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IFB 2025-04R LIFT STATION REHABILITATION PROJECT – LOS ARBOLES AND NORTH ROAD

SECTION 100
UTILITIES MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Measurement and payment for Bid Items shall be specified in this Section.

B. Work to be performed under this contract will be paid for on a Unit Price or Lump Sum basis under the appropriate Bid Items in the Bid Schedule. All costs for Work shown on Drawings or described in Specifications, as incidental to the Contract shall be included in the Contract Price. A claim by the Contractor for extra compensation for an item shown on the Drawings or described in the Specifications will not be considered for any reason, including but not limited to the claim that it does not fall within the scope of one of the Bid Items. All work covered under the Standard Specifications shall be paid as outlined in this Section.

C. Contractor shall, within 15 days of receipt of Notice to Proceed, submit a schedule of values for all lump sum bid items.

D. General scope of work under each bid item includes all labor and materials required for construction of completely functional and operational facilities as shown on the Drawings and Specifications.

E. GENERAL. The total base bid price shall cover all work required by the contract documents for construction of a completely functional and operational facility. If the alternate bid is selected then the total alternate bid price shall cover all work required by the contract documents for construction of a completely functional and operational facility. All costs in connection with the proper and successful completion of the work, including furnishing all materials, equipment, supplies, appurtenances; providing all construction plans, equipment, and tools; and performing all necessary labor and supervision to fully complete the work in accordance with these contract documents shall be included in the unit and lump sum prices bid. All work not specifically set forth as a pay item in the bid

proposal shall be considered a subsidiary obligation of Contractor and as such, all cost connection therewith shall be incidental to and included in the bid prices.

F. ESTIMATED QUANTITIES. All estimated quantities for unit price items stipulated in the bid proposal are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of the work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished at the unit price bid. If actual quantities exceed or are less than estimated quantities, Contractor will not be eligible for a unit price adjustment or increase in contract time.

G. INSTALLATION OF LINES AND CONNECTION TO LINES. Trench location shown on plans may change based on actual location of existing utilities and structures. All descriptions of connections to existing lines are based on available information. Field verifications of connections are required and changes in fitting type and/or locations for connections may be required. No additional cost will be allowed for changes in fittings from Department of Public Utilities 100 - 2 Section 100 Utilities Measurement and Payment those designated unless the work is significantly more difficult. No additional costs will be allowed for working near or installing under or over utilities or structures that are accurately located on the ground in accordance with New Mexico Excavation Law. No additional cost will be allowed for working near or installing under or over or removing abandoned utilities or structures, which are typically not located. Underground Facilities as defined in Section 9.1.1.GG. are active facilities and do not include abandoned facilities.

H. MEASUREMENT AND PAYMENT. All measurements and payments will be based on completed work performed in strict accordance with the Drawings and Specifications and in accordance with the contract-unit prices and schedule of values. Incidental work and items not listed in the contract-unit price schedule will not be paid for separately, but will be included in the payment for the listed item or items to which the incidental work applies. Measurement and payment for lump sum items shall be full compensation for all labor, equipment, materials, testing, and incidentals necessary to perform the work in accordance with these contract documents, and shall include all else incidental thereto for

which separate payment is not provided under other items.

BASE BID

Note: Bid Items may include but are not limited to the following Items:

Item No. 1 - Clearing and Grubbing
Shall include all labor, materials, equipment, and incidentals required for clearing and grubbing as per DPU Construction Standards Specifications section 201. Payment shall be on a Lump Sum basis.

Item No. 2 - Mobilization
Shall include all costs for Contractor's mobilization and demobilization, insurance and bond, construction permits and fees, job trailers, site administration expenses, utilities and plant site repair and cleanup for the Project. Shall include all costs for contract close out, site clean-up, and all costs associated with Contractor's demobilization from site. Payment shall be on a Lump Sum basis as noted in the Bid Schedule.

Item No. 3 - Traffic Control
Contractor shall utilize appropriate signage to redirect traffic around worksite in accordance with DPU Construction Standards Specifications section 103. Payment shall be on a lump sum basis.

Item No. 4 - Storm Water Pollution Prevention Plan
This item shall include all equipment, materials, labor, inspections, supervision, regulatory coordination, public relations, and any incidental items that may be required for the design, installation and maintenance of the SWPPP, as required by applicable provisions of the Clean Water Act. Payment shall be on a lump sum basis.

Item No. 5 – Post Construction Plans
Contractor shall provide a copy of plans with whatever revisions they desire. Payment shall be on a lump sum basis.

Item No. 6 - Trenching and Laying Electrical Conduit – Los Arboles
Shall include all labor, materials, equipment, and incidentals required for installation of 4" electrical conduit by trenching up to 3' bury, including bedding, backfill, joint restraint, locate wire, warning tape, and fittings as shown on Drawings and Specifications. The unit price shall include all labor, materials, equipment and incidentals for hauling of materials and testing of materials and equipment before and/or after installation as required by specifications for entire project and costs associated with the installation. Payment shall be on a Linear Foot basis.

Item No. 7 - Assist with Excavation of Existing Transformer and Placement of New Splice Box – Los Arboles
Shall include all labor, materials, equipment, and incidentals required for removal of existing transformer and placement of new owner provided splice box as required by plans and specifications. The price shall include all labor, materials, equipment and incidentals for excavation around existing transformer. Payment shall be on a Lump Sum basis.

Item No. 8 - Remove and Replace Concrete Collar and Lid – Los Arboles
Shall include all labor, materials, equipment, and incidentals required for removal of existing broken 4' concrete ring and cover, and replacement with new concrete collar and lid as required

by plans and specifications. The price shall include all labor, materials, equipment and incidentals for removing and disposal of waste. Payment shall be on a Lump Sum basis.

Item No. 9 – Install Concrete Pad, Remove Existing Timber Beams and Replace to Existing Conditions, Install Service Panels and Hanging Lattice – Los Arboles

Shall include all labor, materials, equipment, and incidentals required for installation of new service panels and hanging lattice and accompanying concrete base, as well as removal of existing timber beams as needed for access and subsequent replacement to existing conditions, as required by plans and specifications. Payment shall be on a Lump Sum basis.

Item No. 10 - Remove Existing Junction Boxes

Shall include all labor, materials, equipment, and incidentals required for removal of existing junction boxes as required by plans and specifications. Payment shall be on a Lump Sum basis.

Item No. 11.1 - Remove and Dispose of Existing Electrical Components

Shall include all labor, materials, equipment, and incidentals required for removal of existing electrical components as required by plans and specifications. The price shall include all labor, materials, equipment and incidentals for hauling and disposal. Payment shall be on a Per Each basis.

Item No. 11.2 - Replace Electrical components

Shall include all labor, materials, equipment, and incidentals required for replacement of electrical components as required by plans and specifications. Payment shall be on a Per Each basis.

Item No. 12.1 - Remove and Dispose of Existing Mechanical Components

Shall include all labor, materials, equipment, and incidentals required for removal of existing mechanical components as required by plans and specifications. The price shall include all labor, materials, equipment and incidentals for hauling and disposal. Payment shall be on a Per Each basis.

Item No. 12.2 - Replace Mechanical Components

Shall include all labor, materials, equipment, and incidentals required for replacement of mechanical components as required by plans and specifications. Payment shall be on a Per Each basis.

Item No. 13 - Remove and Replace Existing Concrete Pad and Control Panel System - North Rd

Shall include all labor, materials, equipment, and incidentals required for installation of new owner provided control panel and accompanying concrete base and removal of existing control panel and accompanying concrete base as required by plans and specifications. The price shall include all labor, materials, equipment and incidentals for pouring of concrete and breaking, hauling, and disposal of waste. Payment shall be on a Lump Sum basis.

Item No. 14.1 - Manual Sewage Bypass - North Road

Shall include all labor, materials, equipment, and incidentals required for manual bypass of lift station at North Road while sewer line is out of commission. Payment shall be on a Lump Sum basis.

Item No. 14.2 - Manual Sewage Bypass - Los Arboles

Shall include all labor, materials, equipment, and incidentals required for manual bypass of lift station at Los Arboles while sewer line is out of commission. Payment shall be on a Lump Sum basis.

END OF SECTION

SECTION 101
GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 INCLUDED

A. Applicable codes, ordinances, rules and regulations, administrative requirements, coordination with Department of Public Utilities (DPU), easements, approved construction drawings, testing, inspection, contractor qualifications and acceptance of public utility infrastructure.

1.2 APPLICABLE CODES, ORDINANCES AND RULES AND REGULATIONS

A. Department of Public Utilities Rules and Regulation, Revised May 17, 2006

B. Los Alamos County Code of Ordinances, Chapter 16 Development Code

C. Los Alamos County Code of Ordinances, Chapter 40 Utilities

D. New Mexico Administrative Code, Title 14 Housing and Construction

E. 49 Code of Federal Regulations, Part 191

F. 49 Code of Federal Regulations, Part 192

1.3 CONTRACTOR QUALIFICATIONS

A. Licenses: Contractors performing work on new or existing public utility infrastructure shall be licensed by the State New Mexico Construction Industries Department.

1. GF-9 or GF-98: Required for gas, water and sewer work. Electric ductbank, vaults and pull boxes only (no installation or handling of wire, terminating, grounding etc.).

2. EL-1J: Required for electric overhead and underground distribution and transmission lines.
3. Pre approved Operator Qualification Plan and Drug and Alcohol program as applicable.

B. Specific training, certifications, qualifications, manufacturer certifications listed in the individual specifications required to perform work.

1.4 COORDINATION WITH DEPARTMENT OF PUBLIC UTILITIES (DPU)

A. Notification: The contractor shall notify all customers and the Department of Public Utilities 4 calendar days in advance of any service disruption due to work performed by the contractor. Contractor shall notify affected customers with a door hanger approved by the DPU.

B. Permits: A penetration permit issued by the DPU is required for all connections to an existing gas, water and sewer main. The contractor shall complete the permit and coordinate the work with the Engineering Department and the Gas/Water/Sewer

Department at least 48 hours before performing the work. The permit must be signed by the contractor, a representative of the Engineering Department and Gas/Water/Sewer Department 48 hours prior to performing work. If the work will impact or take place on a water transmission line, a representative of the Water Production department must sign the permit.

C. Functions performed by Department of Public Utilities (DPU).

1. Gas

a. Gas valves shall only be operated by DPU.

b. Connections to existing gas mains shall be performed by DPU or contractor personnel with applicable Operator Qualifications (OQ) and who are a member of an approved Drug and Alcohol Program in accordance with U.S. Department of Transportation Pipeline Safety Regulations. If approved prior to connection, DPU may directly supervise, with OQ qualified personnel, the contractor personnel making the connections.

c. DPU will provide materials and install residential service lines upon completion of service request form, approval of plans and payment of applicable fees.

d. DPU will connect service and install meter only after New Mexico Construction Industries Division inspection and approval is obtained.

2. Water

a. Water system valves shall only be operated by DPU staff.

b. Water utility meters will be provided and installed by DPU.

3. Sewer

a. Service connections to existing sewer mains shall be performed by DPU.

4. Electric

a. All primary terminations in the distribution system shall be completed by DPU unless otherwise stated in DPU approved plans.

b. DPU will provide and install electric meters.

c. DPU will provide materials and install residential service lines upon completion of service request form, approval of plans and payment of applicable fees unless otherwise stated in DPU approved plans.

d. DPU will connect service only after New Mexico Construction Industries Division inspection and approval is obtained.

1.5 APPROVED CONSTRUCTION DOCUMENTS

A. Construction drawings must be prepared by a Professional Engineer licensed in the state of New Mexico.

B. Construction drawings must be approved for construction by the DPU Engineering Department.

1.6 EASEMENTS

A. All public utility infrastructure shall be constructed in utility easements or right-of-way.

B. Easements and right-of-way shall be granted and filed in the office of the Los Alamos County Clerk prior to beginning construction.

C. Prior to construction all easements and right-of-way in which public utility infrastructure will be constructed must be staked by a Professional Surveyor licensed in the state of New Mexico.

