PART 1 - GENERAL

All applicable portions of Division 1, including the drawings and general provisions of the contract, the general and supplementary conditions and Division 1 specification sections which apply to work of this section as if printed herein.

1.1 WORK INCLUDED:

1.1.1 Work includes asphaltic concrete paving. Provide minimum 3 inches of asphalt paving over 6 inches of aggregate base unless noted otherwise on the drawings.

1.2 RELATED WORK:

1.2.1 Related Work Specified Elsewhere:

1.2.1.1 Section 311000 - Site Clearing: Removal of existing asphaltic concrete paving.

1.2.1.2 Section 312200 - Earthwork: Preparation and compaction of subgrade.

1.3 QUALITY ASSURANCE:

1.3.1 Qualifications of Asphalt Concrete Producer: Bulk asphaltic concrete producer regularly engaged in production of hot-mix, hot-laid asphalt concrete.

1.3.2 Regulatory Requirements:

1.3.2.1 In addition to complying with the applicable codes and regulations of governmental agencies having jurisdiction, comply with the applicable requirements of CALTRANS Standard Specifications for Public Works Construction.

1.3.2.2 Where the provisions of applicable codes, regulations and standards conflict with the requirements of this specifications, comply with the more stringent provisions.

1.3.3 Source Quality Control:

1.3.3.1 Tests: Materials for which physical characteristics have been stipulated shall have had such characteristics independently confirmed by laboratory tests employing industry-recognized procedures. Both the laboratory performing the tests and the test methods employed will be subject to the approval of the Architect.

1.3.3.2 Certification: Furnish certification, in written form, from the asphaltic concrete producer, confirming the conformance of the following with the requirements of this specification:

1.3.3.2.1 Materials proposed for incorporation into the Work.

1.3.3.2.2 Asphaltic concrete mix design formulae.

1.4 SUBMITTALS:

1.4.1 Product Data: For proprietary products, submit complete manufacturer's description literature and specifications in accordance with the provisions of Section 013300.

1.4.1.1 Materials List: Submit complete lists of materials proposed for use, giving the manufacturer's name, catalog number, and catalog cut for each item where applicable.

1.4.1.2 Manufacturer's Recommendations: Submit the manufacturer's current recommended methods of installation, including relevant limitations, safety and environmental cautions, and application rates.

1.4.2 Test Reports: When and as directed by the Architect and/or Owner, submit certified laboratory test reports confirming physical characteristics of materials used in the performance of the Work of this Section.

1.4.3 Mixes: Submit asphaltic concrete mix design formulae.

1.5 PROJECT CONDITIONS:

1.5.1 Weather Limitations:

1.5.1.1 Apply bituminous prime and tack coats only when the ambient temperature in the shade is above 50 degrees F.

1.5.1.2 Do not apply when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.

1.5.1.3 Construct asphalt concrete surface course only when atmospheric temperature is above 40 degrees F, when the underlying base is dry, and when weather is not rainy.

1.5.2 Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.

1.5.3 Traffic Control: Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

PART 2 - PRODUCTS

2.1 AGGREGATES: Use materials and gradations that have performed satisfactorily in previous installations.

2.1.1 Base Course Aggregate: Class 2 Aggregate Base mineral aggregate, 3/4 inch maximum size, as specified in CALTRANS Standard Specifications

2.1.1.1 Recycled asphalt paving may be used as base course aggregate, subject to complying with CALTRANS Standard Specifications.

2.1.2 Asphalt Aggregate: Type B Aggregate, as specified in CALTRANS Standard Specifications.

2.1.2.1 3/4-inch maximum size for base course.

2.1.2.2 1/2-inch maximum size for surface course.

2.2 ASPHALT MATERIALS

2.2.1 Asphalt Cement: Steam Refined, penetration-graded material. PG 64-10 conforming to CALTRANS Standard Specifications.

2.2.2 Prime Coat: Asphalt prime coat conforming to CALTRANS Standard Specifications.

2.2.3 Tack Coat: Asphalt tack coat conforming to CALTRANS Standard Specifications.

2.2.4 Seal Coat: Emulsified asphalt with a minimum 2 percent – 3 percent latex or copolymer added with 2-4 lbs of grade No. 30 silica sand added per gallon and mechanically agitated.

2.3 ASPHALT MIXES

2.3.1 Hot-Mix Asphalt: Provide dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and designed according to procedures in AI's "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types."

2.3.1.1 Comply with CALTRANS Standard Specifications.

2.3.1.2 Provide mixes complying with the composition, grading, and tolerance requirements of ASTM D 3515 for the following nominal, maximum aggregate sizes:

2.3.1.2.1 Surface Course: 1/2 inch maximum.

2.3.1.2.2 Base Course: 3/4 inch maximum

2.4 CRACK SEALER

2.4.1 Rubberized joint sealant complying with Federal Standards ASTM D5329 Parking Lot Crack Sealer.

2.5 PAVEMENT MARKING PAINT:

2.5.1 Latex, water-base emulsion, ready-mixed, complying with FS TT-P-1952.

2.5.2 Color: As indicated.

2.6 ASPHALT-AGGREGATE MIXTURES:

2.6.1 Job-mix Criteria:

2.6.1.1 Provide job-mix formulas for each required asphalt-aggregate mixture.

2.6.1.2 Establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to aggregate, and a single temperature at which asphalt concrete is to be produced.

2.6.1.3 Comply with the mix requirements of Caltrans Standard Specifications.

2.6.1.4 Maintain material quantities within allowable tolerances of the governing standards.

2.7 CONCRETE HEADERS:

2.7.1 Provide 8-inches wide by 12-inches deep 3000 PSI concrete mow strip with a medium broom finish running perpendicular to the lineal length of the concrete mow strip and provide 3/4” radius to exposed edges. Top of concrete mow strip shall be flush to adjacent hardscape surfaces. At softscape surfaces, landscape surfaces and planter areas the top of the concrete header shall be maximum 1-inch above the softscape/landscape/planter surfaces. Provide 1-inch deep with 1/4" radius tooled joints at a maximum spacing at 10-foot on center.

2.8 WEED KILLER:

2.8.1 Provide a dry, free-flowing, dust-free chemical compound containing not less than 30 percent sodium chlorate, or a chlorate-borate compound. Product shall be non-flammable, not creating a fire hazard when applied in accordance with the manufacturer's recommendations, soluble in water, and capable of being spread dry or in solution.

2.8.2 Acceptable Products:

2.8.2.1 “OV5T” Herbicide, DUOO3048, DuPont, call 1-800-441-7515.

PART 3 - EXECUTION

3.1 PREPARATION:

3.1.1 Aggregate Base Course:

3.1.1.1 Check subgrade for conformity with elevations and section immediately before placing aggregate base material.

3.1.1.2 Place aggregate base material in compacted layers not more than 4 inches thick. Compaction shall be obtained by use of an approved power roller weighing not less than 10 tons.

3.1.1.3 Spread, shape, and compact all aggregate base material deposited on the subgrade during the same day.

3.1.1.4 Compact aggregate base course material to not less than 95 percent of maximum density: ASTM D 1557, Method D.

3.1.1.5 Test density of compacted aggregate base course: ASTM D 2167.

3.1.1.6 Conduct one (1) test for each 2,500 square yards of in-place material, but in no case no less than one daily for each layer.

3.1.1.7 Treat all sub-base with weed killer in accordance with manufacturer's instructions. Take extreme precaution to confine weed poison to area covered with asphaltic concrete, and provide all necessary protection to prevent injury or damage to life or property.

3.1.2 Prime Coat:

3.1.2.1 Uniformly apply at rate of 0.20 to 0.25 gallons per square yard over compacted and cleaned sub-base surface.

3.1.2.2 Apply enough material to penetrate and seal, but not flood the surface.

3.1.2.3 Allow to cure and dry as long as required to attain penetration and evaporation of volatile, and in no case less than 24 hours unless otherwise acceptable to the Architect.

