of the coating product and permitted to cure in accordance with manufacturer recommendations. The coating and dollies shall be adequately prepared to receive the adhesive.

Failure of the dolly adhesive shall be deemed a non-test and require retesting. Prior to performing the pull test, the coating shall be scored to within 30 mils of the substrate by mechanical means without disturbing the dolly or bond within the test area. Two of the three adhesion pulls shall exceed 200 psi or concrete failure with more than 50% of the subsurface adhered to the coating. Should a structure fail to achieve two successful pulls as described above, additional testing shall be performed at the discretion of the Owner or Project Engineer. Any areas detected to have inadequate bond strength shall be evaluated by the Project Engineer. Further bond tests may be performed in that area to determine the extent of potentially deficient bonded area and repairs shall be made by Contractor.

d) Visual inspection shall be made by the Project Engineer and/or Inspector. Any deficiencies in the finished coating shall be marked and repaired according to the procedures set forth herein by Contractor.

e) The municipal sewer system may be returned to full operational service as soon as the final inspection has taken place.

1.6 MEASUREMENT AND PAYMENT:

A. Epoxy Coating of Invert and Bench: Payment shall be based on each set of invert and bench requiring the application of an epoxy lining after repairs and washing/cleaning. The Owner and the Engineer shall approve any epoxy liner Work. The contract unit price shall include all costs for labor, materials, and equipment necessary for necessary for cleaning, surface preparations including grouting of inverts at abandoned pipe, application of the epoxy lining, cleanup, and all other work necessary for a complete and satisfactory job all performed in strict accordance with the specifications and as shown on the Bid Schedule.

B. Application of Epoxy Liner to Manhole Walls/Barrels: Payment shall be based on the actual vertical linear footage identified by the Contractor during manhole washing/cleaning and inspection as requiring the application of an epoxy lining. Depth of the manhole shall be measured from the bottom of the top of pipe to the top of the ring seat of the manhole cover. The Owner and the Engineer shall approve any epoxy liner Work. The contract unit price shall include all costs for labor, materials, and equipment necessary for necessary for cleaning, surface preparations, application of the epoxy lining, cleanup, and all other work necessary for a complete and satisfactory job all performed in strict accordance with the specifications and as shown on the Bid Schedule.

End of Section

SECTION 33 31 00

SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sanitary sewage pipe.
   2. Bedding and cover materials.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe and Fittings:
   1. Basis of Measurement: By the linear foot.
   2. Basis of Payment: Includes excavation, bedding, pipe and fittings, connection to municipal sewer.

1.3 REFERENCES

A. ASTM International:
   1. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D1785 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
   5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
   7. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   8. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.4 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.5 SUBMITTALS

A. Product Data: Submit data indicating pipe material used, pipe accessories.

B. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with the current New Mexico APWA standards.

B. Maintain one copy of project documents on site.

1.7 FIELD MEASUREMENTS

A. Verify field measurements and elevations are as indicated on plans.

1.8 COORDINATION

A. Coordinate the Work with termination of sanitary sewer connections to municipal sewer utility service, and trenching.

PART 2 PRODUCTS

2.1 SANITARY SEWAGE PIPE

A. Plastic Pipe: ASTM D3034, SDR 35, Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of 4 inches and 8 inches, bell and spigot style rubber ring sealed gasket joint.
   1. Fittings: PVC.
   2. Joints: ASTM F477, elastomeric gaskets.

2.2 BEDDING AND COVER MATERIALS

A. Bedding: Native Soils are acceptable as long as no rocks greater than 2” are placed within 12” of the pipe.

B. Soil Backfill from Above Pipe to Finish Grade: Native Soils with no rocks over 6 inches in diameter, frozen earth or foreign matter.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

A. Correct over excavation with fine aggregate.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

3.3 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings; with maximum variation from indicated slope of 1/8 inch in 10 feet.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of 12 inches.

D. Refer to Section to the Geotech Report for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

E. Connect to municipal sewer system.

F. Install Work in accordance with City of Aztec Public Work's standards.

3.4 FIELD QUALITY CONTROL

A. Perform test on site sanitary sewage system in accordance with City of Aztec Public Work's standards.

B. Compaction Testing: In accordance with ASTM D1557 or ASTM D698 per plans and/or Geotech Report.

C. When tests indicate Work does not meet specified requirements, remove work, replace and retest.

3.5 PROTECTION OF FINISHED WORK

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 31 08

HIGH DENSITY POLYETHYLENE (HDPE) PIPE & FITTINGS

1.1 SCOPE: This specification includes but is not limited to high density polyethylene (PE 3408) pressure pipe primarily intended for the transportation of water and sewage either buried or above grade.