1.7 TESTING, INSPECTION AND ACCEPTANCE OF INFRASTRUCTURE

A. All tests required in the individual sections of these specifications shall be completed by the contractor and at the expense of the contractor. Any infrastructure that fails a test must be corrected and retested until a passing test is achieved. All cost associated with correcting infrastructure that fails testing and all cost of re-testing is the responsibility of the contractor. Documentation of test shall be submitted to DPU.

B. DPU shall inspect all new public infrastructure. Contractor is responsible for coordinating the inspections with DPU. Improvements that are buried before DPU has inspected shall be exposed for inspection by the contractor and at the expense of the contractor.

C. Locate wire installed on new public infrastructure shall be verified for continuity as follows:

1. Contractor shall verify continuity with own equipment.

2. When contractor has verified all of tracing wire is continuous, contractor shall make arrangements through Project Manager to have Gas/Water/Sewer Department (GWS) staff verify the continuity of the locate wire.

3. Contractor shall demonstrate continuity, in the presence of DPU staff, by locating all newly installed facilities at all location points (test boxes, valves, hydrants, services, etc.) with own equipment while GWS staff verifies continuity with own equipment and verifies accuracy of as-built drawings.

4. Locations identified where no continuity is found shall be repaired by contractor.

D. Inspection fees as required by DPU and Regulations Fee Schedule, current version, shall be paid prior to beginning construction.

E. Acceptance of public infrastructure shall occur as follows:

1. Public utility infrastructure constructed as part of a new development shall be accepted in accordance with Los Alamos County Code of Ordinances, Chapter 16 Development Code, Section 16-238 Acceptance.

2. Public utility infrastructure constructed by a DPU capital improvement project by means of competitive bid shall be accepted when the terms of the construction contract associated with the work have been satisfied.

END OF SECTION

SECTION 102
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 WORK INCLUDED

A. Required submittals.

B. Submittal procedure.

C. Definition of submittal types for construction.

1.2 REQUIRED SUBMITTALS

A. Provide submittals as indicated in each specific specification section.

1.3 SUBMITTAL PROCEDURE

A. Review submittals prior to transmittal to determine and verify field measurements, field construction criteria, manufacturers' catalog numbers, and conformance of submittals with Contract Documents. To certify compliance with these specifications:

1. Routing Sheet provided in this section shall be attached to all submittals. Form must be completed in its entirety, signed and dated.

B. For any proposed deviation from the Contract Documents, submit a written request to the Project Manager.

C. Submit for review to Project Manager the following number of copies of submittals:

1. 2 Copies for Department of Public Utilities use.
2. Additional number of copies for Engineer and or Contractor use as determined by the Engineer/Contractor.
3. A digital file (Adobe PDF) may be submitted if the Engineer and County agree. Separate or non-affiliated items shall be submitted as separate digital files.

D. Submittal Clarity:

1. Contractors Submittal No. on the routing sheet shall be a successive numbering system.
2. Drawings shall be clear and legible.
3. Manufacturer's Literature: Submit a minimum of one original of all manufacturers' printed material. Remaining number of submittals may be reproductions. Reproductions of original material shall be clear and legible.

E. A partial submittal consists of only a portion of the total required for a project. This is acceptable when it is prudent to submit for review certain submittals before the remaining submittals are available. Submit all items concurrently for which,

due to coordination concerns, a simultaneous review is required. Include a separate Routing Sheet indicating the submittals transmitted with each numbered submittal package.

F. After review of the submittal package the "Action Code" will be indicated on the Routing Sheet and returned to the Contractor. Review of submittals will be indicated on each Routing Sheet by appropriate signature, stamp, and date. The number of copies of each submittal noted above for Los Alamos County use will be retained and the balance will be returned to the Contractor. The Contractor shall allow a minimum of 10 calendar days for return of submittals.

G. The Department of Public Utilities will utilize the following "Action Codes" to indicate the status of submittals resulting from the review, and the action required of the Contractor.

1. A - Reviewed. No comments.
2. B – Reviewed And Noted. Make corrections noted. Resubmission not required.
3. C – Reviewed And Not Accepted. Revise and resubmit.

H. Use a Routing Sheet with all resubmittals indicating each item's submittal number and type suffixed "R1" for the first resubmittal, "R2" for the second resubmittal, and so forth.

I. Do not fabricate products or begin Work that requires submittals before such submittals are approved.

1.4 DEFINITIONS OF SUBMITTAL TYPES FOR CONSTRUCTION

A. Calculations: The methods and results of calculations in documented form where specified.

B. Catalog Data: Standard printed information on materials, products and systems, which shows performance characteristics, dimensions, material of fabrication, and other characteristics necessary to assure conformity with the design requirements. Where other items or information not related to the work of this project are included in the literature submitted, the item(s) and/or information applicable to this project shall be clearly marked.

C. Certifications: A written statement, signed by a qualified party, attesting that items or services are in accordance with specified requirements. Typically, this written statement is accompanied by additional information to substantiate the statement.

D. Installation Instructions: Manufacturer's instructions, step-by-step if necessary, showing the field installation of parts, components, equipment, and other similar items.

E. Material List/Parts List/Design Mixes: A list of system or material components.

F. Performance Data/Curves: Performance data and/or curves for the proposed equipment to show compliance with contract documents.

G. Samples/Colors: Samples, including colors, of proposed materials.

H. Shop Drawings: Drawings necessary to show fabrication details to ensure compliance with contract documents.

I. Test Reports: Results of specified test requirements.

J. Wiring Diagrams: Drawings showing the point-to-point wiring of a piece of equipment or between pieces of equipment in a system.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

CONTRACTOR SUBMITTAL ROUTING SHEET
DEPARTMENT OF PUBLIC UTILITIES

PROJECT:	Contractor's Submittal No.: Date: Product Description:
CONTRACTOR:	Dates of any previous submissions:
Supplier:	Manufacturer:
Specification No.:	Drawing Nos.:
Are there any deviations to the contract documents? ☐ No ☐ Yes (explain and identify)	
CONTRACTOR'S CERTIFICATION: This submittal has been reviewed by the Contractor in compliance with the CONTRACT DOCUMENTS. Any deviations to the CONTRACT DOCUMENTS are identified above. If this is a resubmittal, any changes other than those specifically called for by the PROJECT MANAGER on previous submittals are specifically identified on the sheet(s) directly following this form. **Signed:** **Date:**	
LOS ALAMOS COUNTY ACTION	
Date Received:	No. Copies Received:
Date Returned:	No. Copies Returned:
A — REVIEWED for general conformity with DRAWINGS and SPECIFICATIONS. No comments, approved for construction. **By:** **Date:**	
B — REVIEWED AND NOTED for general conformity with DRAWINGS and SPECIFICATIONS. Make corrections as noted, resubmittal not required. **By:** **Date:**	
C — REVIEWED AND NOT ACCEPTED. Not in conformity with DRAWINGS and SPECIFICATIONS. Revise and resubmit. **By:** **Date:**	
PROJECT MANAGER'S COMMENTS, IF ANY:	

SECTION 103
COMPLIANCE REQUIREMENTS

PART 1 GENERAL

1.1 WORK INCLUDED

A. Erosion and Sediment Control

B. Site Stabilization

C. Spill Control and Response

D. Debris Control

E. Dust Suppression

F. Traffic Control

1.2 QUALITY ASSURANCE

A. Submit per Section 102 Submittal Procedures, manufacturer's data, materials certifications, certified seed mix, Storm Water Pollution Prevention Plan (SWPPP), erosion and sediment control best management practices, traffic control plans and applicable appurtenances to complete work in this section.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EROSION AND SEDIMENT CONTROL

A. General Requirements

1. Contractor shall supply, install and maintain all erosion and sediment control measures, stabilization and structural controls, and other protective measures through the use of Best Management Practices (BMPs) including silt fences, straw bales, compost socks, or other approved methods, prior to any earth disturbing activity. Standard Details, Section 7000 contains drawings for installation of BMPs.

2. Maintain BMPs in accordance with manufacturer's recommendations.

3. Disturb only the minimum amount of soil necessary. Contractor shall take suitable precautions to protect existing trees, shrubs and other natural vegetation during construction. Project Manager must approve any trees to be removed.

B. Projects Where Soil Disturbance Is Greater Than One Acre (SWPPP Required)

1. All provisions in subsection 3.1, A. General Requirements stated above apply.

2. Contractor shall prepare for review and acceptance by Project Manager a Storm Water Pollution Prevention Plan (SWPPP) in compliance with all requirements set by Environmental Protection Agency (EPA) National Pollution Discharge Elimination System for projects where soil disturbance is greater than one acre.

3. Contractor and County, as co-operators, shall each submit a Notice of Intent to the EPA Storm Water Notice Processing Center (http://cfpub.epa.gov/npdes/stormwater/enoi.cfm).

4. Contractor shall manage the SWPPP by supplying and installing all erosion and sediment control measures, stabilization and structural controls, and other protective measures through the use of Best Management Practices (BMPs) including silt fences, straw bales, compost socks, or other approved methods, prior to any earth disturbing activity.

5. Contractor shall conduct and document storm water inspections, maintain a soil disturbance log during construction and maintain records as required by EPA. Inspections shall be documented on the attached form provided on pages 5 and 6 of this section.

6. Contractor shall amend the SWPPP as required by EPA.

7. Contractor shall submit a Notice of Termination (NOT) following project completion and final stabilization, as defined by the EPA, is achieved.

3.2 SITE STABILIZATION

A. Contractor shall stabilize all disturbed areas with native perennial vegetation. Do not leave any disturbed areas as barren soil. After reseeding contractor shall provide and install degradable rolled erosion control product perpendicular to slope to provide long term erosion control without active maintenance.

B. Final stabilization shall be accepted by Project Manager.

C. Seeding application shall be per New Mexico State Highway and Transportation Standard Specifications for Highway and Bridge Construction 2000 Edition, Section 632 or latest. Seeding class shall be Class B.

D. Seed mix shall be from commercial supplier and be certified to be free of invasive species. Seed mix shall be delivered to site in a sealed packaging labeled with mix design from supplier. Seed mix as follows:

SEED MIX FOR ELEVATIONS 6,900 TO 7,500 FEET

SPECIES SCIENTIFIC NAME	SPECIES COMMON NAME	LBS SEED/ ACRE
Bouteloua Gracilis	Blue Gramma	3.0
Bromus Carinatus Var. Polyanthus	Foothills Brome	3.0
Elymus Trachycauldus	Slender Wheatgrass	4.5
Anropogon Gerardii	Big Bluestem	4.5
		Total 15.0

SEED MIX FOR ELEVATIONS 6,000 TO 6,900 FEET

SPECIES SCIENTIFIC NAME	SPECIES COMMON NAME	LBS SEED/ ACRE
Bouteloua Gracilis	Blue Gramma	4.5
Bouteloua Curtipendula	Sideoats Gramma	3.0
Pleuraphis Jamesii	Galleta	3.0
Schizachyrium Scoparium	Little Bluestem	4.5

		Total 15.0

3.3 SPILL CONTROL AND RESPONSE

A. In the event of a spill, contractor shall immediately notify all regulatory agencies having authority and the Los Alamos Project Manager. The Contractor shall be responsible for remediation of any spill and notifying all required agencies in compliance with all local, state and federal laws.

B. Store all fuels, lubricants, chemical storage, material stockpiles, and other potential pollutants in a designated area on-site. Provide secondary containment and controls including berming lined with an impervious material, covering, or other appropriate BMPs.

3.4 DEBRIS CONTROL & DISPOSAL

A. Use good housekeeping practices to keep sites free of construction debris and trash. Provide containers for deposit of debris and trash. Contractor is responsible for disposing of all waste materials generated from the construction including materials demolished, unsuitable excavated debris and construction debris. All materials shall be disposed in a lawful manner.

B. Do not drive or move any vehicle on any public road unless the vehicle is constructed, loaded, secured or covered in a manner that will prevent any of its load from dropping, shifting, leaking, or otherwise escaping.

C. Securely fasten all load covers to vehicles prior to driving on public roads so that the covering does not come loose or become a hazard to others.

D. Do not bury construction waste, sanitary waste, or trash on-site.

E. Concrete truck washout area shall be approved by Project Manager. If necessary, special provisions shall made by contractor if needed to protect property and the environment.