3.1.2.4 Blot excess asphalt with just enough sand to prevent pick-up under traffic. Remove loose sand before paving.

3.1.3 Tack Coat:

3.1.3.1 Dilute material with equal parts of water and apply to contact surfaces of previously constructed asphalt concrete or Portland cement concrete and similar surfaces.

3.1.3.2 Apply at rate of 0.05 to 0.15 gallons per square yard of surface.

3.1.3.3 Apply tack coat by brush to contact surfaces of curbs, gutters, manholes, and other structures projecting into or abutting asphalt concrete pavement.

3.1.3.4 Allow surfaces to dry until material is at condition of tackiness to receive pavement.

3.2 PREPARING THE MIXTURE:

3.2.1 Comply with ASTM D 995 for material storage, control, and mixing, and for plant equipment and operation.

3.2.2 Heating:

3.2.2.1 Heat the asphalt cement at the mixing plant to viscosity at which it can be uniformly distributed throughout mixture.

3.2.2.2 Use lowest possible temperature to suit temperature-viscosity characteristics of asphalt.

3.2.2.3 Do not exceed 350 degrees F.

3.2.3 Aggregate:

3.2.3.1 Deliver dry aggregate to mixer at recommended temperature to suit penetration grade and viscosity characteristics of asphalt cement, ambient temperature, and workability of mixture.

3.2.3.2 Accurately weigh or measure dry aggregates and weigh or meter asphalt cement to comply with job-mix formula requirements.

3.2.4 Joints:

3.2.4.1 Carefully make joints between old and new pavements, or between successive days' work, to ensure a continuous bond between adjoining work.

3.2.4.2 Clean contact surfaces free of sand, dirt, or other objectionable material and apply tack coat.

3.3 COMPACTING THE MIX:

3.3.1 Provide sufficient power rollers to obtain the required pavement density. Minimum 10-ton power roller.

3.3.2 Begin rolling operations as soon after placing when the mixture will bear weight of roller without excessive displacement.

3.3.3 Do not permit heavy equipment, including rollers to stand on finished surface before it has thoroughly cooled or set.

3.3.4 Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

3.3.5 Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and outside edge.

3.3.6 Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot and in condition for compaction. Continue second rolling until mixture has been thoroughly compacted.

3.3.7 Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained specified density.

3.3.8 Patching:

3.3.8.1 Remove and replace defective areas.

3.3.8.2 Cut-out and fill with fresh, hot asphalt concrete.

3.3.8.3 Compact by rolling to specified surface density and smoothness.

3.3.8.4 Remove deficient areas for full depth of course.

3.3.8.5 Cut sides perpendicular and parallel to direction of traffic with edges vertical.

3.3.8.6 Apply tack coat to exposed surfaces before placing new asphalt concrete mixture.

3.4 FIELD QUALITY CONTROL:

3.4.1 General: In addition to other specified conditions, comply with following minimum requirements:

3.4.1.1 Test in-place asphalt concrete courses for compliance with requirements for density, thickness and surface smoothness.

3.4.1.2 Provide final surfaces of uniform texture, conforming to required grades and cross-sections.

3.4.2 Thickness: In-place compacted thicknesses shall conform to the dimensions shown on the Drawings. Variation from indicated thicknesses shall not exceed plus or minus 1/2 inch. If thickness is not shown: minimum thickness shall be 3 inches of asphalt paving over 4 inches of granular base at parking areas, vehicle drives and paved playground areas. Provide 4 inches of asphalt paving over 4 inches of granular base at bus drop-off areas and fire lanes. Actual structural sections shall be determined after an “R” value test has been conducted by a qualified geotechnical engineer on the prepared sub-base material and or as indicated in the soils report..

3.4.3 Surface Smoothness:

3.4.3.1 Test finished surface of each asphalt concrete course for smoothness, using a 10-foot straightedge applied parallel to and at right angles to centerline of paved areas.

3.4.3.2 Surfaces will not be acceptable if exceeding the following:

3.4.3.2.1 Base Course: 1/4 inch in 10 feet.

3.4.3.2.2 Surface Course: 3/16 inch in 10 feet.

3.4.4 Asphalt Concrete Intersection to Concrete Control:

3.4.4.1 All asphalt concrete paved areas that butt to or intersect to all concrete, concrete gutters, concrete swales and concrete walkways, the asphalt concrete shall be a minimum ¼ inch to maximum ½ inches above the adjacent concrete surface after applying finish rolling. In no case shall the asphalt concrete paving, after final rolling, at the intersection of any concrete surfaces, shall be below the finish concrete paved surface(s) unless specifically detailed on the drawings.

3.5 FLOOD TEST:

3.5.1 Flood Test: Before applying a seal coat or striping, a water test shall be made in the presence of the Inspector of Record. The flooding shall be done by water tank truck. All depressions, where water ponds to a depth of more than 1/8 inch shall be filled or the slope shall be corrected to provide proper drainage. The edges of the fill shall be feathered and smoothed so that the joint between the fill and the original surface is invisible. All corrected work of the asphalt concrete paving shall be of the same mix design.

3.6 SEAL COAT:

3.6.1 After completing the flood test and after receiving approvals from the Owner, all new A.C. pavements (minimum 30 calendar days after Owner approvals) shall receive ASPHALTIC CONCRETE PAVING SEAL COATING PER SPECIFICATION SECTION 321236. Sealer shall contain no clay or other deleterious substances.

3.6.2 Place the entire contents of each drum sealer in a plaster or pug mill type mixer thoroughly. Where less than 50 gallons of sealer are used, mixing may be done in a mortar box. During mixing, the sealer may be diluted with water to produce a uniform, free flowing consistency, but in no case shall it be diluted with more than one (1) part of water to four (4) parts of sealer

3.6.3 Areas to receive sealer shall be swept clean and before application, lightly sprayed with water, leaving it cool and damp, but without free water.

3.6.4 Apply sealer by pouring from a can or a wheeled container in continuous parallel lines and spreading immediately with rubber-faced squeegees or with long-handled hair brooms. The squeegee or broom shall be pulled at an angle from the line of spread to continually roll the material toward the operator and not to overflow or spill over its forward edge away from the operator.

Each coat of sealer shall be thoroughly dry before the succeeding coat is applied.

3.6.5 Make two (2) or more applications using at least 35 gallons of sealer (before dilution) per 1,000 square feet of area.

3.6.6 The finished surface seal, when dry and thoroughly set, shall be smooth, tough, waterproof, resilient, of uniform black color and free from coarse textured areas, lap marks, ridges and other surface irregularities. **Should any defects appear in the finished surface, apply as many additional coats of sealer as may be required to produce the specified finished surface at no additional cost.** Protect from traffic during all operations and until the sealer is thoroughly set and cured and does not pick-up under foot or wheeled traffic.

3.7 ADJUSTING AND CLEANING:

3.7.1 Cleaning: After completion of paving operations, clean surfaces of excess or spilled asphalt materials or marking paint to the satisfaction of the Architect.

3.8 PROTECTION:

3.8.1 After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than 6 hours.

3.8.2 Provide barricades and warning devices as required to protect pavement and the general public.

END OF SECTION

PART 1 - GENERAL

All applicable portions of Division 1, including the drawings and general provisions of the contract, the general and supplementary conditions and Division 1 specification sections which apply to work of this section as if printed herein.

