

SECTION 02510

ASPHALTIC CONCRETE PAVING

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Site Clearing: Section 02110
- B. Excavation, Backfilling and Compacting for Utilities: Section 02222

1.2 REFERENCES

- A. State of California, Department of Transportation (CALTRANS) - Standard Specifications for Road Construction and CALTRANS - State Materials Manual.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with CALTRANS Standard Specifications, except as otherwise indicated on Drawings.
- B. Obtain materials from one source throughout.

1.4 SUBMITTALS

- A. Materials List: List source and quality standard for all asphaltic concrete materials.
- B. Certificates of Conformance: Asphalt and aggregated materials.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not place asphalt when base surface temperature is less than 40 degrees F or when rain is imminent.

2.0 PRODUCTS

2.1 MATERIALS

- A. General: Aggregate base, prime coat, paint binder and bituminous surface course shall comply with CALTRANS Standard Specifications, unless otherwise indicated.
- B. Soil Sterilant: Poly-Bor-Chlorate by United States Borax, Monobor-Chlorate by United States Borax, Monobor-Chlorate by Occidental Chemical or equal.
- C. Headers and Stakes: 2x6 nominal preservative treated douglas fir, except at curves provide

laminated 1x6 nominal preservative treated douglas fir. Use hot dipped galvanized nails only.

- D. Aggregates for Base Course: Comply with Section 26 of CALTRANS Standard Specifications, Class 2, 3/4-inch maximum size gradation.
- E. Aggregates for Asphaltic Concrete: Comply with Section 39 of CALTRANS Standard Specifications, Type B, size gradations as indicated or required for paving class.
- F. Asphalt Cement: Comply with Section 92 of CALTRANS Standard Specifications, Grade AR-4000, ASTM D946.
- G. Liquid Asphalt: Comply with Section 93 of CALTRANS Standard Specifications, MC-70, ASTM D2027.
- H. Asphaltic Emulsions: Comply with Section 94 with CALTRANS Standard Specifications, SS-1h.

2.2 ASPHALT PAVING MIX

- A. Mix: Mineral aggregate uniformly mixed with bituminous binder in a central mix plant in accordance with CALTRANS Standard Specifications, Section 39, Type B. Mixing plant and transport and placement equipment shall comply with CALTRANS Standard Specifications, Section 39.
- B. Binder Course: CALTRANS Standard Specifications, Section 39, 4.5 to 6 percent of asphalt cement by weight, 3/4-inch maximum aggregate.
- C. Topping Course: CALTRANS Standard Specifications, Section 39, 5 to 7 percent of asphalt cement by weight, 1/2-inch maximum aggregate.

3.0 EXECUTION

3.1 PREPARATION

A. Subgrade:

1. Top 6-inches compacted to a minimum of 95 % relative compaction.
2. Fine grading, checking, shaping, and compacting of subgrade shall be complete before start of asphaltic concrete Work.

B. Curbs and Gutters: Gutters shall be in place and cured prior to start of asphaltic concrete Work. Coordinate placement so aggregate base extends under curbs and gutters.

C. Soil Sterilant: Sterilize soil areas to receive asphaltic concrete paving. Apply soil sterilant in accordance with manufacturer's instructions and applicable environmental regulations.

Take care to confine application to the areas to be paved.

- D. Headers: Place headers with tops flush with finish asphaltic concrete surfaces. Back headers with stakes.

3.2 ASPHALTIC CONCRETE

- A. Aggregate Base: Place and compact aggregate base material in accordance with CALTRANS Standard Specifications, Section 26, in 6-inch maximum layers, compacted to at least 95 percent relative density, ASTM D1557. Place aggregate base below curbs and gutters and portland cement concrete paving also, compacted to 95 percent at vehicular traffic and 90 percent at pedestrian-only traffic.
- B. Paint Binder: Apply asphaltic emulsion to exposed edges and surfaces against which asphaltic concrete will be placed. Apply emulsion at rate of 0.10 gallons per square yard.
- C. Asphaltic Concrete: Deliver and place asphaltic concrete mix in accordance with CALTRANS Standard Specifications, Section 39. Thicknesses of courses shall be as indicated on Civil Drawings. Place asphaltic concrete in maximum 1-1/2 inch lifts, measured after compaction.
- D. Compaction: Compact asphaltic concrete in accordance with CALTRANS Standard Specifications, Section 39, using machine rollers. Compaction by vehicular traffic is prohibited. Do not displace or extrude pavement from position. Compact areas inaccessible to rolling equipment with machine-powered tamper. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.3 TOLERANCES AND TESTS

- A. Flatness: Maximum variation of 1/4-inch measured with 10 foot straight edge.
- B. Compacted Scheduled Thickness: Within 1/4-inch of design thickness.
- C. Variation from True Elevation: Within 1/2-inch.
- D. Test: Flood test all paving to demonstrate positive drainage. No standing water shall remain 1-hour after test.

3.4 PROTECTION

- A. After final rolling, prohibit all traffic on asphaltic concrete until mix has fully cooled and set. Minimum time, in all cases shall be 6 hours.

*** END OF SECTION***

SECTION 02575

PAVEMENT REPAIR AND RESURFACING

- 1.0 GENERAL
- 1.1 RELATED WORK SPECIFIED ELSEWHERE
 - A. Demolition: Section 02050
 - B. Excavation, Backfilling, and Compacting for Utilities: Section 02222
- 1.2 QUALITY ASSURANCE
 - A. Qualifications of Asphalt Concrete Producer: Use only materials which are furnished by a bulk asphalt concrete producer regularly engaged in production of hot-mix, hot-laid asphalt concrete.
- 1.3 PAVING QUALITY REQUIREMENTS
 - A. General: In addition to other specified conditions, comply with following minimum requirements:
 - 1. Comply with requirements of Road Agency having jurisdiction.
 - 2. Provide final surfaces of uniform texture, conforming to required grades and cross-sections.
 - 3. Patches shall match existing grade and cross section unless otherwise directed by the Road Agency.
 - B. Surface Smoothness:
 - 1. Test finished surface of each asphalt concrete course for smoothness, using a 10 foot straight edge applied parallel to and at right angles to centerline of paved areas.
 - 2. Surfaces will not be acceptable if exceeding 0.25 inch in 10 feet unless more rigid requirements are established by the Road Agency.
- 1.4 SUBMITTALS
 - A. Certify that materials comply with Specification Requirements.
 - B. Certificate to be signed by asphalt concrete producer and Contractor.
- 1.5 JOB CONDITIONS
 - A. Weather Limitations:
 - 1. Construct only when temperatures are above minimum specified in State Highway Standard Specifications unless waived by Road Agency having jurisdiction.