3.5 DUST SUPPRESSION

A. Contractor is responsible for supplying and applying potable water as needed for dust control throughout the project. Apply all liquids in a manner that does not result in runoff.

B. Commercial dust control products may be approved in a case by case basis.

C. Use means necessary to control dust on and near the work, and on and near off-site areas, if such dust is caused by the contractor’s operations during performance of the work, or if resulting from the condition in which the contractor leaves the site.

D. Thoroughly moisten surfaces as required to prevent dust being a nuisance to the public, neighbors, and personnel performing other work on the site.

3.6 TRAFFIC CONTROL

A. A temporary traffic control plan shall be prepared by the contractor for any work that will impact vehicular or pedestrian traffic. Contractor shall submit all traffic plans to the County Traffic Engineering Department for approval. Allow 10 working days for traffic plan approval. The County Traffic Engineering Department shall approve any proposed changes in the temporary traffic control plan.

B. Consider and address the safety of pedestrians in the Traffic Control Plan, and if altering pedestrian traffic, provide an alternate pedestrian route.

C. Traffic control devices shall be properly maintained and inspected daily during the project.

D. A Traffic Control Supervisor shall be designated and be available for call out 24 hours per day.

E. The Traffic Control Supervisor shall be certified in Work-zone Traffic Control.

F. Traffic Control Supervisor shall perform on site inspections of work zone twice daily and once nightly if traffic control devices will be in place during night hours.

G. Contractor is responsible for providing construction coordination to include a weekly log of daily inspections of barricade and maintenance schedules on projects that are over one week duration.

H. Traffic plans shall conform to the latest edition of the Manual of Uniform Traffic Control Devices (latest edition) and may be required to follow AASHTO safety recommendations.

I. Temporary Concrete Barriers must be used where open trenches are within 6 feet of driving lanes. End sections of the temporary concrete barrier must be angled away from the traveled way.

J. Traffic Control Devices shall be kept in a clean condition. Washing of equipment is incidental to its placement and maintenance.

K. Contractor is responsible for the obliteration of any conflicting striping and for any temporary striping.

3.7 DEMOLITION

A. Any person or contractor performing demolition on structures or appurtenance which have utility in the vicinity must contact and make arrangement with DPU to assess the impact on DPU infrastructure.

B. Upon review by the DPU, the person or contractor must pay by means of a back charge any cost associated with demolition that impacts any DPU infrastructure – either temporary or permanent - including but not limited to electric, gas, water or wastewater.

C. Person or contractor excavating as part of the demolition process shall contract NM811 in accordance with NM State Statues.

END OF SECTION

National Pollutant Discharge Elimination System (NPDES)
Storm Water Pollution Prevention Plan (SWPPP) Inspection Checklist
Los Alamos County Department of Public Utilities

Project Title: _____

Project Location: _____

Inspector/Inspection Date: _____

Weather

Current: _____

Last 24 Hours: _____

Date of Last Rainfall _____

Amount of Last Rainfall _____

Chemicals Stored On Site: _____

Method of Chemical Containment: _____

Soil Disturbance Log Status: _____

Assessment of Best Management Practices (BMPs)

Part A. Erosion Prevention - Note condition and corrective actions for deficiently applied BMPs

1. Construction Access – Trackout, Street Clean	☐ OK ☐ Deficient
2. Soil Stabilization - Signs of Erosion, Gullies, Slope Failures, Rills	☐ OK ☐ Deficient
3. Slope Protection – Plastic Condition, Grass Growing, Hydroseed Condition, Matting	☐ OK ☐ Deficient
4. Perimeter Control - Clearing Limits Marked, Silt Fences, Swales	☐ OK ☐ Deficient
5. Conveyances Stable – Ditches, Check Dams Intact, Sand Bags, Slope Drains	☐ OK ☐ Deficient

6. Temporary Erosion and Sediment Control Management - Revisions Required	☐ OK ☐ Deficient
7. Water Management - Infiltration, Clean/Dirty Water Separated, Offsite Water Bypassed	☐ OK ☐ Deficient
8. Outlet Protection – Stabilized	☐ OK ☐ Deficient

Part B. Sediment Control - Note condition and corrective actions for deficiently applied BMPs

1. Storm water Detention and Monitoring	☐ OK ☐ Deficient
2. BMP Maintenance	☐ OK ☐ Deficient
3. Inlet Protection	☐ OK ☐ Deficient
4. Dust Control	☐ OK ☐ Deficient
5. Spill Prevention	☐ OK ☐ Deficient
6. Condition of Discharge Water	☐ OK ☐ Deficient

Other/Continued Comments, Conditions, Corrective Actions, and Observations:

SECTION 104
UNDERGROUND FACILITIES STAKING REQUIREMENTS

PART 1 GENERAL

1.1 WORK INCLUDED

This standard provides the requirements for the construction staking of public utility infrastructure.

1.2 QUALITY ASSURANCE

Utility staking is contingent upon the completion of the following by the owner/developer:

A. Right-of-way and easements establishing legal access for new utility infrastructure shall be granted and filed in the office of the Los Alamos County Clerk prior to beginning construction.

B. Right-of way, easements, lot corners and lot boundaries shall be staked by a New Mexico Licensed Professional Surveyor when utility infrastructure will be constructed within or adjacent to an established legal boundary to prevent encroachments and ensure legal access to facilities is maintained.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. The contractor is responsible for completion and maintenance of all construction staking necessary to complete the work, consistent with standard survey practices.

B. Clearing and grubbing shall be completed prior to staking.

C. Staking utility infrastructure when grading has not been completed to final grades or final subgrade, stakes indicating grade cut or fills shall be place as necessary to ensure utility infrastructure will be constructed at the proper depth when final grading is complete. All infrastructure not installed to the proper burial depth due to lack of staking or incorrect staking shall be removed and replaced at the proper depth at the expense of the contractor.

D. Subgrade stakes: subgrade stakes are generally correct to within 0.2' which is sufficient precision to stake subgrade. However, care must be exercised when staking a utility location in that a greater degree of precision may be necessary.

E. The burial depths and tolerances specified or drawn elsewhere in these construction standards for each specific utility shall be met.

F. It is the contractor's responsibility to stake location and finished grade in all pertinent features, including but not limited to, roadways, curb and gutter, sidewalks, drainage structures, signage, retaining walls that are necessary for placement of utility components as specified.

G. Offset distance: a distance shall be selected which will ensure the protection of stakes during trenching. This distance is generally 10' to 15' to centerline of trench but may depend on site conditions. The stakes may be placed adjacent to the contractor's sub grade stakes if the offset distance is adequate, or may, in fact, be the same if so marked.

H. Stake interval: stakes will be placed as required in order to ensure that the trench will be properly aligned and at all utility components such as vaults, pedestals, transformers,

manholes, clean-outs, meter sets, fire hydrants, changes in direction, fitting location, valve location and other utility components that require to be placed at a specified location and depth. In no case shall staking intervals be less than 50'. The interval may have to be decreased to 25' or less on curves or where site conditions otherwise dictate.

I. Although the center location on small electric boxes and property line structures are normally adequate, in most cases, it will be necessary to stake two corners on the larger boxes. When a box is to be placed against the back face of a sidewalk or any other critical location, care must be exercised to ensure adequate precision in staking.

END OF SECTION

SECTION 201
CLEAR AND GRUB

PART 1 GENERAL

1.1 WORK INCLUDED

A. This work shall consist of clearing, grubbing, removing and disposing of vegetation and debris in accordance with the contract requirements and in compliance with these specifications. This work shall also include the preservation from damage or defacement of all vegetation and items designated to remain.

PART 2 PRODUCTS

2.1 Paint. Paint required for cut or scarred surfaces of trees or shrubs selected for retention shall be an approved asphalt base paint prepared especially for tree surgery and applied per the manufacturer's recommendations.

PART 3 EXECUTION

3.1 GENERAL

A. The Department of Public Utilities will establish construction limits and designate all trees, shrubs, plants, and other items that are to remain.

B. Project Manager must approve all trees to be cut.

C. All surface debris, trees, stumps, roots, organic matter and other objectionable protruding obstructions shall be cleared and grubbed as required.

D. Hazardous objects and unsightly debris within the construction limits shall be removed. Stump holes and other holes in this area shall be backfilled and compacted in accordance with Section 202 Excavation, Trenching and Backfill.

E. Timber felling and other operations shall minimize danger to traffic and damage to trees, vegetation and other items designated to remain, as well as those outside the clearing area.

F. All work operations Including dragging and piling of debris which may be damaging to vegetation shall be confined to approved areas devoid of vegetation, and shall be performed in accordance with all applicable laws, rules and ordinances.

G. Low hanging or unsightly branches shall be removed on trees or shrubs designated to remain only when approved by the project manager. Branches of trees extending over the right-of-way or easement shall be trimmed. All trimming shall be done by skilled workmen in accordance with good tree surgery practices.

H. Cut or scarred surfaces of trees or shrubs designated to remain shall be treated in accordance with subsection 2.1.

3.2 SALVAGEABLE TIMBER

A. When required by the contract, timber having commercial value shall be felled and cut into logs of the specified length in accordance with established logging practices. The logs shall be stacked along the right-of-way at points convenient for loading and shall be disposed of

as approved by the Project Manager.

3.3 REMOVAL AND DISPOSAL OF MATERIAL

A. Contractor is responsible for all labor, materials, equipment and permitting to remove and dispose of material off site.

B. Disposal shall be performed in accordance with all applicable laws and regulations and Section 103 Compliance Requirements.

C. Items designated to remain on the right-of-way, surrounding property, and vegetative cover shall not be damaged by this operation.

D. The right–of-way, easement and adjacent areas shall be left in neat and finished appearance.

3.4 BASIS OF PAYMENT

A. When clearing and grubbing is not established as a pay item the work will be considered incidental to the completion of the project and no separate payment will be made. The cost involved in obtaining disposal locations and in making the disposal will be considered incidental to the completion of the work and no measurement or direct payment will be made therefore.

END OF SECTION

SECTION 202
EXCAVATION, TRENCHING AND BACKFILL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section covers trenching and backfill requirements for buried gas, water and sewer piping systems, as well as electric and communication conduits.

B. This section also covers requirements for excavation and for compaction of succeeding layers after backfill has been placed around pipe, electric conduits, communication conduits, under manholes, surrounding manholes, under vaults, surrounding vaults, beneath equipment bases where detailed in drawings, as well as backfill associated with structures to be abandoned in place.

1.2 RELATED WORK

A. Section 301 Gas Systems

B. Section 401 Underground Ductbank Systems

C. Section 501 Sewer Systems

D. Section 502 Sewer Manholes

E. Section 601 Water Systems

1.3 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the general designation only.

B. American Society for Testing and Materials (ASTM) Publications:

D - 1557 Moisture-Density Relations of Soils and Soil Aggregate Mixtures

D - 2419 Sand Equivalent Value of Soils and Fine Aggregate

D - 2487 Classification of Soils for Engineering Purposes

C. State of New Mexico Excavation Law: Chapter 62, Article 14 NMSA 1978, 2001 Amendment, and all amendments in place at the time of construction.

1.4 QUALITY ASSURANCE

A. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted backfill material to the maximum dry density of the material as determined by the procedure set forth in ASTM Designation D1557 (Modified Proctor).

1.5 GENERAL REQUIREMENTS

A. EXISTING UTILITIES

1. The protection of active utility lines shown on the Plans or otherwise made known to the Contractor shall be the responsibility of the Contractor, prior to and during excavation. Active utility lines shown to be removed, retired, or abandoned in place shall be protected until the replacement utility lines are in place and ready to begin service or be otherwise activated. Any damaged utility shall be repaired or replaced

at the Contractor's expense. Potholing, as may be required to verify utility locations, shall also be the responsibility of the Contractor. Hand digging shall be performed at any time the excavation is within 18 inches of a live utility line per New Mexico Excavation Law. Contractor shall be responsible for contacting all utility companies and coordinating any work that requires relocation or abandonment of existing utilities.

2. Abandoned utility lines shall be cut and capped on both ends of the abandoned section.

3. If active utility lines are encountered and are not shown on the Plans or otherwise made known to the Contractor, promptly take necessary steps to assure no utility services are interrupted.