1.1 SECTION INCLUDES: Description of requirements for installation of Trenching as shown on drawings and necessary to complete the Trenching Work. Work to include but not be limited to the following:

1.1.1 Excavate trenches for utilities and services not specified in other sections.

1.1.2 Compacted bedding.

1.1.3 Backfilling and compaction.

1.2 RELATED SECTIONS:

1.2.1 Section 014523 – Tests and Inspection.

1.2.2 Section 015000 – Construction Facilities and Temporary Controls.

1.2.3 Section 312200 – Earthwork.

1.2.4 Section 312300 – Excavating, Backfilling and Compacting for Utilities.

1.2.5 Division 22 – Mechanical Work.

1.2.6 Division 26 – Electrical Work.

1.3 REFERENCES AND STANDARDS:

1.3.1 ASTM C136 – Method for Sieve Analysis of Fine and Course Aggregates.

1.3.2 ASTM 01556 – Test Method for Density of Soil in Place by the Sand – Cone Method.

1.3.3 ASTM 01557 – Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop.

1.3.4 ASTM 02922-81 – Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3.5 ASTM 03017-78 – Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3.6 Green Book – Standard Specifications for Public Works Construction, latest edition, as adopted by jurisdictional authority, including amendments.

1.4 PUBLIC AGENCY STANDARDS:

1.4.1 Perform all earthwork and related structures and devices indicated as public agency standards in accordance with the standard plans and specifications of that agency.

1.4.2 Where earthwork is constructed in public streets or rights of way, construct in accordance with the standard plans and specifications of the authority having jurisdictions and in the presence of a representative of that agency.

1.4.3 Secure and pay for all necessary permits for work performed under conditions which exist in 1.4.2 above. The Owner will pay for associated inspection fees.

1.4.4 Upon completion of the work, provide the Architect with written certification of acceptance of work by the governing agency having jurisdiction.

PART 2 – PRODUCTS:

2.1 BACKFILL MATERIALS:

2.1.1 Type C – Class 100-E-100 per Table 201-1.1.2 (Green Book) slurry mix as approved by Owner and Geotechnical Engineer.

2.1.2 Type D – Select Backfill: On Site or imported non-expansive soils complying with Section 312300.

2.2 BEDDING MATERIALS:

2.2.1 Type A – Crushed Gravel: Angular, natural stone; free of shale, clay, friable material, sand, debris; graded within the following limits:

Sieve Size	Percent Passing
3/4 inch	95 to 100
No. 4	0 to 10
No. 100	0

2.2.2 Type B – Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; maximum particle size and volume of 1/2 inch and 18 percent respectively, with minimum Sand Equivalent value of 30 per California Test Method 217.

2.2.3 Type E – Concrete Encasement: Class 480-C-2000 per Table 201-1.1.2 (Green Book), as approved by Owner and Geotechnical Engineer.

2.3 ACCESSORIES:

2.3.1 Detection tape: Provide plastic tape with metallic stripping suitable for locating underground piping and conduits. Provide pre-printed label identifying conduit pipe type, alternating with word “CAUTION”.

2.4 DESIGN CRITERIA:

2.4.1 General:

2.4.1.1 All improvements shall be constructed per the referenced standards, the contract documents, and as specified in this section.

2.4.1.2 Where criteria shown on drawings or specified in this specification exceed that of the referenced standards, the more stringent criteria shall apply

2.4.2 Provide other bedding and backfill materials as described and specified in Section 312300 and Divisions 22 and 26.

PART 3 – EXECUTION:

3.1 INSPECTION, LAYOUT AND PREPARATION:

3.1.1 Prior to installation of the work of this Section, Carefully inspect and verify that installed work of all other trades is complete to the point where this installation may properly commence.

3.1.2 Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. All efforts to identify and protect existing utilities must be taken by the Contractor. Consult with on-site personnel for knowledge of existing utilities. Review as-built plans available from the Architect or Owner (not a part of the documents). Infer from existing on-site boxes, valves, sprinkler heads, etc. provide utility runs.

3.1.3 Verify that specified items may be installed in accordance with the approved design.

3.1.4 In event of discrepancy, immediately notify Architect**. Do not proceed in discrepant areas until discrepancies have been fully resolved**.

3.1.5 Not all existing utilities are shown in plans or known. The Contractor is to anticipate trenching operations will uncover conditions requiring slower-than-normal procedures and be prepared to trench accordingly.

3.2 DEMOLITION, DISPOSAL AND DISPOSITION OF UNDESIRABLE MAN-MADE FEATURES:

3.2.1 Existing asphaltic paving in areas of new work shall be removed from site or may be broken up into pieces less than 3 inches in maximum dimension and incorporated into sub-grades of paved areas.

3.2.2 All other obstructions such as concrete paving, abandoned utility lines, septic tanks, concrete foundations, and the like shall be removed from site. Excavations resulting from these removal activities should be cleaned of all loose materials, dish shaped, and widened as necessary to permit access for compaction equipment. Areas exposed by any required over-excavation should

be scarified to a depth of 8 inches, moisture-conditioned to near optimum moisture content, and re-compacted to at least 90 percent of the maximum dry density as determined by ANSI/ASTM Test Method D1557.

3.3 EXCAVATION:

3.3.1 Excavate subsoil required for underground piping to point of connection.

3.3.2 Cut trenches sufficiently wide to enable installation of utilities and allow inspection.

3.3.3 Excavation shall not interfere with normal 45 degree bearing splay of foundations.

3.3.4 Hand trim excavation for bell and spigot pipe joints. Remove loose matter.

3.3.5 Carefully excavate around existing utilities to avoid unnecessary damage. The Contractor shall anticipate and perform hand work on modernization sites to a reasonable extent without additional claims or cost.

3.3.6 Remove lumped subsoil, boulders, and rock up to 3 inches.

3.3.7 Stockpile excavated material in area designated on site and remove excess material not being used from site.

3.4 BEDDING:

3.4.1 Support pipe and conduit during placement and compaction of bedding fill.

3.5 PLACING, SPREADING AND COMPACTING BACKFILL MATERIAL:

3.5.1 Selected fill material shall be placed in layers which, when compacted shall not exceed 6 inches in thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity. **Do not backfill over porous, wet, frozen or spongy subgrade surfaces**. Employ a placement method that does not disturb or damage foundation walls, perimeter drainage, foundation damp-proofing, waterproofing or protective cover.

3.5.2 When moisture content of fill material is below that required to achieve specified density, add water until proper moisture content is achieved. When moisture content is above that required, aerate by blading or other methods until moisture content is satisfactory.

3.5.3 After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to 90 percent of maximum dry density while at required moisture content. Compact each layer over its entire area until desired density has been obtained.

3.5.4 Recompaction of fill in trenches: Where trenches must be excavated in fill, backfill with material excavated. Place in 6-inch layers and compact each layer to provide densities as specified in Article 3.5.3 above. No jetting shall be allowed in any backfill.

3.5.5 Control of Compaction: All backfill operations shall be conducted under supervision of District Inspector. Field density test may be made to check compaction of fill material. If densities are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified densities. Notify Inspector and Architect at least 24 hours in advance of any operation.

3.6 FINAL SUBGRADE PREPARATION:

3.6.1 Upper 6 inches of all final subgrades supporting pavement sections that will sustain automotive traffic shall be brought to uniform moisture content and shall be uniformly compacted to not less than 95 percent of ANSI ASTM D1557 maximum dry density, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade.

3.6.2 Upper surface of all other final sub-grades, 90 percent, unless otherwise noted.

3.7 ERRORS AND SOFT OR UNSUITABLE FOUNDATIONS:

3.7.1 Where Contractor over-excavates through error, resulting excavation shall be recompacted as engineered fill at Contractor's expense. Where additional work is required by reason of soft or unsuitable natural ground or existing engineered fill, cost of additional excavation and filling will be borne by Owner.

3.8 SURPLUS MATERIAL:

3.8.1 Excavated material not required for grading or backfill is to be removed from site.

3.8.2 Filling operation shall be continued as specified above, until fill has been brought to existing slopes and grades.

3.9 REPAIRS TO EXISTING MATERIALS

3.9.1 Repair existing landscaped areas to as new condition. Replant trees, shrubs or groundcover with existing materials if not damaged or with new materials if required. Replace damaged lawn areas with sod, no seeding will be permitted.