2. Do not construct pavement or base when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.
- B. Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.
- C. Traffic Control:
1. Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.
 2. Provide flagmen, barricades, warning signs, and warning lights for movement of traffic and safety and to cause the least interruption of work.

1.6 ROAD AND STREET RESTORATION REQUIREMENTS

- A. The Contractor's responsibility as to road restoration shall include, but not be limited to, proper backfill and compaction of excavation, shaping and general restoration of the roadway, restoration of public and private improvements when damaged by construction, restoration of drainage facilities, scarification of existing surfacing, if required, removal of debris and surplus material and all other requirements of these Specifications. In addition, upon completion of the above restoration, backfill gravel and crushed gravel or crushed rock surfacing shall be placed where required, in the opinion of the Engineer.
- B. Unless otherwise specifically authorized by the authority responsible for the roadway, the final grade and cross section shall conform to applicable Road Agency standard cross sections. In case of existing private roads they shall conform to the roadway that existed prior to construction. The removal and disposal of existing materials necessary to fulfill the above requirements shall be considered incidental to the construction and the costs thereof shall be included in the items for which payment is provided.
- C. Manhole rings, valve boxes and monument cases shall be adjusted as necessary to be flush with the restored surface.
- D. The Contractor shall comply with all requirements of all permits for installation of pipelines in authorized rights-of-way.
- E. The Contractor will place and maintain sufficient and proper lights and barricades at all locations on roads not accepted by the Road Agency involved.
- F. After completion of pipeline installation the Contractor shall clean up drainage ditches and restore all existing drainage structures that he may have damaged during the course of construction. He shall also comply with all drainage requirements of the agency involved upon which the agency's acceptance of the roads is conditioned.

- G. The Contractor shall restore any private improvement on road rights-of-way including, but not limited to, culverts, driveways, curbs, sidewalks, parking strips, parking areas, or other permanent improvements, whether or not a permit for such improvements has been obtained.
- H. On streets where the pipeline is located on the shoulder alongside existing bituminous or concrete surfacing, no payment shall be made for cost of restoring street surfacing which may be damaged by the Contractor's operations. If the Engineer requires crushed surfacing spread on the shoulder it shall be paid under the crushed surfacing bid item.
- I. All streets in the construction area as well as any unpaved streets used by Contractor's trucks or any other equipment hauling material to and from the area, whether within the construction area or adjacent thereto, and any unpaved streets used as detours during the construction shall be serviced with an application of oil or continuous use of sprinkler trucks to allay the dust, and the cost thereof shall be included in the various items for the improvements. The oiling or sprinkling of the dust on roads or streets will continue until accepted by the Road Agency or the roads or streets have been graveled, dust oiled, or resurfaced. All streets, when required shall be sprinkled at least twice daily.
- J. It is specifically understood and agreed that the Contractor is responsible for complying with all requirements of the Road Agency necessary to obtain written acceptance of the roads by the agency concerned, and for such work the Contractor will be paid only for the items included in this Contract.
- K. Until accepted in writing by the Road Agency, the Contractor will maintain all roads in a condition satisfactory to the agency concerned. This shall include periodic grading of all streets on which traffic is allowed wherever in the opinion of the Engineer, such grading is required. A suitable motor grader shall be available for this work.
- L. Any settlement which occurs during the first year after final contract acceptance shall be repaired by the Contractor at his expense.

2.0 PRODUCTS

2.1 CRUSHED SURFACING

- A. Crushed surfacing shall be manufactured from ledge rock, talus, or gravel. The materials shall be uniform in quality and substantially free from wood, roots, bark, and other extraneous material.

1. Immediately after completion of placing the base the Contractor shall place a two inch minimum compacted thickness of asphalt concrete surfacing. The final surface of this lift shall be not lower than ½ inch below the existing surface.
2. If the existing pavement is more than two inches, the first lift of asphalt concrete shall be of the same depth as the existing pavement.
3. The Contractor may substitute an equal amount of asphalt treated base for crushed surfacing and first lift of asphalt concrete.
4. When ordered by the Owner or when required in the Special Provisions, the Contractor shall begin the placement of the second lift. A tack coat shall be placed over the patch area. Asphalt concrete modified so that maximum size aggregate is ½ inch shall be placed over the tack coat. Prior to rolling, the aggregate in the asphalt concrete shall be hand raked back from the edges and rolled in such a manner to produce a uniform "feather" edge over the existing surface. The minimum compacted thickness of the second lift over the trench area shall be one inch.
5. Where excess settlement of the first patch occurs, a leveling course shall be used to prevent the thickness of the second lift from exceeding two inches.
6. The edge of the patch shall be sealed by painting with a cutback asphalt or SS-1 emulsion and immediately covered with sand and heated.

C. Single Lift Patch:

1. Immediately after completion of placing the base the Contractor shall place a two inch minimum thickness of asphalt concrete surfacing.
2. If the existing pavement is more than two inches the asphalt concrete shall be of the same depth as the existing pavement.
3. The edge shall be hand raked to produce a smooth edge where the patch abuts the existing pavement.
4. The thickness shall be adjusted so that a smooth uniform grade exists after rolling.
5. The edge of the patch shall be sealed by painting with a cutback asphalt or SS-1 emulsion and immediately covered with sand and heated.

3.3 CEMENT CONCRETE PAVEMENT PATCH

- A. After the subgrade for the pavement has been compacted and constructed to line and grade, the cement concrete pavement patch shall be placed, compacted and struck off to the grade of the adjacent pavement.
- B. Minimum thickness shall be eight inches or the thickness of the existing pavement plus two inches, whichever is greater.
- C. Through and dummy joints shall be placed and edged to match existing joints.
- D. The surface shall be finished and brushed with a fiber brush.

- E. Approved curing compound shall be placed on the finished concrete immediately after finishing.
- F. Concrete used in patches shall be in accordance with Section 03300 unless Type III cement is required because of urgency of opening the street to traffic.

3.4 ASPHALT CONCRETE PAVEMENT

- A. Full-width asphalt concrete pavement shall conform to the Technical Requirements of the standard specifications of the State Highway Department in which the project is located.
- B. After the subgrade has been properly prepared and compacted, a minimum of two inches of asphalt concrete pavement Class B shall be placed and compacted.
- C. If the existing pavement is more than two inches thick, asphalt concrete shall be of the same depth as existing pavement prior to construction.
- D. The edges of the existing asphalt pavements and castings shall be painted with hot asphalt cement or asphalt emulsion immediately before placing the asphalt patching material.
- E. The asphalt concrete pavement shall then be placed, leveled, and compacted to conform to established cross section and grade and to match adjacent paved surface.
- F. The edge of the new pavement shall be sealed by painting with a cutback asphalt or SS-1 emulsion and immediately covered with sand and heated.

