PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the General Conditions, Supplementary Conditions and the following Specification sections apply to all Work herein:
   1. Section 21 00 10 - General Requirements
   2. Section 21 00 20 - Fire Suppression Scope of Work
   3. Section 21 05 07 - Design Conditions
   4. Section 21 12 00 - Fire Suppression Standpipe Systems
   5. Section 21 13 00 - Fire Protection Sprinkler Systems

1.2 SUMMARY

A. The Contractor is required to verify the locations and depths of all utility lines around and on the site and to govern himself accordingly. The Contractor shall make suitable permanent connections to all the utilities.

1.3 REFERENCE STANDARDS

A. All connections to utilities shall be made and tested in accordance with the latest applicable industry standards including the following:
   1. Associated General Contractors of America, Inc. – “Manual of Accident Prevention in Construction”.

B. All equipment and material to be furnished and installed on this Project shall be UL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

1.4 SUBMITTALS

A. The following submittal data shall be furnished according to the General Conditions and Section 21 00 10 and shall include, but not be limited to:
   1. Submit complete installation and test procedures for all excavation and backfill Work for approval by Architect prior to commencing any Work.

1.5 WARRANTY

A. Comply with the requirements of the General Conditions and Section 21 00 10.

PART 2 PRODUCTS

2.1 WATER SERVICE CONNECTIONS

A. Fire suppression water service shall be as specified in Section 21 13 00 titled “Fire Protection Sprinkler Systems”.

PART 3 EXECUTION

3.1 WATER SERVICE CONNECTIONS

A. The fire suppression water service to the building from a point 5’ - 0” from the building shall be furnished and installed as shown by the Drawings.

B. The Subcontractor shall pay all connection fees, tap charges, meter charges, if any, assessed by local authorities.

3.2 UNDERGROUND PIPE TRENCH EXCAVATION, INSTALLATION AND BACKFILL

A. All underground pipes shall be laid open in trench. All pipes and pipe joints shall be observed by the Architect or Engineer prior to backfill. All field measurements, layouts, batterboard alignment, grade establishments, etc., shall be done by an Engineer in the employ of the Subcontractor. The Subcontractor's Engineer shall be on-the-job as required for the underground Work. The Architect will provide a "Bench Mark" reference for use by the Subcontractor.

B. Pipes shall be laid and maintained at required lines and grades during the course of the Work to comply with the Drawings. All joints shall be aligned and complete.

C. The trench shall be excavated to alignment and depth as required. Trench shall be properly braced and dewatered. The trenches shall be kept free of water at all times during installation, testing of pipe and backfilling. The Subcontractor shall provide proper facilities for discharging water into natural drainage channels. No water shall be discharged onto the street or freeway without approval by the Architect.

D. The trench shall be at least 18" wider than the diameter of the largest bell on the pipe. If the pipe has no bells, the trench shall be at least 18" wider than the maximum diameter of the pipe. Pipe shall be laid in the center of the trench. The trench shall be excavated to a depth sufficient to provide for pipe cushions as specified herein. Subcontractor shall remove all unsuitable excavated material from the Project Site as necessary.

E. Sheet pile and brace excavations wherever necessary to prevent cave-in. Trench width may be increased as required and piling left in place until sufficient compacted backfill is in place. The Subcontractor shall properly sheet and brace all open trenches to render them secure and shall remove all such sheeting and bracing before completing the backfill. The Subcontractor shall comply with local regulations or in the absence thereof, with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc. The quantity of excavation required to install sheeting and the installation and removal of sheeting's and bracing's will not be regarded as extra Work and all costs incurred for this excavation and the installation of sheeting shall be included in the Contract price.

F. Trenching may be done with trench digging machinery unless hand digging is required to avoid damage to existing structures or apparatus both above or below grade.

G. Upon completion of excavation and prior to the laying of the pipe, the trench bottom shall be brought up to the required elevation with a pipe cushion, except where the cushion has been eliminated by the Architect. Pipe cushions shall be select material deposited in the trench, and shall be compacted, leveled off, and shaped to obtain a smooth compacted bed along the laying length of the pipe. Material for pipe cushion shall comply with local codes. In absence of local code requirements the cushion shall be bank sand or select backfill material approved by the Architect. Any material used shall pass a 1/4 " screen.

H. Pipes shall not be laid in water or when trench condition is unsuitable.

I. As sections of pipe are installed, they shall be temporarily sealed until remaining sections of the piping have been installed to complete the system.

J. Cast iron pipes shall have concrete anchors at each change in direction and/or as directed. Any change in direction exceeding 15° shall be anchored. Concrete anchors shall rest against solid virgin ground with the required area of bearing on pipe and ground to provide suitable anchoring.

K. Trenches shall be backfilled only after piping has been inspected, tested and approved by the Architect and/or Engineer. All backfill material shall be placed in the trench either by hand or by approved mechanical methods. The compaction of backfill material shall be accompanied by tamping, with hand tools or approved pneumatic tampers, by using vibrating compactors, by puddling or by any combination of the three (3). The method of compaction shall be approved and all compaction shall be done to the satisfaction of the Architect. Backfill completely around pipe, including 18" above the pipe, with suitable bank sand, tamped in 4" layers under, around and over pipe. Water down backfill as required. The remainder of the backfill for all pipes shall be select backfill material tamped at intervals of no more than 12" depths, to attain Proctor Compaction Density specified in Section 21 00 10. All materials to be used as selected material backfill shall be approved by the Architect. If in the opinion of the Architect, the excavated material does not meet

the requirements of selected material, the Subcontractor shall be required to screen the material prior to its use as selected material backfill. Material used in the upper portion of the backfill or sub-grade shall not contain stone, rock or other material larger than six inches in its longest dimension. No wood, vegetable matter or other material, which in the opinion of the Architect, is unsuitable, shall be included in the backfill. The upper 24" of backfill may be water jetted, if desired. Backfill shall be brought up to finish grade identified on the Architectural Drawings, including additional backfill required to offset settlement during consolidation.

L. When removal of unsuitable excavated material creates a shortage of backfill material, the Subcontractor shall, at no cost to the Owner, furnish material as specified in this Section in the amount required to complete the backfill.

M. Existing streets, driveways, and sidewalks damaged during the excavation Work shall be restored to acceptable condition, subject to approval by the Architect.

N. Provide all street and sidewalk excavations with approved barricades, warning lights and coverplates as required by the authorities having jurisdiction.

3.3 FIELD TESTING

A. Refer to Section 21 05 93 for additional testing requirements for connections to utilities.

END OF SECTION