3.9.2 Replace demolished pavement with new compatible matching materials. Concrete walks to be removed to nearest expansion joint and entire panel replaced. Asphalt to be cut neatly and replaced with new materials.

3.9.3 Any existing materials removed or damaged due to trenching to be returned to new condition.

END OF SECTION

PART 1 - GENERAL

All applicable portions of Division 1, including the drawings and general provisions of the contract, the general and supplementary conditions and Division 1 specification sections which apply to work of this section as if printed herein.

1.1 SUMMARY

1.1.1 Section includes: Excavation and backfill for utilities and storm drains as indicated on the Drawings and specified herein.

1.2 REFERENCE STANDARDS

1.2.1 2019 CBC (CCR Title 24, Part 2), Chapter 18A.

1.2.2 CAL-OSHA requirements.

1.3 PERFORMANCE REQUIREMENTS

1.3.1 Be fully responsible to furnish and maintain temporary barricades, warning lights, and other types of protection and to prevent accidental injury to the general public and personnel employed on the project.

1.3.2 Provide adequate cribbing, sheating, and shoring as necessary to safely retain the earth sides of excavation and trenches from caving and other damage resulting from excavating and trenches from caving and other damage resulting from excavating, together with suitable forms of protection against property damage and bodily injury to personnel employed on the work and the general public. The Contractor shall be responsible for the design, for installation, and maintenance of required cribbing and shoring.

1.3.3 Protect new and existing utilities from damage during the course of installation, and repair work so damaged at no additional cost to the Owner.

1.4 PERMITS

1.4.1 Obtain permits, fees, or bonds required for the work performed under this section. Owner will pay the cost for permanent construction permits. Bonds and encroachment permits shall be paid by the Contractor.

1.5 TESTING AND INSPECTION

1.5.1 Contractor shall be responsible for notifying the Testing Laboratory in advance, so that he/she may be present to perform his services as needed.

1.5.2 The Testing Laboratory shall submit compaction reports to the Architect, and shall notify the Architect immediately of test failures.

1.6 QUALITY ASSURANCE

1.6.1 Bedding Material:

1.6.1.1 Bedding sand shall be Class A, screened fill sand, with a maximum particle size of ¼ inch, and shall be free of expansive material and organic matter. Material shall have a sand equivalent of not less than 30 per ASTM D2419.

1.6.1.2 Bedding crushed rock shall be clean crushed stone free of organic matter and shall conform to the following gradation:

US Standard Sieve Size	Percent Passing by Weight
25mm (1”)	100
19mm (3/4”)	90-100
12.5mm (1/2”)	30-60
9.5mm (3/8”)	0-20
4.75mm (No. 4)	0-5
2.36mm (No.8)	---

1.6.1.3 Bedding material for utility lines and storm drains outside the property lines shall be as required by the agency having jurisdiction.

1.6.2 Backfill material for storm drain and utility lines shall be non-expansive granular material, such as clean sand, and shall be placed in a minimum thickness of 6 inches for bedding and backfilled to 12 inches above the top of pipe.

1.6.3 Additional earth material required to complete the work shall be provided by the Contractor at his expense.

1.6.4 All earth products to the site shall meet or exceed United States Environmental Protection Agency (US EPA) and State of California Regulations for clean fill. Proof of compliance is the responsibility of the Contractor.

1.6.5 Imported earth shall be of granular nature with sufficient binder to form a firm, stable, unyielding subgrade. Adobe or clay soils will not be acceptable. Earth imported shall be relatively non-expansive with an expansion index of less than 35, be clean and free from rubbish and debris and rock larger than 3 inches in maximum dimensions, not have sulfate content greater than 1,000 parts per million. Imported fill material shall have an electrical resistivity box procedure shown in ASTM G57. Imported material to be used in areas to receive planting shall be of such quality as to support plant life.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 PREPARATION

3.1.1 Underground Utilities: Carefully lay out the route of each underground utility prior to trenching. Coordinate the work of various trades to avoid conflicts.

3.1.2 Clearances: Maintain required horizontal and vertical clearances from structural footings for utility trenches running parallel to footings, as detailed on Structural Drawings. In the event of conflict, the Architect shall be notified.

3.2 TRENCHING

3.2.1 Excavate trenches for utilities to the required lines, trades and elevations indicated on the drawings and as specified. Hand trim changes in direction and bottoms of trenches. Accurately shape and thoroughly compact trench bottom to required grade. Keep trenches clean until installed work has been approved.

3.2.2 Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

3.2.2.1 Clearance: 8 inches on each side of pipe or conduit.

3.2.3 Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

3.4 BEDDING

3.4.1 Place and compact 6-inch bedding course on trench bottoms. Shape bedding course to provide continuous support for bells, joints and barrels of pipes and for joints, fittings, and bodies of conduits.

3.4.1.1 Provide crushed rock bedding for sanitary and storm sewer piping.

3.4.1.2 Provide sand bedding for water and fire line piping.

3.4.2 Place and compact initial backfill of crushed rock or sand bedding, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system. This area shall be mechanically compacted to achieve 90% relative compaction per ASTM D-1557.

3.4.3 Utility trenches located within the zone of structural footing influence require special backfill consisting of 2-sack sand/cement slurry. The zone of influence to a distance of 10 feet beyond footings is the zone below a 2(H):1(V) downward plane starting 9 inches above the bottom outer edge of the structural footing.

3.4.4 Backfill with approved native or import soils as specified in 312200 Earthwork.

3.4.5 Spread, water, and mix backfill to obtain optimum moisture content. Compact by mechanical means in 6-inch lifts to a minimum relative density of 90 percent in accordance with ASTM D-1557.

3.4.6 Continue backfilling as required to secure final grade elevations.

3.4.7 Backfill existing utilities which may be uncovered during course of construction in the same manner as specified herein for new utilities.

3.4.8 Coordinate backfilling with Representative of Owner's Testing Laboratory.

3.5 CLEANUP

3.5.1 Transport unsuitable material to a legal off-site disposal area.

END OF SECTION

PART 1 - GENERAL

All applicable portions of Division 1, including the drawings and general provisions of the contract, the general and supplementary conditions and Division 1 specifications sections which apply to work of this section as if printed herein.

The following are minimum requirements and shall govern, except that all local, state and/or federal codes and ordinances shall govern when their requirements are in excess hereof.

1.1 SECTION INCLUDES: Description of requirements for materials, fabrications, and installation Site Clearing and Demolition and associated accessory items including, but not necessarily limited to, the following:

1.1.1 Work includes clearing and grubbing of the site, including the removal of debris, vegetation, foreign objects, existing asphaltic, rock outcrops, rocks, removal and or relocation of underground utilities from the site as shown on the documents, and or as indicated on the drawings.

1.1.2 Grading, stripping and stock piling of topsoil.

1.2 RELATED WORK:

1.2.1 Section 015723 – Storm Water Pollution Prevention Plan

1.2.2 Section 312200 – Earthwork: Dust suppression and project conditions

1.2.3 Cap and identify utilities where required.

1.2.4 Remove and/or relocate underground utilities as shown or required on the civil, offsite drawings, plumbing, electrical drawings and architectural drawings.

1.3 QUALITY ASSURANCE:

1.3.1 Comply with applicable portions of 2019 CBC (CCR Title 24, Part 2), Chapter 33.

1.3.2 Comply with applicable portions of 2019 CFC (CCR Title 24, Part 9), Chapter 14.

1.3.3 Where the requirements of applicable codes and regulations conflict with the requirements of this Specification, comply with the more stringent provisions.

1.3.4 Obtain and pay for any permits, bonds, licenses, etc., required for Site Clearing and Removal Work to include all truck hauling bonds or permits.

1.3.5 All clearing and removal work shall be accomplished in strict accordance with all local and state building codes, requirements, and regulations, including but not limited to noise abatement, dust control, classification of disposal materials, haul route conditions, etc. and coordination with the adjacent developers with their offsite improvements and schedules of operations.