4. If any utility service is interrupted as a result of work under this section, immediately contact The Department of Public Utilities at 662-8333, or Police Dispatch at 662-8222, to restore service by repairing the damaged utility at Contractor's expense.

5. Existing utilities, whether or not shown on the drawings, and believed to interfere with the installation of permanent facilities being constructed under this contract, Contractor shall immediately send written notification to the Project Manager for direction.

6. Contractor shall not proceed with permanent repair or relocation of any existing utilities until written instructions are received from the Department of Public Utilities.

B. PROTECTION OF PERSONS & PROPERTY

1. Contractor shall install all necessary underpinning, shoring, lagging, cribbing, and bracing of ample strength to support adjoining soils, paving and structures. All such items shall be so constructed that they will not interfere with the building of any structural elements, and shall be removed upon completion of the work.

2. Contractor shall barricade open depressions and holes occurring as part of this work, and post warning lights on property adjacent to or with public access, all in compliance with County-approved traffic control plan.

3. Contractor shall protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations of Contractor.

4. Contractor shall install fences and barricades to secure the area from the public.

5. Contractor shall maintain access to areas adjacent to the project site(s) at all times.

6. Contractor shall maintain and/or replace all bench marks, monuments, construction stakes and other reference points. Any property boundary pins, survey monuments or survey benchmarks disturbed or damaged by the contractor shall be replaced at the expense of the contractor, by a surveyor licensed in the state of New Mexico.

7. Contractor shall repair or restore damage to any portion of the work resulting from movement of the sides or bottom of trenches or other excavation which is

attributable to the Contractor's acts or omissions, whether sides are braced or not.

C. SHORING

1. The Contractor shall be solely responsible for all bracing and shoring in compliance with all local, state and federal laws.

D. DEWATERING

1. Contractor shall remove all water, including rain water, encountered during trenching and substructure work to an approved location by pumps, drains, and other approved methods.

2. Contractor shall keep excavations and site construction area free from extraneous water.

E. DUST CONTROL:

1. Contractor shall use any and all means necessary to control dust on and near the work, and on and near off-site areas, if such dust is caused by the Contractor's operations during performance of the Work, or if resulting from the condition in which the Contractor leaves the site.

2. Thoroughly moistening surfaces as required to prevent dust from becoming a nuisance to the public, neighbors, and personnel performing other work on the site shall be the responsibility of the Contractor, throughout the construction period.

F. TRENCHING IN ROCK

Unless Trenching in Rock is specifically listed as a bid item, all trenching to be performed under this contract will be considered incidental to pipe, conduit, or ductbank installation. Excavation in Rock, as may be defined elsewhere in this contract, shall apply only to excavation other than trenching.

The Owner shall provide pertinent information to the contractor, following all appropriate subsoil investigations conducted on the project site, prior to project bidding. Contractor may, at contractor's expense, expand on the scope of such subsoil investigations.

Payment for trenching in rock shall be made in accordance with the specific bid item, and shall be adjusted only if quantities vary from those originally bid.

PART 2 PRODUCTS

2.1 BACKFILL MATERIALS

A. Backfill Materials are those materials placed in the trench between the bedding material to the top of the trench or to below specified base course under roadways or those material used to fill excavations for subsurface structures. On-site native material used as backfill shall be select material free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, frozen, deleterious, or objectionable materials, free of stones or lumps exceeding 3 inches in greatest dimension satisfactory to the Project Manager.

B. Soft, wet, plastic soils which may be expansive, clay soils having a natural in place water content in excess of 30%, soils containing more than 5% (by weight) fibrous organic materials, and soils having a plasticity index greater than 30 shall be considered unsuitable for use as backfill.

C. In the event that native materials not meet the requirements specified for bedding material or backfill, or if the specified field compaction cannot be obtained, contractor shall import suitable material at no additional cost to the owner.

D. The removal, hauling, and disposal of unsuitable material, such as rocks, pavement, concrete, demolished structures, debris, or other extraneous items shall be the responsibility of the Contractor, and shall be performed at no additional cost to the owner. Securing the site and coordinating with the respective agencies or disposal site owners shall also be the responsibility of the Contractor to do at no additional cost to the owner and in accordance with applicable environmental regulations.

2.2 PIPE BEDDING MATERIAL

A. Pipe bedding, a minimum 4 inches below bottom of pipe and six inches above the top of the pipe shall be permeable material with a maximum particle size of 0.5 inches in any dimension, with no sharp rocks. Portion passing No. 200 sieve shall be 50% maximum. Contractor shall provide a submittal for bedding material for approval by the Project Manager, prior to installing such bedding material.

2.3 TRENCHES ON PAVED SURFACES

A. Existing pavement surfaces shall be neatly saw-cut, removed and disposed of by Contractor in a lawful manner and at the Contractor's expense, as necessary for trenching operations to take place. Removed pavement or asphalt shall never be used as backfill. Paved surfaces shall be replaced upon backfilling the trench, in compliance with Los Alamos County Public Works Department Construction Standards. Asphalt and base course thickness shall be as detailed in plans, or at a minimum match existing concrete pavement or asphalt and base course section.

PART 3 EXECUTION

3.1 GENERAL TRENCHING AND EXCAVATING

A. Trenches may be excavated either by hand, or by machine. Trenches shall be cut with vertical sides, and shall be of sufficient width to provide adequate space for working therein. When applicable such space shall have adequate clear distance when shoring is used, so that pipe can be properly placed and aligned in conformity with the plans. Trench sides shall be parallel to and at equal distance from the center-line of the pipe, when aligned as shown on drawings.

B. Pipe trenches shall be excavated to a depth below the bottom of the pipe sufficient to provide for pipe bedding materials as required by Section 2.2.

C. Where a trench has been excavated below the designed grade, the bottom of the trench shall be refilled to proper subgrade with approved material well compacted in place, in an approved manner.

D. No more than 150 feet of trench shall be opened at any one time unless approved by the Project Manager.

E. If practical, no trench or holes shall be left open overnight. Use steel plating to protect open trenches overnight.

F. Excavation for thrust blocks shall be neat to the line and dimensions shown or called for on the plans.

G. Provide for dewatering trenches and excavations and subsequent control of ground water, utilizing such pumps or other equipment as may be necessary to control ground water and seepage until backfilling is completed.

H. The contractor shall remove and legally dispose of all excess excavated material and demolition debris.

3.2 GENERAL BEDDING

A. Utilities shall be laid on a layer of firm bedding material, per section 2.2 A, not less than four (4) inches in depth as shown or as noted on the plans and detail drawings. Compact as specified herein.

B. Upon completion of bedding operations and, prior to the installation of pipe or appurtenances, notify the Project Manager who will then inspect the bedding layer. Pipe laying shall not commence until the bedding has been approved. Upon completion of placement of 6" of bedding above pipe or conduit notify the Project Manager who will then inspect.

3.3 GENERAL BACKFILLING

A. Backfill shall be as shown on the plans. Place in 8-inch maximum lifts. Bring up evenly on each side, and for the full length of the structure. Ensure that no damage is done to structures or protective coatings thereon. Compact each loose lift as specified in Paragraph "General Compaction" before placing the next lift. Where unacceptable settlements occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation.

B. No backfill shall be placed until the line has been inspected and bedding approved.

3.4 GENERAL COMPACTION

A. Use hand-operated plate type vibratory or other suitable hand tampers in areas not accessible to larger rollers or compactors. Contractor shall avoid damaging structures, pipes and protective pipe coatings. Compaction shall be in accordance with the following unless otherwise specified. If necessary, the Contractor's selected equipment and construction procedure shall be altered, changed or modified in order to meet the specified compaction requirements.

B. Initial bedding shall be carefully packed under the haunches of the pipe and brought up simultaneously on both sides so as to prevent any displacement of the pipe from its true alignment. Backfill shall be compacted in layers not more than eight (8) inches in thickness in a manner that will preclude moving the pipe, to not less than 90%, and 95% within road right of ways, and as specified. Base course shall be compacted as required by roadway authority.

C. Backfill above the bedding shall be placed in loose lifts not exceeding eight (8) inches in thickness before compaction, and compacted by the use of pneumatic tampers or other mechanical means approved. Water or dry, as required, to bring the soils as close as

practicable to the optimum moisture content for proper compaction. Compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive displacement or may damage the pipeline will not be permitted.

D. Backfill will be inspected during placement. Backfill not compacted in accordance with these specifications shall be recompacted, or removed as necessary and replaced to meet specified requirements prior to proceeding with the work.

E. Contractor is responsible for protection and maintenance of work during construction and until the project is accepted. The contractor will not be paid an additional amount for such work.

F. Open excavations and backfilled trenches that have not been paved shall be protected from moisture that may sacrifice compaction or backfill quality. Base course or asphalt shall not be placed on subgrade or backfill that is visibly saturated. Saturated subgrade and backfill shall be removed, replaced, recompacted per these specifications and demonstrated to be in conformance with these specifications by testing performed by an approved testing laboratory at the expense of the contractor. Frequency and location of this testing will be determined by the Project Manager.

3.5 GENERAL BRACING AND SHORING

A. The Contractor shall furnish, place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; and to prevent damage to or adversely affect adjacent structures, facilities, landscaping, or pavement.

B. Upon completion of the work, all bracing and shoring shall be removed.

3.6 FIELD QUALITY CONTROL

A. Compaction test are required to be performed by a qualified material testing Laboratory provided by the Contractor and at the expense of the Contractor, and test results shall be provided to the engineer directly from the laboratory.

B. Definition of road prism in these specifications is all subsurface material directly below paving, sidewalk, curb, valley gutter, roadway islands, landscaping and bar ditches within a road right of way.

C. Compaction requirements and test schedule:

1. Trenches under road prism 95% compaction required for bedding and backfill. Minimum of one field density test for each compacted 12” layer of trench backfill for each 400 linear feet of trench.

2. Trenches crossings under road prism 95% compaction required. Minimum of one field density test for each 12” compacted layer of trench backfill at each trench road crossing.

3. Trenches not under road prism 90% compaction required. Minimum of one field density test for each 12” compacted layer of trench backfill for each trench less than 400 linear feet.

4. New manholes, pull boxes or vaults, 95% compaction required. Minimum of one field density test for each 12” compacted layer of backfill for each structure.

5. Manhole bases, pull box bases, transformer pads, vault bases and switch pads 95% compaction required. Minimum of one field density test of prepared subgrade.

D. If backfill has been placed, that is below the specified density, provide additional compaction with subsequent retesting until successful compaction is achieved at no cost to the owner.

3.7 DUST ALLEVIATION AND CONTROL

A. Contractor shall be responsible for and shall provide pollution and dust abatement and control measures satisfactorily during the course of the work. Water trucks shall be equipped with a directional spray nozzle.

3.8 FINISH OPERATIONS

A. Pipes shall be laid to finished grades indicated on the plans.

B. Contractor shall dispose of all surplus material or material unsuitable for filling or grading off the site in a legal manner at no additional cost to the owner.

C. Satisfactorily restore any existing improvements, paving, landscaping, and other utilities disturbed during the course of constructing the improvements.

D. Existing traffic markings and control devices damaged or disturbed during construction shall be replaced or repaired to the satisfaction of the Project Manager.

END OF SECTION

SECTION 205
ROCK AND BOULDER EXCAVATION

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, equipment and incidentals required and excavate and dispose of rock and boulders.

1.2 RELA TED WORK

A. Section 202 Excavation, Trenching and Backfill

1.3 DEFINITIONS

A. Rock: Any Large mass of stone, bedrock or ledge rock as determined by the Project Manager.

B. Boulder: Stone or boulders greater than eight (8) cubic-feet in volume.

C. Rock Excavation: The removal of solid rock or rock fragments greater than 1 cubic yard in volume which cannot be excavated with a standard backhoe, JD 410G or equivalent, with rock teeth, or which requires continuous, chemical expanders, jack hammering or other special procedures as determined by the Project Manager.

D. Boulders: The removal of stone or boulders greater than eight (8) cubic-feet in volume shall be classified as rock excavation.