1.2 REFERENCES:

Reference:	Title:
AWWA C901	Polyethylene (PE) pressure Pipe & Tubing, ½ inch through 3 inch for water service
AWWA C906	Polyethylene (PE) pressure Pipe & Fittings, 4inch through 63 inch for water distribution
ASTM D3035	Standard Spec for PE Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D3261	Butt Heat Fusion PE Fittings for PE Pipe & Tubing
ASTM D3350	Standard Specification for PE Pipe & Fittings Materials ASTM D1238 Melt Flow Index
ASTM D1505	Density of Plastics
ASTM D2837	Hydrostatic Design Basis
NSF Standard #14	Plastic Piping Components & Related Materials

1.3 GENERAL:

A. Use: High Density Polyethylene (HDPE) pipes/fittings shall be allowed for use as water, wastewater and reclaimed water pressure pipe where compatible with the specific conditions of the project. All materials used in the production of water main piping shall be approved by the National Sanitation Foundation (NSF).

B. Documentation:

1. Documentation from the resin's manufacturer showing results of the following tests for resin identification:

a) Melt Flow Index ASTM D1238

b) Density ASTM D1505

C. Manufacturer: All HDPE pipe and fittings shall be from a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of the HDPE pipe to be furnished. The pipe shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications. Qualified manufacturers shall be Performance Pipe (Division of Chevron Chemical Company), JM Eagle, WL Plastics, or equal as approved by the Owner or Owner's Representative.

D. Finished Product Evaluation:

1. Production staff shall check each length of pipe produced for the items listed below. The results of all measurements shall be recorded on production sheets, which become part of the manufacturer's permanent records.

a) Pipe process shall be checked visually, inside and out for cosmetic defects (grooves, pits, hollows, etc.)

b) Pipe outside diameter shall be measured using a suitable periphery tape to ensure conformance with ASTM F714 or ASTM D3035, whichever is applicable.

c) Pipe wall thickness shall be measured at 12 equally spaced locations around the circumference of both ends of the pipe to ensure conformance with ASTM F714 or ASTM D3035, whichever is applicable.

d) Pipe length shall be measured.

e) Pipe marking shall be examined and checked for accuracy.

f) Pipe ends shall be checked to ensure they are cut square and clean.

g) Subject inside surface to a "reverse bend test" to ensure pipe is free of oxidation (brittleness)

E. Stress Regression Testing: The polyethylene pipe manufacturer shall provide certification that stress regression testing has been performed on the specific polyethylene resin being utilized in the manufacture of this product. This stress regression testing shall have been done in accordance with ASTM D2837 and the manufacturer shall provide a product supplying a minimum Hydrostatic Design Basis (HDB) of 1,600 psi as determined in accordance with ASTM D2837.

F. Compatibility: Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

G. Warranty: The pipe MANUFACTURER shall provide a warranty against manufacturing defects of material and workmanship for a period of ten years after the final acceptance of the project by the Owner or Owner's Representative. The MANUFACTURER shall replace at no expense to the Owner any defective pipe/fitting material including labor within the warranty period.

1.4 PRODUCTS:

A. Materials for Pipe Sizes 4-inch Diameter and Larger:

1. Materials used for the manufacture of polyethylene pipe and fittings shall be made from a PE-4710 high density polyethylene resin compound meeting cell classification 445574C per ASTM D3350 or PE 3408 high density polyethylene resin compound meeting cell classification 345464C per ASTM D3350. HDPE pipe for sewer mains shall be white or light grey in color.

2. The High Density Polyethylene (HDPE) pipe shall comply with AWWA Specifications C906.

3. Dimensions and workmanship shall be as specified in ASTM F714. HDPE fittings and transitions shall meet ASTM D3261. HDPE pipe shall have a minimum resin density of 0.947 grams per cubic centimeter for PE-4710 and 0.940 grams per cubic centimeter for PE-3408. All HDPE pipe and fittings shall have a Hydrostatic Design Basis (HDB) of 1,600 psi.