1.4 JOB CONDITIONS:

1.4.1 An attempt has been made to show all existing structures, utilities, drives, pavements, curbs, walks, etc., in their approximate location on the survey and/or on the drawings. However, others that are not shown may exist and may be found upon visiting the site or during the clearing, demolition and removal work. It will be the responsibility of this Contractor to accurately locate all existing facilities and to determine their extent. If such facilities obstruct the progress of the work and are not indicated to be removed or relocated, they shall be removed or relocated only as directed by the Owner and/or Architect.

1.4.1.1 Report any existing site element not shown on the drawings to the Civil Engineer of Record and Architect so that the proper dispensation of the element may be made.

1.4.2 The Contractor shall review the plans and provide calculations to determine the extent of the import or export requirements for the job and pay all associated costs to include: Haul route fees or bonds, any plans/documents as required by the local authority for approved haul route and disposal.

1.4.3 Natural features, existing structures, existing landscaping, existing utilities, etc., which are indicated to remain on the drawings and specifications shall be protected and shall not be defaced or damaged in any manner. Provide protective barriers, markers, fencing to protect any existing natural or manmade features and the Contractor shall maintain such device(s) for the duration of the project or as directed by the Architect to remove such protective device(s).

1.4.4 Restore to their present conditions any pavement in the public right-of-way that is disturbed by the work under this section. All pavement restoration work in public rights-of-way shall be performed to the full satisfaction of the governmental agencies having local jurisdiction. See Sections 321216 and 321600 for all pavement requirements.

1.4.5 Conform to the requirements of Sections 312300 and 312316.13.

1.5 ENVIRONMENTAL REQUIREMENTS:

1.5.1 Noise producing activities shall be held to a minimum. Internal combustion engines and compressors, etc., shall be equipped with mufflers to reduce noise to a minimum. Comply with all noise abatement ordinances.

1.5.2 Keep all areas within the clearing and removal area sufficiently dampened to prevent dust from rising due to clearing or removal operations. Comply with all anti-pollutions' ordinances. All dust prevention control and anti-pollution control shall be done on a daily basis and/or as directed by the **ARCHITECT.**

1.5.2.1 This Contractor shall see to it that trucks leaving the site shall not do so in such a manner that debris, vegetation, mud, and earth will not be deposited on adjacent street pavements. ***Any debris, vegetation, mud, or earth deposited on street pavements shall be promptly removed by this Contractor on a continuous basis and/or as directed by the ARCHITECT***

1.5.3 This Contractor shall notify Local or State Environmental Agencies prior to the removal of any underground storage tanks and their related piping.

1.5.3.1 This Contractor shall remove all related items as required by environmental authorities, and shall test surrounding soils as required.

1.5.4 All clearing and removal operations shall be performed in a manner such as to prevent any wash-off of soils from the site into streams and/or storm drainage systems. Appropriate sedimentation ponds, dikes, silt fences, collars, and filter media shall be employed to ensure compliance with these requirements. Where a specific statute governs these procedures, such statute shall be complied with in its entirety. Such soil prevention, wash-off of soil to any existing, new storm drainage system(s), ponds, dikes, to offsite drainage shall be in conformance to Section 015723 -Storm Water Pollution Plan Control.

1.6 DRAINAGE MAINTENANCE:

1.6.1 During the entire course of clearing and removal operations, all existing drainage ways, both into and from the project area shall be rerouted as required and/or maintained in a functional condition and in accordance to Section 015723 and as directed by the ARCHITECT.

1.6.2 At all times during the clearing and removal operations, the exposed areas of subgrade shall be maintained in a condition compatible with positive drainage of the work area. Failure to maintain such drainage shall be considered adequate cause for the District Representative to order temporary suspension of the work.

1.6.3 If it should become necessary to stop work for indefinite periods, take every precaution to prevent damage or deterioration of the work already performed. Provide suitable and functional drainage by installing ditches, filter drains, temporary cut-off lines, etc., and erect temporary protective structures where necessary. All embankments shall be back bladed and suitably sealed to protect against adverse weather conditions.

PART 2 – PRODUCTS:

2.1 PROTECTION:

2.1.1 It shall be the Contractor’s full responsibility to furnish and maintain all temporary barricades, warning lights, and other types of protection and prevent accidental injury to the general public and all personnel on the project.

2.1.2 All existing improvements and all existing active utility lines to remain (whether above or below ground) within the new construction area shall be properly and adequately protected from damage during the entire construction period. It shall be the responsibility of the Contractor to restore to their original condition any of these existing items that are damaged or disturbed in any way.

2.1.3 Protect all existing structures, utilities, and landscaping indicated to remain on the drawings.

2.1.3.1 All trees, shrubs, and other items, indicated to remain shall be protected during the entire progress of the work. This includes protection of the root system. The trees shall be fenced if they are located in or near an area being used for material storage or subject to damage by traffic during construction. Low

hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed. All trimmings shall be done by skilled workmen and in accordance with good tree surgery practices.

2.1.4 Any damage done or caused by any prime or sub-Contractor to existing structures, pipe lines, utilities, landscaping, etc., indicated to remain shall be repaired by him and at his expense in a manner acceptable to the Owner of the damaged property. Any prime or sub-Contractor shall report any existing damage prior to the beginning of their work.

2.1.5 All temporary shoring, bracing, etc., and maintenance there to required for the completion of clearing and removal work shall be provided by the Contractor whose work requires protection.

2.1.5.1 This Contractor shall work in concert per local and state codes to ensure the provision of adequate bracing, shoring, temporary cross over for pedestrian and vehicular traffic, including guard rails, lamps, warning signs and flags as required by agencies having jurisdiction as directed by the Owner. Remove same when necessity for protection ceases.

2.1.5.2 The Contractor shall work in concert with the adjacent developer(s) to ensure any additional provisions are implemented to ensure safety and coordination of all offsite work.

2.2 MATERIALS:

2.2.1 All materials used to backfill excavations, trenches, holes, pits, etc., caused by utility, underground structure or underground storage tank removal shall meet the requirements for fill material and compaction indicated in Sections 312200, 312219, and 321216.

PART 3 – EXECUTION:

3.1 EXAMINATION:

3.1.1 Visit the site and offsite areas so that a full understanding of the difficulties and restrictions attending complete clearing of the site and removal of underground tanks and utilities is obtained. Verify the location of all pertinent items.

3.1.2 Verify with sewer department, water department, gas company, electric company, etc., that all existing utilities, services, and overhead lines have deactivated and abandoned prior to beginning removal work. Notify affected utility department or company prior to beginning removal work.

3.2 PREPARATION:

3.2.1 Cut drainage swales and provide temporary grading to carry storm water away from clearing area. No storm water will be permitted to stand in open excavations.

3.2.2 Provide, erect, and maintain temporary barriers and security devices as required. Protect all existing landscaping, structures, utilities, and site elements that are not to be demolished.

3.2.3 Notify all affected utility companies and local authorities and agencies prior to beginning the work.

3.2.4 Identify and tag all existing trees and other landscaping designated to remain.

3.2.5 Identify and locate a permanent stockpile area for topsoil. Verify with District Representative and see plans and/or Landscape Architect's plans for fill soil stockpile area. Coordinate with Landscape Contractor.

3.2.6 Identify and locate a waste area for temporary storage of removed materials and a permanent topsoil stockpile area. Stockpile area shall be approved by the ARCHITECT and/or Landscape Architect.

3.2.6.1 No materials may be buried or burned on the site as a means of disposal.

3.3 GRUBBING AND CLEARING:

3.3.1 From the entire site and area of work, remove all trees, rocks, boulders, and vegetation to ground level where the new building and all site work are to be located, regardless if shown or not shown on the drawings.

3.3.2 Scarify ground to remove debris, boulders, rocks, vegetation, and roots to 12 inches below grade, and remove all deep root systems, stumps, root-balls, and any major root systems.