3.5 ASPHALT CONCRETE OVERLAY

- A. Before construction of an asphalt concrete pavement overlay on an existing surface, all fatty asphalt patches, grease drippings, and other objectionable matter shall be removed from the existing pavement. Excess asphalt joint filler shall be removed and premolded joint filler shall be removed to at least one-half inch below the surface of the existing pavement. Existing pavement or bituminous surfaces shall be thoroughly cleaned by sweeping to remove dust and other foreign matter.
- B. Prior to placing asphalt concrete, a tack coat shall be applied using a heated cut back asphalt or emulsified asphalt at the rate of 0.02 to 0.05 gallons per square yard.
- C. When the surface of the existing pavement or old base is irregular, it shall be brought to uniform grade and cross section as required by the Road Agency involved. Preleveling of uneven or broken surfaces over which asphalt concrete is to be placed is required and may be accomplished by the use of asphalt concrete placed with a motor patrol grader, a paving machine, by hand raking, or by a combination of these methods. After placement, the asphalt concrete used for preleveling shall be compacted with rollers.
- D. When asphalt concrete pavement is to be constructed over an existing paved or oiled surface, in addition to the preparation as outlined hereinbefore, all holes and small depressions shall be filled with an appropriate class of asphalt concrete mix. The surface of the patched area shall be leveled and compacted thoroughly. All previous patches that have settled shall be preleveled so that depth of overlay does not exceed two inches in thickness.

- E. After preparation of the base a one inch minimum compacted full width layer of asphalt concrete shall be placed on top of an existing paving surface. Surfacing shall be placed in such a manner as to prevent disturbing existing drainage. Surfacing shall be feathered out as required to meet existing driveways, catch basins, traffic control pads, street intersections, etc., and shall include thickened edge paving where it is now existing.
- F. The edges of the overlay shall be sealed by painting with a cutback asphalt or SS-1 emulsion and immediately covered with dry sand and heated.

3.6 TEMPORARY TRENCH PATCH

- A. The Contractor may be required to furnish and install a temporary trench patch only when specifically directed by the Owner or as provided on the Plans.
- B. Area to be patched shall be cleaned out and graded to the bottom of the base course. Any loose asphalt shall be removed.
- C. Place a patch consisting of 2-inch minimum course of crushed surfacing base and a 2-inch minimum course of cold asphalt plant mix placed over the trench area.
- D. Both the base and surface course shall be placed and compacted so that the finished surface will match the grade and cross-section of the existing pavement.
- E. Surface of pavement shall be cleaned of all dirt and debris before opening to traffic.
- F. The Contractor shall maintain temporary patch until the permanent patch is installed.

3.7 CEMENT CONCRETE CURBS AND GUTTERS

- A. Constructed with air entrained concrete.
- B. Side forms shall rest throughout their length on firm ground and shall be full depth of the curb. They shall be either metal of suitable gauge for the work or surfaced "construction" grade lumber not less than two inches (commercial) in thickness. Forms shall be cleaned and well oiled prior to use. Forms used more than one time shall be cleaned thoroughly and any forms which have become worn, splintered, or warped shall not be used again. Forms shall be adequately supported to prevent deflection or movement.
- C. The foundation shall be watered thoroughly before the concrete is placed.
- D. Concrete shall be well tamped and spaded or vibrated in the forms.
- E. Exposed surfaces shall be finished full width with a trowel and edger. Remove forms of all roadway face of curbs within 24 hours or placement of concrete and treat with a float finish. The top and face of the curb shall receive a light brush finish and the top of the gutter shall receive a broom finish.
- F. Joints shall be spaced to match joints in the abutting pavement. If the abutting pavement is not jointed or the curb or gutter is not abutting pavement, joints in the curb and gutter shall be

spaced at 15 foot intervals. These joints shall be 1/8 inch minimum thickness and constructed to a minimum depth of 1 inch by sawing or scoring with a tool which leaves the corners rounded and destroys aggregate interlock to a depth specified. Expansion joints, filled to full cross section with filler 1/4 inch thick shall be placed in the curb and gutter to match joints in the abutting pavement, at structures, curb returns and where shown in the plans.

- G. Cure for 72 hours by one of the methods specified in Section 03300.
- H. Curb and gutter may be constructed by the use of slip-form equipment provided the completed curb or gutter retains its shape, grade, and line. finishing, joints, and curing shall be as provided above.
- I. Top of the form shall not depart from grade more than 1/8 inch when checked with a 10 foot straight edge. Alignment shall not vary more than 1/4 inch in 10 feet.

3.8 ASPHALT CONCRETE CURBS AND GUTTERS

- A. Placed, shaped and compacted true to line and grade with machine capable of shaping and compacting the materials to the required cross section.
- B. Provide tack coat of asphalt applied to the surface upon which asphalt concrete curb is to be placed immediately prior to placing of curb.

3.9 CEMENT CONCRETE SIDEWALKS

- A. The concrete in the sidewalks shall be air entrained concrete in accordance with the requirements of Section 03300.
- B. Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be straight, free from warp and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.
- C. The foundation shall be brought to the grade required and well wetted before placing the concrete.
- D. Place concrete in the forms and strike off with a heavy iron-shod straight edge, trowel surface smooth with a steel trowel as soon as surface can be worked. After troweling and before jointing or edging, the surface of the walk shall be lightly brushed in a transverse direction with a soft brush. On grades of over 4%, the surface shall be finished with a stipple brush.
- E. Joints shall be constructed at the locations and of the sizes as indicated in the plan.
- F. Cured for at least 72 hours by means of moist burlap or quilted blankets. Exclude all traffic, both pedestrian and vehicular, during curing period.

3.10 PAVEMENT MARKINGS

- A. The Contractor shall restore any and all pavement striping and traffic buttons damaged during construction under this Contract.
- B. Restoration shall be in accordance with the current standards of the Road Agency involved.
- C. Cost of restoration of pavement striping and traffic buttons shall be incidental to pavement restoration.