4. HDPE pipe and accessories 4-inch diameter and larger, shall be IPS and meet the following requirements:

PE-4710 Requirements		
Requirements	Type of Installation	
	Water Mains	Sewer Mains
SDR Rating	DR-11	DR-17
PSI Rating (at 73.4^{o}F)	200 psi	125 psi

PE-4710 Requirements		
Requirements	Type of Installation	
	Water Mains	Sewer Mains
SDR Rating	DR-11	DR-17
PSI Rating (at 73.4^{o}F)	200 psi	125 psi

B. Materials for Pipe Sizes 2-inch Diameter and Less:

1. Materials used for the manufacture of polyethylene pipe and fittings shall be made from a PE-4710 high density polyethylene resin compound meeting cell classification 445574C per ASTM D3350 or PE 3408 high density polyethylene resin compound meeting cell classification 345464C per ASTM D3350.

2. The High Density Polyethylene (HDPE) pipe shall comply with AWWA Specifications C901.

3. Dimensions and workmanship shall be as specified in ASTM D3035. HDPE fittings and transitions shall meet ASTM D3261. HDPE pipe shall have a minimum resin density of 0.947 grams per cubic centimeter for PE-4710 and 0.940 grams per cubic centimeter for PE-3408. All HDPE pipe and fittings shall have a Hydrostatic Design Basis (HDB) of 1,600 psi.

4. HDPE pipe and accessories 2-inch diameter and less, shall be 200 psi at 73.40F meeting the requirements of SDR-11 for PE-4710 or SDR 9 for PE-3408 as minimum strength. Pipe shall be IPS.

C. Pipe Fittings: All molded fittings and fabricated fittings shall be fully pressure rated to match the pipe SDR pressure rating to which they are made. All fittings shall be molded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by the Owner or Owner's Representative.

The manufacturer of the HDPE pipe shall supply all HDPE fittings and accessories as well as any adapters and/or specials required to perform the work as shown on the drawings and specified herein.

Fittings from manufacturers other the HDPE pipe manufacturer may only be used if they meet all of the requirements of this specification, are compatible with the HDPE pipe, and are approved by the Owner or Owner's Representative. These fittings shall be as manufactured by Specified Fittings, Improved Piping Products, George Fisher, or approved equal.

All fittings shall be installed using butt-fused fittings, thermo-fused fittings/couplings, or flanged adapters and must be approved by the Owner or Owner's Representative. No size on wet taps shall be permitted.

All transition from HDPE pipe to ductile iron or PVC shall be made per the approval of the Owner or his/her representative and per the HDPE pipe manufacturer's recommendations and specifications. All cast components of the transition fitting (end rings, center ring, and bolt cams) shall be ductile iron as per ASTM A 536, grade 65-45-12. The gaskets shall be formed from virgin Nitrile Butadiene Rubber (NBR) compounded for water and sewer service in accordance with ASTM D2000, also resistant to hydrocarbons. The rubber shall be NDF 61 Certified rubber. Nuts and bolts

shall be 304 stainless steel. The transition fitting shall be center ring fusion bonded epoxy meeting AWWA C213 and NSF 61 certified. For water applications, the transition coupling shall be equal to the Alpha Wide Range Coupling as manufactured by Romac Industries, Inc., unless the transition coupling is attaching to asbestos cement water main. For asbestos cement water main, a Macro HP Extended Range Coupling as manufactured by Romac Industries Inc. shall be used. Joint restraint requirements shall meet NM APWA and the standard details.

For sewer applications, the transition coupling shall be equal to the Macro HP Extended Range Coupling as manufactured by Romac Industries, Inc.

D. Warning Tape: Metallic impregnated warning tape shall be blue in color with "Caution – Buried Water Line Below" continuously printed on it for water line pipe. Metallic impregnated warning tape shall be green in color with "Caution – Sewerline Below" continuously printed on it for sewer line pipe. Tape shall be a minimum of 3-inches wide, 5 mils total thickness, composed of plastic with a metal foil core, and equal to Traceline Detectable for Underground Utility Marking Tape. Where copper tracer wire is buried with the pipe line, the locator/warning tape shall be plastic without metal foil. The warning tape shall be installed above the pipe with an 18-inch maximum bury depth.

E. Copper Tracer Wire (For Water Mains and Sewer Force Mains Only):

1. Wire: 10-guage single strand copper polyethylene insulated tracing wire, type THHN/THWN.

2. Installation/Termination: Tracer wire shall be securely attached to the top of the pipe a minimum of three (3) times for each pipe length. The wire shall be properly grounded at all valve boxes, fire hydrants, and flush hydrants. For terminations at hydrants, the wire is to extend up through the interior and is to be affixed to the safety flange bolt. For gate valve boxes, the wire is to extend up through the interior of the gate valve box. Adequate tracer wire slack shall be maintained to allow for easy access.