3.3.3 Remove and legally dispose of debris. When and as directed by the Architect and/or Landscape Architect, stockpile selected stripped soil materials and rocks/boulders for subsequent use in landscaping work.

3.3.4 No less frequently than continuously each day, treat exposed ground areas for dust control. At windy conditions as deemed necessary by the Inspector and Construction Manager, provide dust control to suit the Inspector and ARCHITECTS's satisfaction.

3.4 OFFSITE WORK:

3.4.1 Clean haul roads on and off site to a distance of three miles from the site or as directed by the Architect, Resident Inspector, ARCHITECTS and/or per local ordinance.

3.4.2 "Clean" herein refers to properly remove dirt clods, flocks, tree branches, and other items which may fall off the hauling equipment or be "tracked" off the site.

3.4.3 Notify all affected utility companies and local authorities and agencies prior to beginning the work.

3.4.4 Identify and tag all existing trees and other landscaping designated to remain.

3.4.5 Identify and locate a permanent stockpile area for topsoil. Verify with District Representative and see plans for fill soil stockpile area. Coordinate with Landscape Contractor.

3.4.5.1 **No materials may be buried or burned on the site as a means of disposal**.

3.5 PERFORMANCE:

3.5.1 This Contractor shall be responsible for all clearing, grubbing, removing and disposing of trash and debris and for clearing and stockpiling all topsoil which are with the designated limits of the property, easements and roadway, unless otherwise indicated on the Drawings.

3.5.2 Prior to rough grading, storage of construction materials or the installation of any temporary construction facilities, strip areas per plans to be occupied by site improvements.

3.5.2.1 Stockpile soil in previously designated areas or as directed by the District Representative. Sticks, stones, roots, weeds, grass, clods and rubbish shall be removed from the topsoil prior to stockpiling. If excess soil exists, it shall be disposed off-site.

3.5.2.2 Only soil meeting the requirements of Section 329000 – Landscape Grading shall be stockpiled. All non-conforming soil shall be removed from the site.

3.5.2.3 No topsoil may be used as structural fill under any building or paved areas.

3.5.3 This Contractor shall be responsible for removal of sidewalks, pavements, curbs, curbs and gutters, foundations, exterior slabs and sidewalks indicated to be removed on plans except for work covered under Landscape scope of work.

3.5.4 This Contractor shall be responsible for removal of all underground utilities, underground structures, etc., according to plans.

3.5.5 Protect any existing structures, utilities and all appurtenances to remain. Prevent movement or settling. Provide bracing and shoring as required.

3.5.6 Cease cleaning and removal operations immediately if any existing structure or utility appears in danger. Notify the District Representative and Civil Engineer of Record. Do not resume operations until directed.

3.5.7 All broken construction material, trash, and debris, tree slash, sidewalks, curbs, etc., will be considered “waste” and shall be removed from the site. “Waste” material shall be removed from the site as soon as possible and shall not be allowed to accumulate. Short-term storage of removed material shall be restricted to previously designated “waste” areas or as directed by the District Representative.

3.5.7.1 No burning or burying of “waste” material will be permitted.

3.5.8 Continuously dampen all clearing and removal areas to prevent dust from rising during the operation. Provide hoses and/or water trucks as required.

3.6 FIELD QUALITY CONTROL:

3.6.1 This Contractor shall retain an independent inspection firm or contact local officials and inspectors at locations where local building codes require special inspections.

3.7 CLEAN UP:

3.7.1 Material designated for removal shall become the property of this Contractor, and any salvage value there from will accrue to this Contractor.

3.7.2 Remove from the site and make legal disposition of all waste and debris. No waste or debris shall be burned or buried on the site as a means of disposal.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

1.1.1 Extent of potable water systems work is indicated on drawings and schedules, and by requirements of this section.

1.1.2 Refer to Section 312300 for excavation and backfill required for potable water systems; not work of this section.

1.2 QUALITY ASSURANCE

1.2.1 Manufacturer's Qualifications: Firms regularly engaged in manufacture of potable water systems, materials and products, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.2.2 Water Purveyor Compliance: Comply with requirements of local water agency, supplying water to project, obtain required permits and inspections.

1.2.3 Codes and Standards:

1.2.3.1 Regulatory Requirements: Comply with applicable portions of codes, standards, specifications and regulations of governmental agencies having jurisdiction. Some of the other agencies having jurisdiction are City of Glendale.

1.2.3.2 City of Glendale will inspect and approve all work within their jurisdiction.

1.2.3.3 Pay for all water district permits in conjunction with this work.

1.2.3.1 Comply with the applicable portions of the 2019 California Building Code (CCR Title 24, Part 2) Chapter 33.

1.2.3.2 Comply with the applicable portions of the 2019 California Fire Code (CCR Title 24, Part 9) Chapters 5 and 9.

1.2.3.3 Coordinate work of this Section with Permit provisions of the State of California Water Resources Control Board Order Number 2012-0006-DWQ.

1.2.3.4 The project Storm Water Pollution Prevention Plan.

1.2.3.5 2019 California Electrical Code (CCR Title 24, Part 3).

1.2.3.6 2019 California Plumbing Code (CCR Title 24, Part 5).

1.2.3.7 Cal-OSHA.

1.2.3.8 OSHA.

1.2.3.9 American National Standards Institute (ANSI) A21.10

1.2.3.10 American Society for Testing and Material (ASTM) F 477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.2.3.11 American Water Works Association (AWWA) Publications regarding pipe and installation:

1.2.3.11.1 AWWA C 104

1.2.3.11.2 AWWA C 110.

1.2.3.11.3 AWWA C 111.

1.2.3.11.4 AWWA C 115.

1.2.3.11.5 AWWA C 151.

1.2.3.11.6 AWWA C 600.

1.2.3.11.7 AWWA C 651.

1.2.3.11.8 AWWA C 900.

1.2.3.11.9 AWWA C 901.

1.2.3.11.10 AWWA M 23

1.2.4 Uni-Bell Plastic Pipe Association (UNI) - B - 3 with AWWA C 900.

1.2.5 National Fire Protection Association 24 - Standards for the Installation for Private Fire Service Mains and Their Appurtenances 2019 Edition (NFPA 24)

1.3 SUBMITTALS

1.3.1 Product Data: Submit manufacturer's technical product data and installation instructions for potable water system materials and products.

1.3.2 Shop Drawings: Submit shop drawings for potable water systems, showing piping materials, size, locations, and elevations. Include details of underground structures, connections, thrust blocks, and anchors. Show interface and spatial relationship between piping and proximate structures.

1.3.3 Record Drawings: At project closeout, submit record drawings of installed potable water system piping and products, in accordance with requirements of Division 1.

1.3.4 Maintenance Data: Submit maintenance data and parts lists for potable water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual in accordance with requirements of Division 1.

PART 2 – PRODUCTS

2.1 IDENTIFICATION

2.2.1 Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches wide by 4 mils thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

2.1.2 Metallic-Lined Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

2.1.3 Nonmetallic Piping Label: Engraved plastic-laminate label, for installation on main electrical meter panel; not less than 1 inch by 3 inches, with captions "CAUTION - THIS STRUCTURE HAS A NONMETALLIC WATER SERVICE."

2.2 PIPES AND PIPE FITTINGS

2.2.1 General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials, which match pipe materials used in potable water systems.

2.2.2 Piping: Provide pipes of one of the following materials, of weight/class indicated, unless otherwise indicated on plans. Provide pipe fittings and accessories of same material and weight/class as pipes.

2.2.2.1 Ductile-iron, AWWA C110; asbestos-cement couplings; rubber rings conforming to ASTM D 1869, and joints conforming to AWWA C111.

2.2.2.2 Ductile-Iron Pipe: AWWA C151, with cement mortar lining complying with AWWA C104; Class 51 unless otherwise indicated.