3.11 DUST OIL

- A. Dust oil shall be PS-300 Fuel Oil or equivalent.
- B. Dust oil shall be applied by means of a bituminous distributor, so that uniform distribution is obtained over all points of the surface to be treated.
- C. The entire width of the roadway shall be treated.
- D. Dust oiling will not be permitted at temperatures below 50°F.
- E. Oiling shall not be started unless trenches have been compacted, streets cleaned and reshaped and base course of crushed rock or gravel applied.
- F. The allaying of dust prior to and subsequent to this application of dust oil shall be solely the Contractor's obligation in accordance with other provisions of these Specifications.

3.12 ADJUSTING MANHOLES TO GRADE

- A. The Contractor shall adjust manhole castings to final grade by adding brick and/or mortar under the casting and patching with asphalt concrete. Paving adjusting rings will not be allowed.
- B. The Contractor shall exercise extreme care in preventing foreign material from entering the manhole.
- C. All manholes shall be adjusted to grade after the asphalt concrete surfacing has been placed. Disturbed area around cover shall be patched and sealed to the satisfaction of the Road Agency having jurisdiction.
- D. The Contractor shall take care not to extend the manholes above finished grade.

3.13 ADJUSTING MONUMENT CASES AND VALVES BOXES TO GRADE

- A. Monument cases and/or valve boxes shall be adjusted to final grade and patched with asphalt concrete.
- B. Adjustment shall be made after the resurfacing.
- C. Patching around monument cases and/or valve boxes shall be done to the satisfaction of the Road Agency having jurisdiction.
- D. Valve boxes shall be adjusted to the satisfaction of the utility having jurisdiction.
- E. The Contractor shall take care not to extend the monument cases and/or valve boxes above the finished grade.

*** END OF SECTION ***

SECTION 02576

ASPHALT/CONCRETE PAVEMENT REMOVAL

1.0 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, material, equipment and incidentals required to remove the entire section of pavement over the trenches used to install the water mains on the attached plans. The minimum trench width shall be 24 inches unless otherwise stated on plans. Actual trench width will vary with construction method and location.
- B. Furnish all labor, material, and equipment necessary to remove and dispose of all excess spoil after the ground asphalt has been returned to the trench for use as a temporary driving surface until main construction is complete.
- C. Furnish all labor, material, and equipment necessary to maintain all ground pavement surfaces free from potholes and large loose gravel areas.
- D. Furnish all labor, material, and equipment necessary to remove any and all concrete underlayment beneath the pavement as encountered during the pavement removal process.

1.2 REFERENCE SPECIFICATIONS

Except as otherwise specified herein, the current Standard Specifications for Construction, current edition, (a.k.a. "Green Book"), shall apply to materials and workmanship required for the work of this Section.

2.0 PRODUCTS:

2.1 MATERIALS

- A. Use locally available materials and aggregate gradations that exhibit a satisfactory record of previous installations. Any imported material necessary to fill potholes or soft spots in the ground trench shall be for Class II base.

3.0 EXECUTION:

3.1 LAYOUT AND ALIGNMENT AND COMMITMENT

The Contractor shall review all markings with Owner in advance of the start of all grading operations. Any questions regarding trench width, trench location, and alignment shall be discussed and agreed upon prior to the start of the grinding operation.

3.2 ASPHALT REMOVAL

The grinding shall be accomplished by one pass of the "Bomag MPH 100" asphalt reclaimed or approved equal. The grinding blade shall be set deep enough to cut through the entire existing pavement section so that no underground portion of asphalt remains within the proposed trench area.

All ground material shall be put back into the ground trench and compacted by wheel rolling and all excess material shall be removed and disposed of by the Contractor at no additional expense to the owner.

At the end of each business day and upon completion of the grinding, all ground areas of asphalt shall have the following characteristics:

- A. The uncut pavement surface shall be clear of all loose material.
- B. The ground trench shall be approximately level with the surrounding area.
- C. The ground material within the ground area shall be free of overly soft or loose material.

3.3 CONCRETE REMOVAL AND PAVEMENT

It is the opinion of the engineer that large sections of the road bed contain concrete underlayment. All concrete visible from the surface and an additional 800 square feet subgrade concrete is considered as part of base bid. All additional concrete will be paid on a square foot basis. The following process shall be followed whenever concrete underlayment is encountered:

- A. When concrete underlayment is encountered during the grinding process, it shall be clearly marked so that the area of concrete removal can be clearly calculated.
- B. The Contractor shall meet the Owner in the field and review the concrete prior to removal.
- C. The Contractor shall submit an invoice to the Owner clearly identifying the concrete needing removal (from station to station in a specific street), the area of concrete, the unit price for removal submitted on the bid schedule, and the total price for each section of concrete.
- D. The Owner will then review the invoice and provide the Contractor with written permission to proceed with concrete removal.
- E. Payment for concrete removal will be issued upon verification of the completion of work.
- F. The unit price provided the Engineer on the schedule of values shall include removal, disposal, and overhead profit. The schedule of values price shall apply to all concrete regardless of condition or thickness.

G. Disposal of concrete shall be done in a safe and legal manner.

H. The owner will multiply the approved schedule of values price for concrete by square feet and apply that to the overall bid price.

3.4 MAINTENANCE

Upon completion of the grinding process, the Contractor shall maintain all ground pavement surfaces free from potholes and large loose gravel areas.

*****END OF SECTION*****

SECTION 02610

PIPE AND FITTINGS

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Water Lines: Section 02660

1.2 QUALITY ASSURANCE

A. Testing by Manufacturer:

1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specification requirements.
3. No material shall be delivered until test results and certifications are in the hands of the Engineer.
4. Engineer shall have free access to all testing and records pertaining to material to be delivered to the job site.
5. The Engineer may elect to be present at any or all material testing operations.

- B. Joint tests are intended for qualification of joint design and shall be considered to be a qualification test to establish the adequacy of the manufacturer's joint design. The manufacturer shall certify that tests have been performed within the last year with pipes equivalent in size and design and that they have passed the test enumerated in the specifications. Tests may be waived for pipes of different strength class if joint design is the same as the pipe tested.

2.0 PRODUCT

2.1 DUCTILE IRON PIPE

- A. Conform to AWWA C151, Type 1, (ANSI A21.51) and shall be Class 50, unless otherwise specified, restrained joints shall be TR FLEX® or equal.
- B. Joints shall be mechanical joint or Tyton-type push-on joint and shall conform to AWWA C111 (ANSI A21.11).
- C. Pipe and fittings shall have a cement mortar lining conforming to AWWA C104 (ANSI A21.4).

2.2 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE (4 INCHES AND OVER)

- A. Conform to AWWA C900.
- B. Outside diameter equal to ductile iron pipe and with gasket bell ends.
- C. Minimum wall thickness shall be equal to or greater than dimension ratio (DR) of 18 (150 psi) unless otherwise specified.
- D. Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM F477.
- E. All PVC water pipe shall be considered flexible conduit.