PART 2 EXECUTION

2.1 ROCK EXCAVATION

A. Rock excavation may be performed by jack hammering, expansive chemical splitting, or other similar process.

B. Blasting shall only be used as final viable option after all other options are tried and only with written authorization by the Owner.

2.2 BOULDER EXCAVATION

A. Boulders and rock fragments may be reduced in size by rock excavation methods to simplify removal.

2.3 DISPOSAL OF ROCK AND BOULDERS

A. Rock and boulders may be crushed and screened for reuse in the work, provided that the resultant materials meet the requirements for backfill as specified in Section 202 Excavation, Trenching and Backfill.

B. Unused rock and boulders shall be removed and disposed of off-site in a legal manner.

END OF SECTION

SECTION 502
SEWER STRUCTURES

PART 1 GENERAL

1.1 WORK INCLUDED

A. Manholes, vaults and wet wells installed for the maintenance of gravity flow sewers, energy dissipaters, lift station wet wells, and lift station valve vaults, supplied and installed complete with frames, covers and doors, as well as other associated components.

1.2 RELATED WORK

A. Section 701 Cast-In-Place Concrete

B. Section 702 Grout

C. Section 501 Sanitary Sewer Systems

D. Section 503 Polyethylene Pipe for Sewer and Non-potable Water

E. Section 504 Sewer Flow Control

F. Section 505 Lift Station Equipment

1.3 REFERENCED STANDARDS

A. The publications listed below form a part of this specification. The publications are referenced in the text by their general designation only.

B. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections

C. ASTM A48-07 – Standard Specification for Gray Iron Castings

D. ASTM C923-07 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

E. ASTM D4101-07 - Standard Specification for Polypropylene Injection and Extrusion Materials

1.4 SUBMITTALS

A. Submit shop drawings and product data for manhole sections, mastic sealants, pipe to manhole/wet well/vault connections, steps and castings per Section 102 Submittal Procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Precast Manhole, Wet Well, and Valve Vault Sections

1. Precast manhole sections shall be constructed with concrete having a minimum 4,000 (psi) 28-day compressive strength and have a minimum wall thickness of 4 inches. Precast sections shall meet the requirements of ASTM C478. Pre-fabricated materials other than concrete, may be acceptable, upon written approval, by the Owner, as being equivalent. Contractor shall submit complete information, including costs, on any proposed material substitution for approval by the Engineer.

2. Lift station wet wells and valve vaults shall be constructed with concrete having a minimum 4,000 (psi) 28-day compressive strength. Minimum wall thickness shall be as indicated in drawings. Precast sections shall meet the requirements of ASTM C478.

B. Gaskets

1. Mastic sealing compound per FS SS-S-210. Approved products; Kent Seal No. 2 by Hamilton Kent; CONSEAL CS 102 by Concrete Sealants Inc.; Butyl-Nek by CRETECO; BUTYL-LOK by ALOK Products, Inc., or approved equal.

2. Flexible pipe to manhole/wet well/vault connectors per ASTM C923 with hardness of 40 plus or minus 5 per ASTM D2240 (shore A durometer). Approved products; Kor-N-Seal by NPC; Z-LOK by A-LOK Products, Inc.; PSX or Cast-A Seal by Press-Seal Gasket Corp.; TYLOX by Hamilton Kent; or approved equal.

C. Castings

1. Standard manhole cast iron frame and cover per ASTM A48. Minimum combined weight of frame and cover 325 pounds. Cover shall have vent hole, monolithic lifting rod and “SEWER” cast in cover, with letters 1 inch in height minimum. Approved products by Deeter Foundry, Inc.; Neenah Foundry Company; East Jordan Iron Works, Inc.; or approved equal.

3. Entry feature (door) for wet well or vault shall be as indicated in drawings.

PART 3 EXECUTION

3.1 FABRICATION

A. Manhole/Wet Well/Vault Section

1. Precast barrels, cone sections, base and cover.

2. Minimum inside diameter as indicated in drawings.

3. Manholes 6 feet deep and greater shall be provided with eccentric cones.

4. Manholes less than 6 feet deep shall be provided with flat concrete top slabs, unless specified otherwise elsewhere.

5. Step openings for co-polymer coated steel step placement cast in sidewall.

6. Keylock-type shall have pre-formed gaskets or mastic seal.

7. Manholes clear opening shall be 30 inches minimum unless otherwise shown in drawings. Wet well and vault clear opening shall be as indicated in drawings.

8. Drop, energy dissipating, or any other specialty manholes shall be as indicated on drawings.

B. Manhole/Wet Well/Vault Height Adjustment

1. Contractor shall use precast grade adjustment rings, 12 inches maximum total adjustment height above cone or flat top to top of casting.

C. Placing Precast Manhole/Wet Well/Vault Sections

1. Section joints shall be cleaned before applying mastic or gasket seal, completed structure shall be rigid and watertight.

2. Sections with chipped or cracked joints shall not be accepted.

D. Preformed Gaskets and Flexible Pipe to Manhole/Wet Well/Vault Seals

1. Shall be installed in conformance with manufacturer’s recommendations.

E. Interior Manhole/Wet Well/Vault Finish

1. Contractor shall remove excess mastic flush with precast sections, mortar in joints and penetrations flush with precast sections, and fill in any chipped areas with non-shrink grout.

2. Lift Station Wet Wells, Dissipating Manholes, and Manholes as indicated in drawings: Contractor shall complete surface preparation and apply finish in accordance with manufacturer’s recommendations. Preparation shall include concrete walls and floor and the interior surfaces of any non-aluminum or non-stainless steel entry feature such as manhole rings and covers, entry hatches, exposed pipe and conduit, etc. Testing for full coverage (spark test) is required per manufacturer’s recommendations.

3.

Approved Manufacturers:

a. ZEBRON 386, 100% solids polyurethane, 125 mils dry film thickness (DFT). ZEBRON Low Temperature poxy primer, 4-8 mils DFT. Color shall be Cream.

b. Sauereisen SewerGard No. 210, aggregate-filled epoxy, 1/8 inch thick DFT.

c. Polibrod 705 by Carboline, 125 mils DFT.

F. Manhole Invert

1. Construction shall conform to engineering drawings, with particular attention paid to elevations shown on drawings.

2. Concrete shall be placed in manhole's invert, to form a smooth transition.

3. Contractor shall invert shape to conform to radius of pipe it connects.

4. Contractor shall remove all rough sections or sharp edges which tend to obstruct flow or impede or cause material to snag.

G. Wet Well and Vault Invert/Floor

1. Construction shall conform to engineering drawings, with particular attention paid to elevations shown on drawings.

2. Concrete shall be placed in wet well and vault inverts, to form a smooth surface, and to accommodate sewage or drainage flows in accordance with engineering drawings.

3. Contractor shall remove all rough sections or sharp edges which tend to obstruct flow or impede or cause material to snag.

H. Drop Assemblies

1. Shall be constructed as shown on drawings with C-900 PVC or ductile iron pipe, both with gasketed fittings.

I. Pipe Stubouts for Future Connections

1. Where indicated in drawings stubouts shall be constructed from manholes/wet wells/vaults. They should connect to these structures, allowing a ell formed transition either at the inverts or walls, as shown on drawings.

2. Length and slope of stub-out shall be as shown on drawings.

3. Watertight temporary plug shall be laced in all stub-outs brace plug against blow-off.

J. Manholes over existing sewers

1. Base shall be built on site, around existing pipe, using 4,000 psi Portland cement concrete, per Section 701 - Cast-in-Place Concrete. Form tongue joint to match barrels for water tightness.

2. Wastewater flow shall be maintained in the affected lines at all times. Contractor shall obtain prior approval from Project manager, on the proposed method for maintaining continuous wastewater flow. Refer to section 504 Sewer Flow Control.

3. When breaking into an existing sewer manhole, its invert shall be reshaped, to provide for a smooth transition for the new flows. Care shall be taken to keep debris from entering the existing sewer.

4. Annular space between the new perforations and the new pipe shall be filled with non-shrink grout to ensure watertight conditions.

3.2 FIELD TESTING

A. Contractor shall coordinate the project manager's inspection of manhole/wet well/vault grout, invert, pipe penetrations, walls, steps, and coatings to verify their conformance with drawings and specifications.

B. Infiltration and Hydrostatic Testing

1. Structure shall be thoroughly hosed, from either the inside or the outside, with potable water.

2. No visible signs of water exfiltration (running or dripping) shall occur anywhere in or around the new structure.

3. Hydrostatic Testing shall be performed from an upstream manhole, for gravity flow lines, wet wells and vaults, when directed by the Project Manager, following the steps listed below:

a. Contractor shall plug all inlets and outlets.

b. Structure shall be filled with potable water, to ¾ height, or six inches above the highest joint.

c. Water shall be allowed to stand for a minimum of 24 hours.

4. Maximum leakage allowable shall be less than 0.2 gallons per hour for each foot of depth, in the 24-hour period following the beginning of the test.
5. Any structure that fails to pass the hydrostatic test shall be repaired by the Contractor at no additional cost to Owner.

END OF SECTION

SECTION 505
SEWER LIFT STATION

Part 1 GENERAL

1.1 WORK INCLUDED

A. Submersible pumps, controls, valves, piping, and other related accessories not specifically mentioned herein or noted on the plans, and which are incidental and necessary to complete the work and provide an operational lift station.

1.2 REFERENCES

A. Hydraulic Institute Standards

B. National Electric Code Standards

1.3 SUBMITTALS

A. Submit the following product data per Section 102 Submittal Procedures.

1. Performance curves, pump and motor.

2. Materials of construction.

3. Dimensioned pump outline drawings.

4. Lift station drawing for accessories.

5. Detailed electrical data.

6. Control drawings and data.

7. Access cover drawing.

8. Warranty.

9. Installation instructions.

B. Two copies of Operation and Maintenance Manuals.

C. Submit equipment manufacturer representative's certification that installation was completed in conformance with manufacturer's recommendations and is ready for use as intended as discussed in Part 3 herein.

1.4 WARRANTY

A. In printed form and apply to all similar units.

B. Five years or 10,000 hours under municipal permanent installation policy to include parts and labor.

C. Manufacturer's authorized warranty repair station within 150 miles of this installation; service station to have been appointed by the manufacturer at least three years prior to this project's Bid date and to have service trucks with cranes for jobsite service and factory trained and certified service mechanics and technicians.

D. Manufacturer shall certify repair facilities. Manufacturer's authorized repair station shall have $100,000 minimum inventory of repair parts including O-rings, bearings, mechanical seals, motor stator, power cable, grommets, and fittings to be supplied under this job.

E. The aluminum access frames and covers shall carry a guarantee of 10 years against defects in material and/or workmanship.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

E. Flygt, Barnes or DPU-approved equivalent.

F. All pumps specified in this section shall be made by same manufacturer.

G. Motor and pump shall be designed and manufactured by the same source.

H. Pump manufacturer shall have a minimum of 5,000 units of similar type pumps, installed and operating for no less than five (5) years in the United States.

2.2 PUMP MATERIALS

A. Volute, Impeller, Motor Housing, Discharge Elbow, and Other: Gray cast iron ASTM A-48, Class 35 B, with smooth surfaces devoid of blow holes or other casting irregularities.

B. Shaft:

1. AISI 431 Stainless steel up to 100 HP. Stainless steel sleeves covering shafting constructed of lesser materials are not acceptable.

C. Motor:

1. Rotor bars and short circuit rings: Aluminum.

2. Stator winding and lead insulation; Class H monomer free polyester resin.

D. Mechanical Seal: Tandem seals with all seal faces to be solid sintered tungsten carbide featuring a nickel binder to cement tungsten-carbide particles together during sintering.

E. Wear Rings: Required if C impeller scheduled.

1. Case wear ring; Nitrile rubber molded with steel ring insert.

2. Impeller wear ring on 20 horsepower or larger pumps; ANSI 304 SS.

F. Cutters:

1. Stationary Cutters- Hardened 316 “L” Stainless Steel.

2. Rotary Cutter- Chrome alloyed cast iron.

G. All exposed nuts or bolts are constructed of AISI type 304 stainless steel or brass and are protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish.