2.2.2.3 Polybutylene (PB) Pipe: AWWA C902 for sizes 1/2" through 3", and ASTM D 2662 for sizes 1/2" through 6"; SIDR 15.

2.2.2.4 Polyvinyl Chloride (PVC) Pipe: AWWA C900 for sizes 4" through 12"; Class 150.

2.2.2.5 Polyvinyl Chloride (PVC) Pipe: ASTM D 1785, Schedule 40 for sizes 1/2" through 3".

2.2.2.6 Polyethylene (PE) Pipe: AWWA C901 for sizes 1/2" through 3".

2.2.3 Fittings

2.2.3.1 Ductile Iron Fittings, AWWA C110 or C153

2.2.3.2 All fittings shall be cement-mortar lined in accordance with AWWA C104.

2.3 VALVES

2.3.1 Gate Valves: Provide as indicated, gate valves, AWWA C500, 175 psi working pressure. Provide threaded, flanged, hub, or other end configurations to suit size of valve and piping connection. Provide inside screw type for use with curb valve box, iron body, bronze-mounted, double disc, parallel seat, non-rising stem.

2.3.1.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering gate valves which may be incorporated in the work include, but are not limited to, the following: Subject to compliance with requirements, provide gate valves of one of the following:

2.3.1.1.1 Clow Corp; Valve Div.

2.3.1.1.2 Dresser Mfg.; Div. of Dresser Industries.

2.3.1.1.3 Cla-Val Co.

2.3.1.1.4 Kennedy Valve; Div. of ITT Grinnell Valve Co. Inc.

2.3.1.1.5 American AVK Co.

2.3.1.1.6 Waterous Co.

2.3.2 Butterfly Valves: Provide as indicated, butterfly valves, AWWA C504, 150 psi working pressure. Provide iron body, bronze disc, stainless steel stem, and metal-reinforced EPDM seat.

2.3.2.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering butterfly valves which may be incorporated in the work include, but are not limited to, the following: Subject to compliance with requirements, provide butterfly valves of one of the following:

2.3.2.1.1 Demco; Div. of Copper Industries, Inc.

2.3.2.1.2 ITT Grinnell Valve Co. Inc.

2.3.2.1.3 Keystone Valve; Div. of Keystone International Inc.

2.3.2.1.4 Cla-Val Co.

2.3.2.1.5 American AVK Co.

2.3.3 Check Valves: Provide as indicated, swing check valves, AWWA C508, 150 psi working pressure. Provide iron body, cast-iron disc, bolted cap.

2.3.3.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering check valves which may be incorporated in the work include, but are not limited to, the following: Subject to compliance with requirements, provide check valves of one of the following:

2.3.3.1.1 Clow Corp.; Valve Div.

2.3.3.1.2 Dresser Mfg.; Div. of Dresser Industries.

2.3.3.1.3 Fairbanks Co.

2.3.3.1.4 Kennedy Valve; Div. of ITT Grinnell Valve Co. Inc.

2.3.3.1.5 Stockham Valves and Fittings Inc.

2.3.3.1.6 Waterous Co.

2.3.3.1.7 American AVK Co.

2.4 FIRE HYDRANTS

2.4.1 Fire Hydrants: Wet barrel type complying with AWWA C503-88, UL listed, and local Fire Marshal approved.

2.4.2 Provide frangible section near the ground line designed to break on impact.

2.4.3 Provide one 2-1/2 inch and two 4-inch outlets. Provide cap with chain on each outlet.

2.4.4 Provide flanged, threaded, hub or sleeve type mechanical joint inlet connection designed to suit pipe or tapping sleeves connections.

2.4.5 Acceptable manufacturers or equal:

2.4.5.1 Clow Corp.

2.4.5.2 James Jones

2.4.5.3 Long Beach Iron Works

2.5 WATER METERS

2.5.1 Water Meters: Meters to be provided and installed by the local water agency.

2.5.2 Pipe, fittings, accessories, boxes, and materials complying with local water agency standards.

2.6 ACCESSORIES

2.6.1 Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.

2.6.1.1 Clamps, Straps, and Washers: Steel, ASTM A 506.

2.6.1.2 Rods: Steel, ASTM A 575.

2.6.1.3 Rod Couplings: Malleable-iron, ASTM A 197.

2.6.1.4 Bolts: Steel, ASTM A 307.

2.6.1.5 Cast-Iron Washers: Gray-iron, ASTM A 126.

2.6.1.6 Thrust Blocks: Concrete, 2,500 psi. Size as shown on Construction Documents.

2.6.1.7 Yard Hydrants: Provide non-freeze yard hydrants, 3/4" inlet, 3/4" hose outlet, bronze casing, cast-iron or cast-aluminum casing guard, key-operated, and tapped drain port in valve housing.

2.6.1.7.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering yard hydrants which may be incorporated in the work include, but are not limited to, the following:

2.6.1.7.2 Manufacturers: Subject to compliance with requirements, provide yard hydrants of one of the following:

2.6.1.7.2.1 Josam Mfg. Co.

2.6.1.7.2.2 Smith (Jay R.) Mfg. Co.

2.6.1.7.2.3 Tyler Pipe.

2.6.1.7.2.4 Zurn Industries, Inc.; Hydromechanics Div.

PART 3 – EXECUTION

3.1 INSPECTION

3.1.1 General: Examine areas and conditions under which potable water system's materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.1.2 Surveyor Qualifications

3.1.2.1 Surveyor shall currently be licensed in the State of California as a Professional Land Surveyor.

3.1.2.2 Surveyor shall employ proper field procedures, instrumentation and adequate survey personnel in order to achieve accuracies as required by each section.

3.1.2.3 Cut sheets, if required, shall be provide to the Inspector of Record at the start of the following business day after completion of the work.

3.1.3 Domestic Water and Fire:

3.1.3.1 Stakes shall be located with positional accuracies of a minimum of 0.1 feet horizontally and 0.05 feet vertically.

3.1.3.2 One set of construction stakes with lath shall be set. Lath shall indicate offset, cut/fill, and reference point, i.e. “”TC”, “FL”.

3.1.3.3 Stakes shall be set at maximum intervals of 50 feet, grade breaks, angle points, valves, meters, backflow devices, fire hydrants, fire department connections, post indicator valves, and building point of connections. All construction stakes shall be offset to the side of the utility at a distance from centerline designated by contractor and agreed to by surveyor prior to commencement of staking.

3.1.3.4 Surveyor shall provide to the Inspector of Record cut sheets for all staking. The contractor shall not commence work until Inspector of Record has provided copies of said cut sheets.

3.1.3.5 All stakes shall be preserved in place until such time that the Inspector of Record has approved utility installation for backfilling.

3.1.3.6 All pressure water lines shall be verified by the Inspector of Record for minimum depth of cover as designated by the plans and specifications.

3.1.3.7 Should a dispute arise over the position of the utility in question and the stakes provided for said installation are removed, destroyed, or disturbed, the contractor assumes full responsibility for all cost associated with the resolution of the dispute.

3.1.4 Beginning of installation means acceptance of existing conditions.

3.1.5 The Contractor shall notify Underground Service Alert at least two (2) days prior to starting work and shall coordinate all work with utility company representatives. The existence and locations of existing underground facilities indicated on the plans were obtained from a search

of available records. The contractor shall be responsible for the protection of all existing utilities indicated on the plans, and any other which is not of record or indicated on the plans.

3.1.6 Prior to commencing the work, the contractor shall POTHOLE THE EXISTING UTILITIES at points of connections and or crossings of the proposed utilities.

3.2 INSTALLATION OF IDENTIFICATION

3.2.1 General: During back-filling/top-soiling of potable water systems, install continuous metallic lined underground warning tape, located directly over buried line at 6" to 8" below finished grade. Tape shall be polyethylene with metallic core, 6 inches wide by 4 mils thick, solid blue color with continuously printed caption in black letters “CAUTION – WATER LINE BURIED BELOW.”