2.3 DUCTILE IRON AND GRAY IRON FITTINGS

- A. Use for ductile iron or PVC pipe.
- B. Conform to AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI 1921.53) as indicated.
- C. Joint shall conform to AWWA C111 (ANSI A21.11).
- D. Dimensions of fittings and design of bell may be modified to conform with the pipe being used.
- E. Cement mortar lining conforming to AWWA C104 (ANSI A21.4).
- F. Gaskets for flat faced or raised faced flanges shall be 1/8-inch thick neoprene having a durometer of 60 plus or minus 5.
- G. Gaskets for flanges having a recess machined to receive an "O" ring shall be neoprene and shall have the dimensions and durometer as recommended for the particular service application by the flange manufacturer.
- H. Provide type, material and identification mark for bolts and nuts.

2.4 STEEL PIPE (OVER 4 INCHES)

- A. Conform to AWWA C200.
- B. Design Pressure 150 psi.
- C. Design stress 50% of yield strength.
- D. All pipe and fittings shall receive coal tar protective treatment in accordance with AWWA C203.
- E. Field couplings shall be compression style coupling.
- F. When flanges are required they shall conform to AWWA C207.

G. All couplings shall be coated the same as pipe.

2.5 STEEL PIPE (4 INCHES AND SMALLER)

A. Conform to ASTM A120.

B. Schedule 40, unless otherwise specified.

C. Fittings shall be malleable iron screw type conforming to ANSI B16.3.

D. Pipe and fittings shall be hot dipped, galvanized inside and out.

2.6 VITRIFIED - CLAY PIPE

A. Conform to ASTM C700.

B. Joints shall conform to ASTM ct25.

2.7 COPPER TUBBING

A. Copper tubing shall conform to the requirements of ASTM B88, Type K, annealed.

B. The tubing shall be coupled using flare-type compression fittings, conforming to the requirements of AWWA C800, minimum 150 psi working pressure.

3.0 EXECUTION

3.1 INSTALLATION

A. Unloading of pipe and fittings:

1. Pipe and fittings shall be unloaded using appropriate mechanical equipment.
2. Under no condition shall pipe or fittings be allowed to roll or fall from the truck onto the ground or from the ground into the trench.
3. Pipe materials may be strung out a maximum of two days in advance of pipe laying operations. Placement of strung pipe is subject to the approval of the Engineer.

B. Install pipe in accordance with specification section for pipeline being installed.

*** END OF SECTION ***

SECTION 02640

VALVES

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Pipe and Fittings: Section 02610
- D. Water Lines: Section 02660

1.2 QUALITY ASSURANCE

A. Testing by Manufacturer:

1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specification requirements.
3. No materials shall be delivered until test results and certifications are in the hands of the Engineer.
4. Engineer shall have free access to all testing and records pertaining to materials to be delivered to the job site.
5. The Engineer may elect to be present at any or all materials testing operations.

2.0 PRODUCTS

2.1 GATE VALVES - UNDER 16 INCHES

- A. Conform to AWWA C500.
- B. Iron body, bronze mounted resilient seated, epoxy coated wedging device.
- C. O-ring stuffing box.
- D. Open counter-clockwise unless otherwise specified.
- E. Non-rising stem type.
- F. Equipped with 2-inch standard operating nut.

G. Mechanical joint suitable for installation with the type and class of pipe being used or flanged where detailed.

H. All flange faces shall be machined. Flanges shall be drilled to straddle vertical centerline.

2.2 BUTTERFLY VALVES

A. Conform to AWWA C504, Class 150B.

B. Epoxy coated interior conforming to AWWA C550.

C. Suitable for direct burial.

D. Mechanical joint suitable for installation with type and class of pipe being used or flanged where detailed.

E. Standard O-ring shaft seal.

F. Operator shall be traveling nut or worm gear type, sealed, gasketed and permanently lubricated for underground service.

G. Operator shall be designed to withstand all anticipated operating torques and designed to resist submergence in ground water.

H. Equipped with a standard two-inch operating nut.

I. Open counter clockwise.

2.3 STEM EXTENSION

A. Provide stem extension with standard operating nut and self-centering rockplate support for all valves with operating nut more than 5 feet below grade to raise operating nut to within 36 inches of the ground surface.

2.4 VALVE BOXES

A. Provide for all buried valves.

B. Valve boxes shall be constructed as detailed in the drawings.

C. Lengths suitable for the particular project or as specified.

D. Base corresponding to size of valve.

E. Cover shall have the word "Water" cast on it.

F. Valve box tops shall be cast iron.

2.5 VALVE MARKER POST

- A. Shall have a 4-inch minimum square section and a minimum length of 42 inches, with beveled edges.
- B. Contain at least one No. 3 bar reinforcing steel.
- C. Paint exposed portion of the marker posts with two (2) coats of concrete paint in a color selected by the Owner.
- D. Stencil the size of the valve and the distance in feet and inches to the valve on the face of the post, using black paint and a stencil which will produce letters 2 inches high.

2.6 COMBINATION AIR RELEASE VALVE

- A. Designed to operate with potable water under pressure to allow entrapped air to escape from the pipeline.
- B. Body and cover: Cast iron conforming to ASTM A48, Class 30.
- C. Floats: Stainless steel conforming to ASTM A240 and designed to withstand 1,000 psi pressure.
- D. Seats: Buna N rubber.
- E. Internal Parts: Stainless steel or bronze.
- F. Designed to withstand 300 psi pressure with normal operating pressure under 100 psi.
- G. Manufactured by APCO or equivalent with following listed orifice sizes:

<u>Model N</u>	<u>Size of Valve</u>	<u>Large Orifice</u>	<u>Small Orifice</u>
143C	1"	1"	5/64"
145C	2"	2"	3/32"
147C	3"	3"	3/32"
149C	4"	4"	3/32"

- H. Vault shall be precast concrete meter box or utility vault as indicated on the detail.

2.7 TAPPING SLEEVE AND VALVE ASSEMBLY

- A. Furnished with flanged inlet end connections having a machined projection on the flanges to mate with a machined recess on the outlet flanges of the tapping sleeves and crosses.
- B. Outlet ends shall conform in dimensions to the AWWA Standards for hub or mechanical joint connections, except that the outside of the hub shall have a large flange for attaching a drilling machine.