2.3 PUMP CONSTRUCTION

A. Water Tight Seal: Nitrile rubber o-rings against machined surfaces.

B. Sealing of the pumping unit to the discharge connection, guided by two guide bars extending from the top of the station to the discharge connection.

C. Cable Entry Design:

1. Seal: Torque-free mechanical compression type with strain relief (epoxies, silicones, or other secondary sealing not acceptable), single grommet-type to 100 HP.

2. Junction chamber to be sealed from motor by a non-hydroscopic, feed-through-type terminal board and elastomer compression seal.

D. Pump Motor:

1. Air-filled, squirrel-cage rotor, induction type, shell-type design, housed in air-filled watertight chamber.

2. Stator shall be insulated by trickle impregnation to achieve a minimum 95% winding fill factor using monomer-free, moisture-resistant, polyester Class H resin rated for 180º C(356º F) and heat shrink fitted into the stator housing. Designs requiring use of bolts, pins, or other fastening devices requiring penetration of stator housing shall not be acceptable.

3. Sensors:

a. Equipment shall have winding over-temperature switch in each phase. Set to open at a maximum of 140º C.

b. Thermal switches shall be set to open at 125º C (260º F) and embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection, and shall be connected to the control panel. At 125ºC (260º F) the thermal switches shall open, stop the motor and activate an alarm.

4. Combined service factor shall be 1.15 and rated for operation at 40º C ambient temperature.

5. Pump Motor: Connections between cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to the terminal board. Connections via wire nuts or crimping devices shall not be acceptable.

6. All sensors shall be NEMA B design.

7. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31.

8. The motor shall have a voltage tolerance of plus or minus 10%.

E. Motor Cooling System:

1. For pumps up to 10.5 HP: Provide thermal radiators integrally cast into stator housing.

2. For pumps larger than 10.5 HP: Provide cooling jacket to allow circulation of pumped media or propylene glycol around motor housing.

F. Pump Shaft:

1. Rotates in two permanently lubricated ball bearings for pump sizes up to 100 HP.

a. Upper bearing shall be single-row deep groove ball bearing up to 100 HP.

b. Lower bearing shall be a two-row angular contact ball bearing up to 100 HP.

2. Completely isolated from pumped liquid.

3. Pump and motor shaft are the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable.

G. Minimum ABMA L10 Bearing Life: 50,000 hours at any point on head-capacity curve.

H. Mechanical Seals: Each pump is provided with a tandem mechanical shaft seal system consisting of two seal assemblies. The seals operate in a lubricant reservoir using FDA-approved, non-toxic paraffin oil, that hydro dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, contains one stationary and one positively driven rotating ceramic ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing contains one stationary carbon seal ring and one positively driven rotating ceramic seal ring. Each seal interface is held in contact by its own spring system. The seals require neither maintenance nor adjustment, nor depend on direction of rotation for sealing. The position of both mechanical seals depends on the shaft. Mounting of the lower mechanical seal on the impeller hub is not an acceptable method. The following seal types shall not be considered acceptable nor equal to the dual independent seal specified: shaft seals without positively driven rotating members; conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing will be used. Each pump is provided a lubricant chamber for the shaft sealing system, designed to prevent overfilling and to provide lubricant expansion capacity. Drain and inspection plug for this chamber will have a positive anti-leak seal, and shall be easily accessible from the outside. Seal system shall not rely upon the pumped media for lubrication. The motor shall be able to operate dry without damage while pumping under load.

I. Impeller As scheduled:

1. N-type impeller: Dynamically balanced, semi-open, multi-vane, back-swept, non-clog with vanes of screw-shaped leading edges, RC45 hardness, self-cleaning by shearing action from grooves in the volute.

2. C-type impeller: Double shrouded, non-clogging design with long throughlets without acute turns.

3. M-type impeller: Semi-open, multi-channel impellers with integral grinder cutter in a single volute casing for liquids containing solids and fibers.

4. Impeller coating: Acrylic dispersion zinc phosphate primer or Alkyd resin primer.

J. Volute - As scheduled:

1. N-impeller: Volute bottom design shall be of sharp, spiral shaped grooves integrally cast into the suction side of the volute. Clearances shall be adjustable for wear.

2. C-impeller: Volute with non-concentric design, and smooth passage ways, large enough to pass any solids entering the impeller.

3. Volutes shall be constructed from a single-piece gray cast iron, Class 35B.

K. Each pump shall be equipped with submersible power cable to be:

1. Sized according to NEC and ICEA Standards.

2. Meets P-MSHA Approval.

3. Have at least 3 power leads, a ground lead, and a ground check lead.

4. Oil-resistant, chloroprene rubber jacket.

5. Long enough to reach the control box without the need of any splices.

L. Sliding guide bar bracket to be integral part of pump unit to guide on at least two rails. No portion of the pump or guidance system shall bear on the sump floor.

M. Discharge pump/elbow connection seal to be metal to metal. Diaphragm or O-ring type seals are not acceptable. Critical mating surfaces, where watertight sealing is required, shall be machined and fitted with Nitrile rubber O-rings. Fittings are the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides, without the requirement of a specific torque limit. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. Secondary sealing compounds, elliptical O-rings, grease or other devices are not used.

N. Bearings- The pump shaft rotates on two bearings. Motor bearings are permanently grease-lubricated. Sleeve or single row lower bearings are not acceptable and are not used.

2.4 PERFORMANCE

A. Pump Motor:

1. Non-overloading throughout pump curve.

2. Capable of fifteen evenly spaced starts per hour.

3. Capable of running dry indefinitely without damage.

4. Capable of continuous operation unsubmerged or under continuous submergence, to a depth of 65 feet without lose of watertight integrity.

5. Motors for use in NEC/500/501 hazardous areas and shall be FM, UL, or CSA listed for use in the area specified.

6. Designed for continuous duty handling pumped media of 40º C (104º F).

7. Motor horsepower is adequate so that each pump is non-overloading throughout the entire pump performance curve, from shut-off through run-out.

8. Power cable is capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.

2.5 PROTECTIVE COATING

A. Pump Exterior: Acrylic dispersion zinc phosphate primer with polyester resin paint finish.

B. Impeller: Acrylic dispersion zinc phosphate primer.

2.6 ACCESSORIES

A. Furnish the following accessories associated with pump installation. These accessories shall be furnished by the pump manufacturer and shall be provided for each pump:

1. 304 SS Upper and intermediate guide bar brackets.

2. 304 SS Safety chain hook.

3. 304 SS Cable holder.

4. 304 SS Cable support grips for motor cables and float cables.

5. 304 SS Anchorage.

6. Grip eye lifting system.

7. 304 SS Lifting chain, eye bolts, shackles, and anchor bolts for the discharge elbows.

8. Guide bars shall be of 304 SS pipe, size ¾ inch Schedule 40. The guide bars shall not support any portion of the weight of the pump.

9. Wet well access cover, when specified.

10. Pump hoist support mount.

B. Wet Well and Valve Vault General Work/Standards/Submittals, Products, Execution and Field Testing shall be according to Section 502 SEWER STRUCTURES.

1. Wet Well Interior Manhole Finish

a. Remove excess mastic flush with precast sections. Mortar in joints and penetrations flush with precast sections and fill in any chipped areas with non-shrink grout.

b. Finish for lift station wet wells shall be applied in accordance with manufacturer's recommendations. Spark test required. Inside of CI ring and cover shall be coated. Exposed pipe and conduit shall

be coated. The inside of an aluminum or stainless steel cover shall be protected from interior coating.

Approved Manufacturers:

1) Zebron 386, 100% polyurethane, 125 mils DFT, Zebron low temperature Epoxy primer, 4-8 mils DFT, surface preparation per manufacturer's recommendations, cream color

2) Sauereisen SeverGard No. 210, 1/8 inch aggregate epoxy

3) Polibrid 705 by Carboline, 125 mils DFT

2. Wet Well and Valve Vault Access Cover

a. Materials: Structural aluminum cover and frame.

b. Hardware: Stainless Steel, equipped for padlock use.

c. Rail incorporated in frame.

d. 300 pounds per square foot rated or H-20 rated whichever is specified.

e. Size: Actual clear openings as recommended by pump manufacturer for the pumps being installed in wet well or as shown on contract documents.

f. Approved Manufacturers:

1) Flygt

2) USF Fabrication, Inc, Hialeah, FL

3) Halliday Products, Orlando, FL

4) Engineer approved equivalent

g. The access cover's frame shall be securely placed, mounted directly above the pumps. Doors shall be constructed of skid proof design, provided with stainless steel hinges and stainless steel fasteners. The doors shall open to 90 degrees and lock automatically in that position with a stainless steel positive locking arm and stainless steel release handle.

h. Door opening shall be spring assisted and equipped with a

stainless steel lifting handle and stainless steel locking bar. The access covers for pumps shall be furnished with an attached nut rail for the upper guide bar brackets.

i. The wet well access cover shall include a fall-safe hatch feature designed to combine-covering of the hole per OSHA 1910.23 standard and fall through protection and controlled confined space entry. Aluminum grating shall be designed to withstand a minimum live load of 300 pounds per square foot, with a maximum deflection of 1/150th of the span. Aluminum safety grate openings shall be 5" x 5".

1) The safety grate opening arm shall also be equipped with a controlled confined space entry locking device (lock provided by others). Welding shall be in accordance with ANSI/AWS D1.290 Structural Welding Code for aluminum.

2) Design of the system must ensure that fall-through protection is in place after the door has been closed, thereby protecting the next operator.

B. Grip Eye Lifting System: Each submersible pump shall be furnished with one complete lift-chain positive recovery system consisting of the following components:

1. Pumps designed to automatically and firmly connect to the discharge connection, guided by two guide bars extending from the top of the station to the discharge connection.

2. Chain Sling: Continuous stainless steel chain (length as required for adequate slack) of high tensile strength, attached to lifting eye of pump. Stainless steel chain sized as required for hoisting the full weight of the pump, or 3/16 inch in diameter, whichever is more. Upper end of chain shall connect to safety chain hook under access cover.

3. A forged "grip eye" of wrought alloy steel, provided separately to connect to the end of the lifting cable or chain of the pump lift hoist.

4. A stainless steel shackle as part of the chain sling for connecting to the pump handle.

D. Ball Check Valves: Furnish and install non-clog Flygt HDL, or approved equivalent ball check valves, unless otherwise specified in these contract documents. Valves shall be installed inside cast-in-place, or pre-cast concrete valve vault. See Sewer Structures, Section 502 for more specific details. The ball valve shall consist of three components with only one moving part: body, cover, and ball. The ball shall clear the water way providing "full flow" equal to the nominal size. The ball shall be hollow steel with an exterior coating of nitrile rubber, it shall be resistant to grease, petroleum products, animal and vegetable fats, diluted concentrations of acids and alkalines (pH 4 –10), tearing and abrasion. Valve body and cover shall be of gray cast iron, Class 35. Flange drilling shall be according to ANSI B16.1, Class 125.

E. Mix-flush system capable of cycling for a period between 20 seconds and 50 seconds. Materials will be cast iron for valve body, ball bearing steel for ball and nitrile rubber for membranes. Mix-flush manufacturer and pump manufacturer shall be the same.

F. Pressure sensor Cla-Val full port design, accurate pressure instrument protection, one wetted part with local readout.

G. Plug valves: DeZurik PEC, or approved equivalent, eccentric-type with manual lever actuator.

H. Submersible pressure transducer- Series 700, KPSI Transducer

I. Floats for back-up (2 each) shall be Flygt Model ENM-10, or approved equal.

2.7 CONTROLS

A. Supplied by pump manufacturer or pump supplier.

B. Control panel type: Duplex-pump control panel as manufactured by EG Pump Controls, Inc., Jacksonville, Florida, or approved equal.

C. One (1) year warranty on all components.

D. Primary wet well level control with submersible pressure transmitter. This level transducer shall incorporate the following features: isolated diaphragm sensor, designed for use in a wastewater environment with hostile fluids and gases; and a silicon pressure cell that has been fitted into a stainless steel housing with an integral, compliant stainless steel barrier diaphragm. The level transducer shall have a static accuracy of +/-1% FSO BFSL (Full Scale Output, Best Fit Straight Line) and shall be certified intrinsically safe for hazardous locations. Construction shall be of welded 316SS. Submersible transducer shall be KPSI Model 700, or approved equivalent.