1.5 JOINTING METHOD:

A. The pipe shall be joined with butt, heat fusion joints as outlined in ASTM D2657. All joints shall be made in strict compliance with the manufacturer's recommendations. A factory qualified joining technician as designated by the pipe manufacturer or experienced, trained technician shall perform all heat fusion joints in the presence of the Owner or Owner's Representative.

B. Lengths of pipe shall be assembled into suitable installation lengths by the butt- fusion process. All pipe so joined shall be made from the same class and type of raw material made by the same raw material supplier. Pipe shall be furnished in standard laying lengths not to exceed 50 feet and no shorter than 20 feet.

C. On days butt fusions are to be made, the first fusion shall be a trial fusion in the presence of the Owner or his/her representative. The following shall apply:

1. Heating plates shall be inspected for cuts and scrapes. The plate temperature shall be measured at various locations to ensure proper heating/melting per manufacturer's recommendations and approval by Owner or Owner's Representative.

2. The fusion or test section shall be cut out after cooling completely for inspection.

3. The test section shall be 12-inches or 30 times (minimum) the wall thickness in length and 1-inch or 1.5 times the wall thickness in width (minimum).

4. The joint shall be visually inspected as to continuity of "beads" from the melted material, and for assurance of "cold joint" prevention (i.e. – joint shall have visible molded material between walls of pipe). Joint spacing between the walls of the two ends shall be a minimum of 1/16 inch to a maximum of 3/16 inch.

1.6 INSTALLATION:

A. High Density Polyethylene (HDPE) Pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the drawings and as specified herein. A factory qualified joining technician as designated by the pipe manufacturer shall perform all heat fusion joints.

B. Care shall be taken in loading and transporting and unloading to prevent injury to the pipe. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before installation, and no piece shall be installed which is found to be defective. Any damage to the pipe shall be repaired as directed by the Owner or Owner's Representative. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his own expense.

C. Under no circumstances shall the pipe or accessories be dropped into the trench or forced through a directional bore upon "pull-back".

D. Care shall be taken during transportation of the pipe such that it will not be cut, kinked or otherwise damaged.

E. Ropes, fabric or rubber protected slings and straps shall be used when handling pipes. Chains, cables or hooks inserted into the pipe ends shall not be used. Two slings spread apart shall be used for lifting each length of pipe.

F. Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects, which could damage the pipe. Stacking of the polyethylene pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

G. Pipe shall be stored on clean level ground to prevent undue scratching or gouging. The handling of the pipe shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. The maximum allowable depth of cuts, scratches or

gouges on the exterior of the pipe is 5 percent of the wall thickness. The interior pipe surface shall be free of cuts, gouges or scratches.

H. Pipe shall be laid to lines and grade shown on the drawings with bedding and backfill as shown on the drawings.

I. When laying pipe is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means.

J. Sections of pipe with cuts, scratches or gouges exceeding 5 percent of the pipe wall thickness shall be removed completely and the ends of the pipeline rejoined.

K. The pipe shall be joined by the method of thermal butt fusion, as outlined in 1.4. All joints shall be made in strict compliance with the manufacturer's recommendations.

L. Mechanical connections of the polyethylene pipe to auxiliary equipment such as valves, pumps and tanks shall be through flanged connections which shall consists of the following:

1. A polyethylene flange shall be thermally butt-fused to the stub end of the pipe.
2. A 316 stainless steel back up ring shall mate with a 316 stainless steel flange.
3. 316 stainless steel bolts and nuts shall be used.

M. Flange connections shall be provided with a full-face neoprene gasket.

N. All HDPE pipe must be at the temperature of the surrounding soil at the time of backfilling and compaction.

O. If defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required.

P. Open Trench Installation:

1. Trenching and backfilling operations shall be performed as specified in TRENCH EXCAVATION & BACKFILL of the Technical Provisions.

2. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16-inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

3. Good alignment shall be preserved during installation. Deflection of the pipe shall occur only at those places on design drawings and as approved by the Owner or his/her representative. Fittings, in addition to those shown on the drawings, shall be used only if necessary or required by the Owner or Owner's Representative.

4. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

5. Precautions shall be taken to prevent flotation of the pipe in the trench.

6. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in

placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. As trench boxes, movable sheeting, shoring and plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

7. Restrained joints shall be installed where shown on the drawings or as directed by the Owner or Owner's Representative.

1.7 PIPE CLEANING: At the conclusion of the work, thoroughly clean all of the new pipe lines to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period by forcing a cleaning swab through all mains 6-inch or greater. Flushing velocities shall be a minimum of 2.5 feet per second. All flushing shall be coordinated with the Owner or Owner's Representative. Debris cleaned from the lines shall be removed from the job site.

1.8 TESTING:

A. Pressure testing shall be conducted per the Manufacturer's recommendations and as approved by the Owner or his/her representative.

B. All HDPE water mains shall be disinfected prior to pressure testing in accordance with Disinfection of Mains.

C. All HDPE mains shall be field-tested. Contractor shall supply all labor, equipment, material, gages, pumps, meters and incidentals required for testing. Each main shall be pressure tested upon completion of the pipe laying and backfilling operations, including placement of any required temporary roadway surfacing.

D. All mains shall be tested at 150 percent of the operating design pressure of the pipe unless otherwise approved by the Owner or Owner's Representative.

E. Pressure testing procedure shall be per manufacturer's recommendations or as follows:

1. Fill line slowly with water. Maintain flow velocity less than 2 feet per second.

2. Expel air completely from the line during filling and again before applying test pressure. Air shall be expelled by means of taps at points of highest elevation.

3. Apply initial test pressure and allow to stand without makeup pressure for two to three hours, to allow for diametric expansion or pipe stretching to stabilize.

4. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for one to three hours.

5. Upon completion of the test, the pressure shall be bled off from a location other than the point where the pressure is monitored. The pressure drop shall be witnessed by the Owner or his/her representative at the point where the pressure is being monitored and shall show on the recorded pressure read-out submitted to the Owner.

F. Allowable amount of makeup water for expansion during the pressure test shall conform to Chart 6, Allowance for Expansion Under Test Pressure, Technical Report TR 31/9-79, published by the Plastic Pipe Institute (PPI). If there are no visual leaks or significant pressure drops during the final test period, the installed pipe passes the test.

G. If any test of pipe laid disclosed leakage significant pressure drop greater than the manufacturer's recommended loss, the Contractor shall, at his/her own expense, locate and repair the cause of leakage and retest the line. The amount of leakage, which will be permitted, shall be in accordance with AWWA C600 Standards.

H. All visible leaks are to be repaired regardless of the amount of leakage.

1.9 SITE CLEAN UP: Upon completion of the work, the entire site shall be cleared of all debris, and the ground surface shall be finished to smooth and uniform slopes. Cleanup shall be considered an incidental item and no additional payment shall be made for it.

1.10 AS-BUILT INFORMATION: The Contractor shall be responsible for keeping accurate records of all installed items under this section of the specifications, and indicating revisions of the furnished construction drawings in sufficient detail to be accepted by the Owner for as-built drawings. Sufficient detail under this contract means that the Contractor shall take accurate measurements and record them on the drawings to provide the minimum information of at least two swing ties and distances to permanent objects and/or marker posts for all valves, pressure reducing valves, air and vacuum valves, hydrants, connections to other lines, and bends; the beginning, end of any stabilization material placed; the beginning, end, and depth to rock encountered; the beginning, end, and depth of any encasement installed; ant the location and depth of any other utilities encountered. Further information on as-builts is contained in the Special Provisions section of these specifications.

The recording of the as-built information is considered an integral part of the progress of this construction and shall be reviewed with the Owner or Owner's Representative in determining progress under this contract.

1.11 2811 MEASUREMENT AND PAYMENT:

A. HDPE PIPE: The HDPE pipe shall be measured in linear feet along the centerline of the pipe, including fittings, for each of the various sizes of HDPE pipe installed. Payment for HDPE pipe shall be at the contract unit price shown on the Bid Schedule. This price shall be full compensation for furnishing all labor, equipment, materials, and incidentals required for a complete installation, including excavation, bedding, stabilization material, pipe installation, fittings, thrust blocks, water main warning tape, hydrostatic testing, disinfection, trench backfilling, as-builts, and final cleanup.

1.12 SUBMITTALS:

A. HDPE Pipe & Fittings

B. Warning Tape

C. Copper Tracer Wire

End of Section