C. Seat opening of the valves shall be larger than normal size to permit full diameter cuts.

D. Tapping sleeves shall be epoxy-coated steel.

3.0 EXECUTION

3.1 GATE VALVE OR BUTTERFLY VALVE INSTALLATION

A. Valves shall be accurately set at places designated on the drawings.

B. Inspect each valve for defects.

C. Adjust stuffing boxes to ensure watertightness without binding the stem.

D. Set valve and valve box plumb.

E. Set lower casting of valve box so that it is supported by a styrofoam collar not less than 2 inches in thickness.

F. Tamp backfill around valve box to a minimum distance of 3 feet on all sides or to face of trench.

G. Set valve box cover flush with surface.

3.2 VALVE MARKER POST

A. Where required, set valve marker post at edge of right of way opposite the valve.

B. Leave 18 inches of post exposed above grade.

3.3 INSTALLATION OF COMBINATION AIR RELEASE VALVE

A. Install in accordance with standard detail.

B. Locate so that high point of water main is vented.

C. Pipe between main and valve shall slope upward.

D. Locate valve adjacent to property line unless otherwise indicated.

3.4 BLOCKING

A. Provide blocking for valve not connected to fitting with bolted connection.

3.5 TESTING

A. Test valves along with pipeline in which they are installed.

*** END OF SECTION ***

SECTION 02660

WATER LINES

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Field Engineering: Section 01050
- B. Inspection Services: Section 01420
- C. Dewatering: Section 02140
- D. Shoring: Section 02150
- E. Excavating, Backfilling and Compacting for Utilities: Section 02222
- F. Pipe and Fittings: Section 02610
- G. Valves: Section 02640
- H. Existing Utilities/Facilities-Underground and Overhead: Section 02760

1.2 QUALITY ASSURANCE

A. Testing Before Acceptance:

1. The Engineer may require that the first section of pipe, not less than 1,000 feet in length, installed by each of the Contractor's crews, be tested in order to qualify the crew and/or the material.
2. Pipelaying shall not be continued more than an additional 1,000 feet until the first section has been tested successfully.

B. Final Acceptance:

1. Prior to final inspection all pipelines shall be flushed and cleaned of all debris, disinfected and hydrostatically tested.
2. Any corrections required shall be made at the expense of the Contractor and the line retested.

2.0 PRODUCTS

2.1 BEDDING MATERIALS

- A. Conform to Section 02222.

3.0 EXECUTION

3.1 BEDDING FOR RIGID PIPE

- B. Bedding for rigid pipe except ductile iron shall be as specified in Section 02222.
- C. Unless otherwise ordered, bedding for ductile iron may be native bedding material, free of stones.
- D. Bedding shall be carefully placed under the pipe and to a depth of at least six (6) inches over the top of the pipe.
- E. Shall be thoroughly rammed and tamped around the pipe with the proper tools, so as to provide firm and uniform support over the full length of all pipe, valves and fittings.
- F. Care shall be taken to prevent any damage to the pipe or its protective coating.

3.2 BEDDING FOR FLEXIBLE PIPE

- A. Material to be used for bedding for flexible pipe shall be sand/gravel material as specified in Section 02222.
- B. Bedding shall be placed in more than one lift. The first lift is to provide at least 4-inch thickness under any portion of the pipe and shall be placed before the pipe is installed, and shall be spread smoothly so that the pipe is uniformly supported along the barrel.
- C. Subsequent lifts of not more than 6-inch thickness shall be installed to 6 inches over the crown of the pipe and individually compacted to 90 percent of maximum density.

3.3 PIPE LAYING

- D. Pipe laying shall be done in accordance with the Specifications and instructions of the manufacturer of the kind of pipe used.
- E. Tools designed especially for installing each particular type and kind of pipe shall be used.
- F. Short Lengths and Field Cut Joints:
 - 1. Short lengths of pipe supplied by the manufacturer shall be used to provide the proper spacing of valves, tees or special fittings.
 - 2. Whenever it becomes necessary to cut a length of pipe, the cut shall be made by abrasive saw or by a special pipe cutter.
 - 3. Pipe ends shall be square with the longitudinal axis of the pipe and shall be reamed and otherwise smoothed so that good connections can be made.
 - 4. Threads shall be cleanly cut.
 - 5. Flaring of copper tubing shall be accurately and smoothly done.

6. All operations for any connection shall be carefully done in accordance with the manufacturer's instructions.

D. Laying of Pipe on Curves:

1. Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints or by the use of shorter lengths of pipe.
2. When pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment.
3. Where field conditions require deflection or curves not anticipated by the Plans, the Contractor shall use deflected joints, short lengths or special fittings as required. No additional payment will be made for laying pipe on curves as shown on the Plans or for field changes involving pipe deflected at the joints. When special fittings not shown on the Plans are required to meet field conditions, additional payment will be made for fittings.
4. Maximum deflections at pipe joints and laying radius for various pipe lengths shall be no greater than 80% of that recommended by the pipe manufacturer unless approved by the Engineer.

E. Contamination Prevention:

1. Pipe, fittings and valves shall be carefully cleaned of all dirt and foreign material as they are placed.
2. Open ends of pipe and fittings shall be plugged with a temporary watertight plug whenever work is stopped and/or when water in the trench threatens to enter the pipe.
3. Groundwater shall be excluded from the pipe at all times.
4. Particular care shall be exercised to guard against the entrance of sewage into the water line trench during the course of construction. All sewer lines, house side sewers or other subsurface drains should be located prior to excavation. Adequate provision shall be made for the flow of sewers, drains, and other water courses during construction.

F. Condition of Pipe and Fittings:

1. The interior of all pipe, fittings and other accessories stockpiled on the project shall be kept free of dirt and other foreign matter at all times.
2. Each pipe, fitting or other accessory shall be carefully inspected and thoroughly cleaned of any dirt or foreign matter that might be present on the inside.
3. Cleaning shall be accomplished prior to lowering the pipe or other accessories into the trench.
4. Care shall be taken to keep materials internally clean after the pipe is placed in the trench.