E. Control Panel Security Enclosure: Enclosure shall be NEMA 3R fabricated from 14 gage stainless steel. Panel shall include gasketed outer door, stainless steel hardware, removable back panel and dead front inner door fabricated from 0.080 Marine alloy aluminum.

F. Panel to include provisions for two (2) back up wet well level control floats, Flygt Model ENM-10, or approved equal.

G. The pump controller shall utilize a microprocessor with a digital display to program and alternate up to three (3) pumps with high and low level alarms. The controller shall utilize at a minimum a 14 Bit analog input. The controller shall supply a 4-20 mA DC output signal. The 4-20 mA DC output signal shall be programmable from the front of the panel. The controller shall be an EG Controls Digigage or approved equivalent.

H. Two NEMA Size I (minimum) starters, rated for motor horsepower and 10 million full load electrical operations.

I. Two heavy duty E frame thermal magnetic circuit breakers shall be equipped with trip test button for short circuit protection. Two overloads, ambient- compensated, with external reset buttons mounted on hinged dead front panel. Set main power and ground lugs. Control transformer for 120 VAC primary and 24 VAC secondary.

J. Two circuit breakers for pumps and one for control power circuit.

K. Main circuit breaker disconnect interlocked with panel door.

L. Panel to include lightning/surge protection: A lighting/surge arrestor shall be provided at the service entrance to the control panel. The unit shall be of the solid-state type and be able to clamp in five (5) nanoseconds and absorb up to 25 KA peak surge current during an occurrence. The unit shall have a surge life expectancy of 10,000 occurrences at 200 amps.

M. Panel to include three-phase monitor relay connected to the incoming side of the power input terminals. Phase monitor shall be manufactured by Diversified, or approved as equal.

N. Panel to include a duplex alternator relay manufactured by Diversified, or approved equal.

O. Panel equipped with an external Bryant (or approved equivalent) generator receptacle, with transfer switch, to connect an emergency generator set. Generator set specifications are not part of these contract documents.

P. Panel equipped with one motor amp load meter for each pump.

Q. Panel to include time delay function on lag pump start.

R. All control circuits, including pilots and contactors, shall operate on 120 VAC.

S. Panel shall have switched light in panel for night visibility.

T. Any floats shall operate on 24 VAC.

U. Inner door shall include 2 x Hand/Off/Auto (HOA) switches, 2 x pump running green pilot lights, 2 x red pump fail pilots (lights shall be "push-to-test" type or a separate pilot light test circuit shall be provided), 2 x 6 digit elapsed time meters, 1 x alarm silence push button, and 2 x overload reset push buttons.

V. Condensation heater with thermostat shall be installed inside the control panel.

W. One heavy duty Ground Fault Interrupting (GFI) receptacle shall be installed on the interior panel cover of the enclosure. One fluorescent light fixture with integral switch shall be mounted inside the enclosure between the outer door and inner operating panel to allow work on the panel at night.

X. High level shall be indicated by a NEMA 4X red lexan flashing alarm light mounted on the top and one side of the enclosure respectively.

Y. Normally closed, dry, 5 amps at 120V ac contacts for remote indication:

1. High level alarm
2. Pump failure (temperature or moisture alarm)
3. Pump overload
4. Power ail

Z. UL listing mark.

AA. Prewired and factory tested.

BB. All level control wiring shall be specially labeled as to function.

CC. Complete schematics and connection diagram shall be furnished, including single copy in panel inner door.

DD. The control panel shall start pumps step-wise on rising level and stop pumps simultaneously at low level.

EE. All electric components shall be NEMA standard.

PART 3 EXECUTION

3.1 INSTALLATION

A. Pumps shall be installed in compliance with the manufacturer's recommendations.

B. The installations shall be level, plumb, and accurate pump alignment to produce leak-proof pump connection which allows easy removal without entering wet well.

C. No splices shall be allowed in power cable.

D. All fasteners and miscellaneous steel in or exposed to the interior of the wet well or valve vault shall be stainless steel to avoid corrosion and adequately sized and manufactured for the required strength.

3.2 REQUIRED SUPPORT BY FIELD SERVICE REPRESENTATIVE

A. Qualified Field Service Representative (FSR) shall be available throughout the installation and start-up period, and furnish written report to the Department of Public Utilities, certifying that equipment was properly installed, fully functional, ready for use, and is operating as intended.

B. FSR shall provide up to 8 hours of training to Owner's personnel on operation and maintenance as part of the installation at no additional cost to Owner.

3.3 SCHEDULE

A. Submersible Pumps: (2) NP-type Model 3102-3H-256 Flygt, Barnes equivalent OAE.

END OF SECTION

SECTION 701
CAST IN PLACE CONCRETE

GENERAL

1.1 WORK INCLUDED

A. Formwork, shoring, bracing, anchorage, reinforcing, and accessories for cast in place vaults and manholes.

B. Concrete sidewalks, drive pads, curb and gutter, and median pavement.

C. Concrete utility pads, thrust blocks, valve box collars, manhole cover collars, and fence posts.

D. Control, expansion, and contraction joint devices associated with concrete work.

1.2 RELATED WORK IN OTHER SECTIONS

A. Section 401 Underground Ductbank Systems

B. Section 502 Sewer Manholes

C. Section 601 Water Systems

D. Section 702 Grout

1.3 DEFINITIONS

A. Reinforced concrete is structural concrete reinforced with no less than the minimum amounts of steel reinforcement specified in ACI 318.

B. Plain concrete is structural concrete with no reinforcement or with less reinforcement than the minimum amount specified for reinforced concrete.

1.4 REFERENCES

A. Publications noted in these specifications shall form a part of these specifications to the extent referenced. The publications are referred to in the text by the basic designation only.

B. New Mexico Department of Transportation (NMDOT) Standard Specifications for Highway and Bridge Construction including any Supplemental or Interim Specifications.

C. All concrete work, products, and materials conform to ACI 301 and other specific referenced publications and standards except where otherwise specified herein.

D. Where reference is made to publications and standards, the revision in effect at the time of bid opening shall apply.

1.5 SUBMITTALS

A. The contractor shall submit the following to the Project Manager, in accordance with Section 102 Submittal Procedures:

- Design mix of concrete: A request for approval of the concrete mix design shall be submitted to the Project Manager thirty (30) days minimum prior to concrete placement. Submit a mix design for each strength and type of concrete for approval. Each request shall be made in writing with a cover letter exhibiting the company name of the testing laboratory, company address and telephone number, and the signature and stamp of the New Mexico Professional Engineer responsible for work.
- Laboratory test reports for each design mix.
- Batch Tickets.
- Shop Drawings: Indicate bar sizes, spacing, locations and quantities of reinforcing steel and welded wire fabric, bending and cutting schedules, supporting and spacing devices, spacing and location of dowels, and spacing and location of water stops.
- Product Data: Provide data on joint devices (sealer and filler), attachment accessories, admixtures, rebar doweling anchorage, epoxy bonding compound, and water stops.
- Test reports of concrete field testing per Section 3.10, Field Quality Control.

1.6 QUALITY ASSURANCE

A. Contractor shall perform Work in accordance with ACI 301, 318, and 347, CRSI 63 and Manual of Practice, ANSI/ASTM A184.

B. The work shall be subject to inspection at all times by the Owner for the purpose of determining that the work is properly executed in accordance with this specification. Failure to detect defective workmanship or material during any interim inspection shall not constitute acceptance of workmanship and materials.

C. Work shall conform to ACI 305R when concreting during hot weather, as well as ACI 306R when concreting during cold weather.

D. Independent Testing Agency Qualifications shall be approved by the Department of Public Utilities, qualified according to ACI 301, ASTM C 1077 and ASTM E 329 for testing indicated.

1.7 DELIVERY, STORAGE AND HANDLING

A. Contractor shall not deliver concrete until vapor barrier, forms, reinforcement and embedded items are in place and ready for concrete placement. Job site storage of materials shall be in accordance with ACI 301, and contractor shall protect materials from contaminants such as grease, oil, and dirt.

B. Reinforcement: Contractor shall store reinforcement of different sizes and shapes in separate piles on racks raised above the ground in order to avoid excessive rusting. Reinforcement material shall be protected from contaminants such as grease, oil, and dirt. Contractor shall ensure bar sizes can be accurately identified after bundles are broken and tags removed.

PRODUCTS AND MATERIALS

1.1 FORM MATERIALS AND ACCESSORIES

A. Smooth-Formed Finished Concrete shall be constructed using form-facing panels that provide continuous, true, and smooth concrete surfaces. Forms shall be furnished in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

a. Metal form surfaces shall not contain irregularities, dents, or sags.

2. Prefabricated forms.

a. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Form Ties: Contractor shall use snap off type, galvanized metal cone type with waterproofing washer free of defects that could leave holes or gaps larger than 1 inch in concrete surface.

C. Form Release Agent: Colorless mineral oil, which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

D. Corners: Chamfered, wood strip type; ¾ x ¾ in. size where indicated in drawings.

E. Nails, Spikes, Lag Bolts, Through Bolts, and Anchorages: Sized as required and of sufficient strength and character to maintain formwork in place while placing concrete.

1.2 REINFORCING AND ACCESSORIES

A. Reinforcing Steel: ASTM A 615, grade 60 deformed bars and stirrups; ties grade 40.

B. Welded Steel Wire Fabric: ASTM A 185 Plain type in flat sheets.

C. Concrete reinforcing shall be fabricated in accordance with CRSI Manual of Practice.

D. Welding of reinforcing bars is not permitted.

E. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions, including load bearing pad on bottom to prevent vapor barrier puncture. Special chairs, bolsters, bar supports, and spacers adjacent to weather exposed concrete surfaces shall be plastic coated steel type of required size and shape.

F. Tie Wire shall be minimum 16 gage annealed type.

1.3 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I or Type II.

B. Fine and Coarse Aggregates: Shall conform to ASTM C 33.

C. Water: Clean, potable water that is not detrimental to concrete.

D. Fly Ash: Shall conform to ASTM C 618, type F. Fly ash.

1.4 ADMIXTURES

A. Air Entrainment: Shall conform to ASTM C260.

B. Chemical: Shall conform to ASTM C494.

1.5 ACCESSORIES

A. Bonding Agent: Polymer resin emulsion.

B. Vapor Barrier: 6 mil clear polyethylene film of type recommended for below grade application.

C. Joint Filler: ASTM D 1751; asphalt impregnated fiberboard or felt, 1/4 in. thick.

1.6 CONCRETE MIX

A. STANDARD MIX DESIGN

1. The standard mix design for the Department of Public Utilities shall contain from 20% to 30% by dry weight of total cementitious material Type F fly ash conforming to ASTM C 618 for mitigating the deleterious effects of alkali-silica reaction in concrete that is common with the silicious nature of aggregates found in northern New Mexico.

B. The compressive strength required for the various applications is indicated on the standard detail for the work. Contractor shall provide concrete that meets the following criteria:

1. 4,000 psi exterior concrete exposed to freezing and thawing.

a. Compressive strength, f'_c: 4,000 psi @ 28 days.

b. Maximum nominal aggregate size: 0.75 inch.

c. Maximum water / cement ratio: 0.44.

d. Slump: 3 inches plus or minus 1 inch tolerance.

e. Air content: 4 to 6 percent.

2. 3,000 psi exterior concrete exposed to freezing and thawing.

a. Compressive strength, f'_c: 3,000 psi @ 28 days.

b. Maximum nominal aggregate size: 0.75 inch.

c. Maximum water / cement ratio: 0.44.

d. Slump: 3 inches plus or minus 1 inch tolerance.

e. Air content: 4 to 6 percent.

C. Contractor shall use accelerating admixtures in cold weather only when approved by the Project Manager. Use of admixtures will not relax cold weather placement requirements.

D. Contractor shall use set retarding admixtures during hot weather only when approved by the Project Manager.

EXECUTION

3.1 GENERAL

E. All concrete construction shall conform to applicable provision of ACI 301 unless otherwise specified herein.

3.2 EXAMINATION

A. Contractor shall verify the following:

a. Lines, levels, block-outs, and centers before proceeding with formwork. Contractor shall ensure that dimensions agree with the Drawings.

b. Anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

c. Erected formwork, shoring, and bracing is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

d. Concrete cover for reinforcement conforms to the drawings and to Section 3.4.B herein.