3.3 INSTALLATION OF PIPE AND PIPE FITTINGS

3.3.1 Copper Tube: Install in accordance with CDA "Copper Tube Handbook".

3.3.2 Ductile-Iron Pipe: Install in accordance with AWWA C600 "Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances".

3.3.3 Polyvinyl Chloride Pipe: Install in accordance with manufacturer's installation instructions.

3.3.4 Depth of Cover: Provide minimum cover over 4” diameter and smaller piping of 24" below finished grade and 36” minimum for piping 6” and larger diameter.

3.3.5 Water Main Connection: Arrange for tap in water main of size and in location as indicated, by City of Fontana Water Company Forces.

3.3.6 Water Service Termination: Terminate potable water piping 5'-0" from building foundation in location and invert as indicated. Provide temporary pipe plug for piping extension into building, by work of Division 15.

3.4 INSTALLATION OF VALVES

3.4.1 General: Install valves as indicated with stems pointing up.

3.4.2 Provide valve box over underground valves with valve covers set to finished grade and clearly marked to indicate “WATER”.

3.5 INSTALLATION OF FIRE HYDRANTS

3.5.1 Comply with AWWA M17. Install with gate valve and provision for drainage as indicated.

3.5.2 Set hydrants plumb and locate 4” outlet perpendicular to fire lane.

3.5.3 Set hydrants to grade with nozzles at least 20 inches above ground.

3.5.4 Install with the face of the bottom flange of the barrel 4 to 6 inches above the adjacent ground or paving.

3.5.5 Locate control valve 24 inches away from hydrant.

3.5.6 Provide drainage pit 36 inches square by 24 inches deep filled with 2 inch washed gravel. Encase elbow of hydrant in gravel to 6 inches above drain opening. Do not connect drain opening to sewer.

3.5.7 Paint hydrants in accordance with the Fire Marshal having jurisdiction.

3.5.8 Fire hydrants shall be as approved by the Fire Marshal having jurisdiction.

3.6 INSTALLATION - BACKFLOW PREVENTORS

3.6.1 Install backflow preventer of type, size and capacity indicated for potable and irrigation point of connections. Include valves and test cocks.

3.6.2 Install according to local water agency.

3.6.3 Support backflow preventers, valves, and piping on 2,500-psi; concrete piers as indicated.

3.6.4 Double detector check for fire service point of connection shall be furnished and installed by local water agency.

3.7 TESTING OF FIRE SERVICE MAINS AND APPURTENANCES

3.7.1 Testing and acceptance of fire service mains and their appurtenances shall be in accordance with NFPA 24 2019 Edition.

3.7.2 Approval of Underground Piping: The installing contractor shall be responsible for the following:

3.7.2.1 Notifying the authority having jurisdiction and the owner's representative of the time and date testing is to be performed.

3.7.2.2 Performing all required acceptance tests.

3.7.2.3 Completing and signing the contractor's material and test certificate shown in Figure 10.10.1 of NFPA 24.

3.7.3 Acceptance Requirements

3.7.3.1 Flushing of Piping

3.7.3.1.1 Underground piping, from the water supply to the system riser, and lead-in connections to the system riser shall be completely flushed before the connection is made to downstream fire protection system piping.

3.7.3.1.2 The flushing operation shall be continued for a sufficient time to ensure thorough cleaning.

3.7.3.1.3 The minimum rate of flow shall not be less than one of the following:

3.7.3.1.3.1 Hydraulically calculated water demand flow rate of the system, including any hose requirements.

3.7.3.1.3.2 Flow necessary to provide a velocity of 10 ft/sec in accordance with Table 3.7.3.1.3.

3.7.3.1.3.3 Maximum flow rate available to the system under fire conditions.

Table 3.7.3.1.3 Flow Required to Produce a Velocity of 10 ft/sec in Pipes

Pipe Size (in)	Flow Rate (gpm)
4	390
6	880
8	1,560
10	2,440
12	3,520

3.7.3.2 Hydrostatic Test

3.7.3.2.1 All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi or 50 psi in excess of the system working pressure, whichever is greater, and shall maintain that pressure at +/-5 psi for 2 hours.

3.7.3.2.2 Pressure loss shall be determined by a drop in gauge pressure or visual leakage.

3.7.3.2.3 The test pressure shall be read from one of the following, located at the lowest elevation of the system or the portion of the system being tested:

3.7.3.2.3.1 A gauge located at one of the hydrant outlets

3.7.3.2.3.2 A gauge located at the lowest point where no hydrants are provided

3.7.3.2.4 Hydrostatic Testing Allowance: Where additional water is added to the system to maintain the test pressures required by 3.7.3.2.1, the amount of water shall be measured and shall not exceed the limits of Table 3.7.3.2.4 which is based on the following equation:

$$L = \frac{SD(P)^{1/2}}{148{,}000} \qquad (3.7.3.2.4)$$

Where:

L = testing allowance (makeup water), in gallons per hour

S = length of pipe tested, in feet

D = nominal diameter of the pipe, in inches

P = average test pressure during the hydrostatic test, in pounds per square inch (gauge)

Table 3.7.3.2.4 Hydrostatic Testing Allowance at 200 psi per 100 Feet of Pipe

Nominal Pipe Diameter (in)	Testing Allowance in Gallons per Hour (gph) per 100 Feet of Pipe
2	0.019
4	0.038
6	0.057
8	0.076
10	0.096
12	0.115
14	0.134
16	0.153
18	0.172
20	0.191
24	0.229

Notes:

(1) For other length, diameters, and pressures, utilize Equation 3.7.3.2.4 to determine the appropriate testing allowance.

(2) For test sections that contain various sizes and sections of pipe the testing allowance is the sum of the testing allowances for each size and section.

3.7.3.3 Other Means of Hydrostatic Tests: Where required by the authority having jurisdiction, hydrostatic tests shall be permitted to be completed in accordance with the requirements of AWWA C600, AWWA C602, AWWA C603, and AWWA C900.

3.7.3.4 Operating Test

3.7.3.4.1 Each hydrant shall be fully opened and closed under system water pressure.

3.7.3.4.2 Dry barrel hydrants shall be checked for proper drainage.

3.7.3.4.3 All control valves shall be fully closed and opened under system water pressure to ensure proper operation.

3.7.3.4.4 Where fire pumps are available, the operating tests required by 3.7.3.4 shall be completed with the pumps running.

3.7.3.5 Backflow Prevention Assemblies

3.7.3.5.1 The backflow prevention assembly shall be forward flow tested to ensure proper operation.

3.7.3.5.2 The minimum flow rate required by 3.7.3.5.1 shall be the system demand, including hose stream demand where applicable.

3.7.3.6 The trench shall be backfilled between joints before testing to prevent movement of pipe.

3.7.3.7 Where required for safety measures presented by the hazards of open trenches, the pipe and joints shall be permitted to be backfilled, providing the installing contractor takes the responsibility for locating and correcting leakage.

3.7.3.8 Provision shall be made for the proper disposal of water used for flushing or testing.

3.8 TESTING OF WATER MAINS

3.8.1 Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline 24 hours prior to testing, and apply test pressure to stabilize system. Use only potable water.

3.8.2 Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2-hrs.

3.8.3 Test fails if leakage exceeds 2-qts per hour per 100 gaskets or joints, irrespective of pipe diameter.

3.8.4 Increase pressure in 50-psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

3.9 ADJUSTING AND CLEANING

3.9.1 Disinfection of Potable Water System: Flush pipe system with clean potable water until no dirty water appears at point of outlet. Fill system with water-chlorine solution containing at least 50 ppm of chlorine. Valve off system and let stand for 24-hrs minimum. Flush with clean potable water until no chlorine remains in water coming from system.

3.9.2 Repeat procedure if contamination is present in bacteriological examination.

3.9.3 Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C601 "Standard for Disinfecting Water Mains".

END OF SECTION