3.4 CONNECTION TO EXISTING WATER MAINS

- A. Type of connections shall be as shown on the Drawings.
- B. Wet tap connections made without shutting off the existing line shall be made unless otherwise approved by the Owner.
- C. Connections to the existing water main shall not be made without first making the necessary arrangements with the Owner in advance.
- D. Work shall not be started until all of the materials, equipment and labor necessary to properly complete the work are assembled on the site.
- E. When work is once started on this connection, it shall proceed continuously without interruption and as rapidly as possible until completed. No shut-off of mains will be permitted overnight or over weekends or holidays.
- F. If the connection to the existing system involves turning off the water, the Contractor shall be responsible for notifying the residents affected by the shut-off. The Owner will advise which owners are to be notified.
- G. The Contractor may be required to perform the connection during times other than normal working hours.
- H. The Contractor shall not operate any valves on the existing system without specific permission of the Owner.
- I. The types of connections are varied and suggested pipe arrangements have been shown on the Plans. In general, they involve deflecting new pipe to match the existing pipe alignment and utilization of necessary fittings and new pipe. For the installation of these connections, the surfaced portion of the road shall not be penetrated unless the connecting point is directly under it. For connection by any other method, the Contractor shall furnish a detailed sketch for approval not less than one week prior to the expected construction.
- J. Interior of pipe and fittings used in making connections shall be swabbed or sprayed with a 1% solution of hypochlorite before they are installed.
- K. Exterior of main shall be cleaned and interior surface of tapping sleeve shall be dusted with calcium hypochlorite powder before tapping sleeve is installed.
- L. Installation of tapping tee shall be tested with air or water at a minimum pressure of 100 psi before cutting into the existing line.
- M. Any replacement pipe used for cutting into existing mains shall be same material and strength as existing pipe except that ductile iron may be substituted for other materials.

3.5 EXISTING SYSTEM MAINTENANCE

- A. The Contractor shall acquaint himself with all aspects of the existing system prior to starting construction on new mains. Pertinent information concerning existing system may be obtained from the Owner and from the Owner's records.
- B. Materials, fittings, pumps, equipment and qualified personnel must be available on the project at all times during construction, so that in the event of damage to or disruption of the existing water system service there will be immediate repair and restoration by the Contractor. Any unnecessary delay in repairs or service restoration due to Contractor's failure to adhere to these requirements shall be reason to immediately suspend any further new main installation until repairs are completed to the Owner's satisfaction.
- C. Existing water services shall be located by the Contractor prior to beginning work so that it may be properly protected and maintained in service during construction and during the changeover from the existing pipes to the pipe installed under this Contract.

3.6 HYDROSTATIC PRESSURE TEST

- A. Water mains and appurtenances shall be tested in sections of convenient length under a hydrostatic pressure equal to 150 psi in excess of that under which they will operate.
- B. The pumps, gauges, plugs, saddles, corporations, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.
- C. Pipeline shall be backfilled sufficiently to prevent movement of pipe under pressure.
- D. Thrust blocks shall be in place and time allowed for the concrete to cure before testing.
- E. Procedure:
 - 1. The mains shall be filled with water and all air removed prior to starting the test.
 - 2. The test shall be accomplished by pumping the main up to the required pressure; stop the pump for fifteen (15) minutes, and then pump the main up to the test pressure again.
 - 3. The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter with a sweep unit hand registering 1 gallon per revolution. The meter to be approved by the Engineer.
 - 4. Acceptability of the test will be determined by two factors:

- a. The quantity of water lost from the main shall not exceed the number of gallons as determined by the formula:

$$L = \frac{SD(T*P)^{0.5}}{133,200}$$

in which

L = Allowable leakage, gallons

S = Length of pipeline tested

D = Nominal diameter of the pipe in inches

T = Duration of test, hours

P = Average test pressure during the leakage test, psig

- b. There shall not be an appreciable or abrupt loss in pressure during the two (2) hour test period.
5. Gauges used in the test shall be accompanied with satisfactory certifications of accuracy from a laboratory approved by the Engineer.
- F. All tests shall be made with the hydrant gate valves open and pressure against the hydrant valve. After the test has been completed, each gate valve shall be tested by closing each in turn and relieving the pressure beyond. This test of the gate valve will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked.
- G. Sections to be tested shall normally be limited to 1,500 feet.
- H. Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

3.7 DISINFECTION OF MAINS

- A. Flush lines to remove particulate debris prior to disinfection.
- B. Main sterilization shall be accomplished by the following method. No other method of sterilization will be accepted by the Engineer, unless, prior to use, the Contractor obtains written approval from the Engineer.
- C. Disinfection:

1. A chlorine gas-water mixture of not less than 50 mg/l, nor more than 80 mg/l of dry chlorine gas may be applied by means of a chlorinator, or the gas may be fed directly from a chlorine cylinder equipped with the proper devices for regulating the flow, and the effective diffusion of gas within the pipe. Use of the chlorinator is preferred to direct feed from the cylinder.
2. The preferable point of application for the chlorinating agent is at the beginning of the pipeline extension, or any valved section thereof, and through a corporation cock inserted in the horizontal axis of the pipe. The water injector for delivering the gas-water mixture into the pipe may be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension. In a new system, application may be at the pumping station, elevated tank, stand pipe, or reservoir.
3. Water from the existing distribution system, or other source of supply, shall be controlled to flow very slowly into the newly laid pipeline during application of the chlorine. The rate of chlorine gas-water mixture or dry gas feed shall be in such proportion that the rate of water entering the newly laid pipe will be at least 50 parts per million (ppm), but not more than 80 ppm. A color comparator set will be used to determine chlorine residual.
4. Back pressure, causing a reversal of flow in the pipe being treated, shall be prevented.
5. Treated water shall be retained in the pipe at least twenty-four (24) hours. After this period, the chlorine residual at pipe extremities and at other representative points shall be at least twenty-five (25) parts per million.
6. In the process of chlorinating newly laid water pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.
7. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity, until the replacement water throughout its length, upon test, shows the absence of chlorine or in the event chlorine is normally used in the source of supply, until the tests shall show a residual not in excess of that carried by the system.
8. Should the initial treatment prove ineffective, the chlorination procedures shall be repeated until tests show that the water sample from the newly laid pipe conforms to the requirements of this Specification.
9. Before placing the lines in service, a satisfactory report or approval shall be received from the local or state health department on samples collected from representative points in the new system, but in no case at intervals greater than 1200 feet. Sterilized sample bottles and/or instructions shall be obtained by the Contractor from the laboratory where the samples will be tested.
10. The Contractor shall collect all samples for the bacteriological tests under direct supervision of the Engineer. The Owner will pay for initial testing and the Contractor shall pay for any required retesting.
11. Should the disinfectant treatment result in an unsatisfactory test, the procedure shall be repeated until satisfactory results are obtained.
12. The environment to which the chlorinated water is to be discharged shall be inspected and if there is any question that the chlorinated discharge will cause damage to the environment, a reducing agent shall be applied to the water to be wasted to neutralize the chlorine residual.

remaining in the water. Disposal may be made to any available sanitary or storm sewer provided the rate of disposal does not overload the sewer and the disposal is approved by the agency having jurisdiction. Where necessary, federal, state, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

3.9 FLUSHING THE MAINS

- A. Upon completion of pipe laying, chlorination and pressure testing, all dirt and foreign matter shall be removed by a thorough flushing through all hydrants, blowoffs or other approved means. Each section of newly laid pipe between valves or dead ends shall be flushed independently, and fire hydrants or other dead end appurtenances shall be flushed simultaneously with the parent line.
- B. Flush lines with a quantity of water equal to at least to 100% of nominal line capacity or 3 feet per second, whichever is greater.
 - 1. The Contractor shall be responsible for rescheduling and organizing his work so as to use flushing water only during off-peak hours and in the most economical manner.
 - 2. No flushing shall be performed without the prior approval of the Owner.