3.3 FORMWORK ERECTION

A. Formwork, shoring and bracing shall be erected to achieve design requirements and maintain tolerances in accordance with requirements of ACI 301 and ACI 347.

B. Bracing shall be installed to ensure stability of formwork. Contractor shall shore or strengthen formwork subject to overstressing by construction loads.

C. Form joints shall be properly aligned, made watertight and kept to a minimum.

D. Installation shall provide formed openings where required for items to be embedded in or passing through concrete work.

E. Contractor shall locate and set in place items that cast directly into concrete.

F. All accessories shall be installed in accordance with manufacturer’s instructions, straight, level, and plumb. Items shall not be disturbed during concrete placement.

G. Where required, water stops shall be continuous without displacing reinforcement.

H. Forms or bracing shall not be removed until concrete has gained sufficient strength to carry its own weight and other imposed loads without excessive deflection or creep. Shoring under elevated slabs shall remain in place for at least 7 days after concrete is placed.

I. Forms shall be carefully loosened without the use of pry bars, hammers, or tools against finish concrete surfaces that are scheduled to be exposed.

3.4 REINFORCING PLACEMENT

A. Contractor shall place, support, and secure reinforcement against displacement and shall not deviate from required position

B. Minimum concrete cover around reinforcing shall be as follows:

Item	Minimum Cover, inches
Formed Concrete Surfaces Exposed to Earth, Water, and/or Weather:	
No. 5 bars and smaller, W31 or D31 wire and smaller	2
No. 6 through No. 18 bars, W45 or D45 wire	2
Footings and Base Slabs:	
At formed surfaces	2
At unformed surfaces and bottoms in contact with earth	3
Top of footings	2

C. PREPARATION

1. Previously placed concrete shall be prepared by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

3.6 PLACING CONCRETE

A. Concrete shall be placed in accordance with ACI 301.

B. Contractor shall notify the Project Manager a minimum of 24 hours prior to commencement of concreting operations.

C. Reinforcement, inserts, embedded parts, formed joint fillers, joint devices, water stops, and formwork shall not be disturbed during concrete placement.

D. Joint fillers, primer, and sealant shall be installed in accordance with manufacturer’s instructions.

E. Joint filler shall extend from bottom of slab to within 0.25 inch of finished slab surface.

F. Joint devices shall be installed in accordance with manufacturer’s instructions.

G. Concrete shall be placed continuously between predetermined expansion, control, and construction joints.

H. Screed floors on grade level, maintaining surface flatness with maximum level variations of 0.25 inch in 10 feet.

I. …

3.7 CONCRETE FINISHING

A. Formed concrete surfaces shall be left exposed with smooth rubbed finish.

B. Broom finish shall be performed on exterior sidewalks, vault tops, valve collars or other areas subject to pedestrian or vehicular traffic.

C. Concrete floor surfaces shall be finished in accordance with ACI 301.

D. New concrete finish shall match existing concrete unless otherwise approved by the Project Manager.

E. Contractor shall avoid excessive float. Floating shall not be performed until concrete has stopped bleeding and the water sheen has left the surface. No water or cement shall be applied to the concrete surface while finishing.

1.7 CURING AND PROTECTION

A. General.

1. Immediately after placement, concrete shall be protected from premature drying and excessively hot or cold temperatures.

2. Contractor shall comply with applicable practices and recommendations for hot weather concrete application from ACI 305R; for cold weather concrete applications from ACI 306R; for curing from ACI 308.

1.8 CONTROL/CONTRACTION JOINTS

A. Where shown on drawings, joints shall be provided while concrete is still plastic.

1.9 FIELD QUALITY CONTROL

A. A certified testing agency shall be retained by the Contractor to perform all required field-testing in accordance with ACI 301. Testing laboratory certification may be provided by Cement and Concrete Reference Lab (CCRL). All testing costs shall be incidental to the cost of the project.

1. Testing agencies performing testing services on concrete materials shall meet the requirements of ASTM C 1077.

2. Field-testing of concrete shall be performed by an ACI Certified Concrete Field Testing Technician – Grade I.

B. Contractor shall submit proposed mix design of each class of concrete to the Project Manager for approval prior to commencement of work.

C. Contractor shall inform the Project Manager 48 hours in advance of field-testing to allow for witnessing of testing.

D. The Testing Agency shall collect strength cylinders from one batch in every 20 cubic yards of concrete placed, or once a day when less than 20 cubic yards is placed, and perform the tests specified herin. Samples for Acceptance Testing are to be taken at the discharge from the transit mixer, except when using concrete pumps or conveyors to transport concrete to its final placement location. When pumps or

conveyors are used, the samples for acceptance tests shall be taken at the end of the pipe or last conveyor belt.

1. Concrete shall be sampled in accordance with ASTM C-172.
2. Temperature of concrete shall be recorded in accordance with ASTM C 1064.
3. Slump test shall be performed in accordance with ASTM C 143.
4. Air content test shall be performed in accordance with ASTM C 231, pressure method.
5. Six (6) concrete strength test cylinders shall be taken in accordance with ASTM C 31.

E. The Testing Agency shall test the strength test cylinders in accordance with ASTM C 39 at 7 days and 28 days.

1.10 CONCRETE ACCEPTANCE CRITERIA

A. Fresh Concrete

1. Temperature - Less than 90 degrees F.
2. Slump - per Section 2.6.
3. Air content - per Section 2.6.
4. Drum revolution counter - 100 to 300 revolutions within 1-1/2 hours after initial mixing.

B. Strength

1. Concrete strength is satisfactory if the average of all sets of 3 consecutive strength test results equal or exceed the specified 28 day strength f'_c and no individual strength test result falls below the specified 28 day strength f'_c by more than 500 psi.

C. Appearance

1. Free from honeycombs and embedded debris.

D. Construction requirements

1. Conforming to required lines, details, dimensions and tolerances specified for construction.

1.11 DEFECTIVE CONCRETE

A. Defective concrete is concrete not conforming to acceptance criteria in Section 3.10.

B. Contractor shall replace defective concrete not meeting strength criteria at Contractor's expense. The concrete's in-place strength may be evaluated by testing 3 core samples for each strength test, wherever LAC-cured cylinders were more than 500 psi below f'_c, all in accordance with ACI 301 and ASTM C42. Core

holes shall be filled in accordance with ACI 301. Testing shall be completed at no additional cost to the Owner.

C. Defective concrete not meeting appearance criteria shall be replaced or, where approved by the Project Manager, repaired at Contractor's expense.

D. Concrete not in conformance with details, tolerances, and other construction requirements shall also be replaced at Contractor's expense.

END OF SECTION

SECTION 702
GROUT

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, equipment, and incidentals required, and install grout complete as shown on the Drawings and as specified herein.

1.2 RELATED WORK IN OTHER SECTIONS

A. Section 401 Underground Ductbank Systems

B. Section 502 Sewer Manholes

C. Section 601 Water Systems

D. Section 701 Reinforced Concrete

1.3 SUBMITTALS

A. Contractor shall submit, in accordance with Section 102 Submittals Procedures, shop drawings and product data showing materials of construction and details of installation for:

1 Commercially manufactured non-shrink cementitious grout: The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, and conformity to required ASTM standards and Material Safety Data Sheet.

2 Commercially manufactured non-shrink epoxy grout: The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, and conformity to required ASTM standards and Material Safety Data Sheet.

3 Cement grout: The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, and product data on any proposed admixtures and the proposed mix of the grout.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

2. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes

3. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

4. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non shrink)

B. U.S. Army Corps of Engineers Standard (CRD)

1. CRD C-621 - Corps of Engineers Specification for Non-shrink Grout

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Grout manufacturer shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery of materials to the jobsite shall be made in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers, and printed instructions.

B. Materials shall be stored in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.

C. Material that becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Department of Public Utilities.

D. Non-shrink cement-based grouts shall be delivered as pre-blended, pre-packaged mixes that require only the addition of water to be applied.

E. Non-shrink epoxy grouts shall be delivered as pre-measured, pre-packaged, three component systems that require only blending as directed by the manufacturer before application.

1.7 DEFINITIONS

A. Non-shrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to clean prepared surfaces.

PART 2 PRODUCTS

2.1 GENERAL

A. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

2.2 MATERIALS

A. Non-Shrink Cementitious Grout

1. Non-shrink cementitious grouts shall meet or exceed the requirements of ASTM C1107, Grades B or C and CRD C-621. Grouts shall be portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents, and shall require only the addition of water. Non-shrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827. General purpose non-shrink cementitious grout shall be: SikaGrout 212 by Sika Corp.; Euco NS Grout by The Euclid Chemical Co.; FX-228 by Fox Industries; UNIGROUT by Universal Building Products; Five Star Grout by Five Star Products; or equal.

B. Non-Shrink Epoxy Grout

1. Non-shrink epoxy-based grout shall be a pre-proportioned, three-component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 13,600 psi in 7 days when tested in conformity with ASTM C579 and have a maximum thermal expansion of 18 x 10^{-6} when tested in conformity with ASTM C531. The grout shall be Five Star HP Epoxy Grout by U.S. Grout Corp.; Sikadur 42 Grout-Pak by Sika Corp.; High Strength Epoxy Grout by the Euclid Chemical Co.; or equal.

C. Cement Grout

1. Cement grouts shall be a mixture of one-part portland cement (conforming to ASTM C 150, Types I, II, or III) and one- to two-parts sand (conforming to ASTM C33) with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.

D. Water

1. Only potable water shall be used in the preparation of grouts for application.

PART 3 EXECUTION

3.1 PREPARATION

A. Grout shall be placed over cured concrete that has attained its full design

strength unless otherwise approved by the Department of Public Utilities engineer.

B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance, and paints; free of all loose material or foreign matter, all of which may affect the bond or performance of the grout.

C. Concrete surfaces shall be roughened by chipping, sandblasting, or other mechanical means to ensure bond of the grout to the concrete. Loose or broken concrete shall be removed. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance, and firmly embedded into the parent concrete.

D. Air compressors used to clean surfaces in contact with grout shall be the oil-less type or equipped with an oil trap in the airline to prevent oil from being blown onto the surface.

E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the Project Manager. Upon completion of the 24-hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the Project Manager for each specific location of grout installation.

F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.

G. Grout forms or other leak proof containment shall be constructed as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer.

H. Grout forms shall be of adequate strength, securely anchored in place, and shored to resist the forces imposed by the grout and its placement.

I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks, or other approved means. The shims, wedges, and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the Project Manager.

3.2 INSTALLATION - GENERAL

A. Mix, apply, and cure products in strict compliance with the manufacturer's recommendations and this section.

B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.

C. Maintain temperature of the grout during and after grouting as recommended by the grout manufacturer.

D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 and 90 degrees Fahrenheit range.

E. Install grout in a manner that will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.

3.3 INSTALLATION - CEMENT GROUTS AND NON-SHRINK CEMENTITIOUS GROUTS

A. Mix in accordance with manufacturer's recommendations.

B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Before mixing, wet the mixer and empty excess water. Add pre-measured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.

C. Placements greater than 3” in depth shall include the addition of clean washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.

D. Place grout into the designated areas in a manner that will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner that will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces.

E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix after initial stiffening.

F. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding, or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

3.4 INSTALLATION - NONSHRINK EPOXY GROUTS

A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout

mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener, and aggregate.

B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees F.

C. Place grout into the designated areas in a manner that will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces.

D. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.

E. Epoxy grouts are self-curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

3.5 SCHEDULE

A. The following list indicates where the particular types of grout are to be used:

1. General purpose non-shrink cementitious grout: Use at all locations where non-shrink grout is called for on the Drawings.

2. Non-shrink epoxy grout: Use for the setting of anchor rods, anchor bolts and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.

3. Cement grout: Only use where cement grout is called for on the Drawings. It shall not be used when non-shrink grout is specifically called for on the Drawings.

END OF SECTION