3.10 PLACING IN OPERATION

- A. Upon completion of the work and before its final acceptance, the entire system shall be put in operation under normal pressure and operated at that pressure for a period of not less than ten (10) days by the Contractor.
- B. Any leaks or defects in the construction of the system that may develop, shall be repaired and the test continued until the system is practically watertight.
- C. No provision of this Section shall be construed as waiving any provision of the Contractor's guarantee.

*** END OF SECTION ***

SECTION 02760

EXISTING UTILITIES/FACILITIES UNDERGROUND AND OVERHEAD

1.0 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 LEGAL REQUIREMENTS-UNDERGROUND FACILITIES

- A. The Contractor shall, before commencing excavation in any area, comply with the provisions of any applicable laws relating to or governing the identification, location, marking, and responsibility for protecting and repairing of underground facilities.
- B. Whenever there may be a conflict between the provisions of any law and the provisions of these specifications, the provisions of law shall control.

1.3 DEFINITIONS

- A. Utility means any facility or item placed above or below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephonic or telegraphic communication, cablevision, electric energy, petroleum products, gas, gaseous vapors, hazardous liquids, or other substances and including, but not limited to pipes, sewers, conduits, cables, valves, lines, wires, manholes, and attachments.

1.4 IDENTIFICATION

- A. All underground utilities known by the Owner to be in the proposed area of excavation are identified on the project plan.
- B. The underground utilities identified on the plans have not and cannot be precisely located by the Owner or its agents or engineers and location is approximate only because such information is within the control of the owners of the underground utilities. The Owner, under this Contract, does not warrant the location of underground utilities.
- C. NOTICE: Overhead electrical service lines are generally not shown on the drawings. Electrical transmission lines shown on the drawings are located by point to point, power pole to power pole connections. The transmission cables or wires may be located on either side of the drawing location depending upon the configuration of the crossarms on the power poles or towers. Line voltage is not shown.
- D. Other overhead utility lines are generally not shown on the drawings.

1.5 NOTIFICATION

- A. It is the responsibility of the Contractor to give notice to the Owner or owners of any utilities known or suspected to be within the area of any proposed excavation or construction activities.
- B. The Contractor is responsible to have the locations of underground utilities marked by the utility owners prior to beginning excavation.
- C. The Contractor is responsible for determining the extent of any hazard created by electrical power in all areas and shall follow procedures during construction as required by law and regulation. Prior to construction, the Contractor shall meet with utility owners and determine the extent of hazards and remedial measures and shall take whatever precautions may be required.
- D. The Contractor's attention is directed to federal, state, and local safety codes relative to limitations of work in proximity to overhead power lines.

1.6 QUALITY ASSURANCE

- A. The Contractor will be required to have available a pipe finder and a man capable in its use and to utilize same to satisfy himself as to the exact location of such underground facilities in the interest of avoiding unnecessary damage, maintenance costs, and to insure continuity of customer service.
- B. Contractors shall cooperate with utility owners to aid in locations and maintenance of existing utilities.

1.7 ELECTRICAL TRANSMISSION AND SERVICE LINES

- A. Since neither the Engineer nor the Owner can anticipate the construction methods or techniques and equipment to be used by the Contractor in performing the work, the extent of the possibility of the Contractor's equipment and personnel coming in contact with electrical transmission lines cannot be fully anticipated, and there is no representation that all electrical transmission lines are shown on the plans.
- B. The Contractor is charged with the responsibility of observing and investigating the presence of any electrical transmission lines which might impinge on his work whether overhead or underground and shall consult with and utilize the information given by utility owners and operators to determine the extent of any hazards and remedial measures required, and follow appropriate safety procedures.

1.8 ABOVE GROUND UTILITIES

- A. Existing above ground utilities, whether shown on the drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities.

1.9 MAJOR UNDERGROUND UTILITIES

- A. Existing major underground utilities and appurtenant structures within the area of excavation shall be maintained, relocated, rerouted, removed and restored by the Contractor as necessary.
- B. Existing major underground utilities and appurtenant structures outside of the area of excavation, whether shown on the drawings or not, shall be maintained and restored by the Contractor if damaged.

1.10 UTILITY SERVICE LATERALS

- A. Minor underground utility service lines, including but not limited to sanitary sewer services, gas services, water services, house or yard drains, and electricity or telephone services and driveway culverts shall be maintained, relocated, rerouted, removed and restored by the Contractor with the least possible interference with such services.
- B. All sanitary sewer services encountered during excavation shall be removed and replaced in accordance with the following schedule:
 - 1. Ductile iron and cast iron services shall be replaced with ductile iron services of the same size.
 - 2. Services constructed of any other material including vitrified clay pipe or PVC pipe shall be replaced with vitrified clay pipe of the same size.
- C. Even though the presence of minor underground utility service lines may be deemed changed or differing conditions, in no case shall the interference of such service lines be the basis for extra compensation.

1.11 RESTORATION BY UTILITY OWNER

- A. The right is reserved by owners of public utilities and franchises to enter upon any street, road, right-of-way, or easement for the purpose of maintaining their property and for making necessary repairs or adjustments caused by the Contractor's operations.
- B. The Contractor shall save the Owner harmless of any costs so incurred in restoration of a utility damaged by the Contractor.

1.12 RESTORATION OF DRAINAGE FACILITIES

- A. Where it is necessary for drainage facilities to be removed and replaced, existing pipe and catch basins may be reinstalled when approved by the agency having jurisdiction.
- B. The materials shall be cleaned.
- C. When it is necessary to replace existing pipe or catch basins, the new materials shall be of equal strength and similar design to existing materials.
- D. Installation shall be in accordance with the applicable provisions of these specifications.

E. All costs, whether new or existing facilities are installed, shall be considered to be included in the unit prices bid for the various items and no additional payment shall be allowed.

*** END OF SECTION ***