PART ONE - GENERAL

1.1 The Contractor shall comply with the minimum requirements of this specification. Maintenance and inspection of any shoring and related equipment shall be the responsibility of the Contractor. The City and/or the Engineer reserves the rights to require the Contractor to remove, repair and/or replace any portions of the shoring system deemed unsafe but the final responsibility for worker's safety remains with the Contractor.

1.2 The Contractor shall determine the safety system needed for the project within the minimum requirements of this specification. The Contractor shall submit to the City a certified submittal from a Registered Professional Engineer from the State of Texas that the Contractor's Trench Safety System meets the minimum requirements of this specification, and shall make adjustments as required by the City to meet minimum requirements at Contractor's expense. Approval of a trench safety system by the City shall not relieve the Contractor of his responsibility to provide a safe working place for his employees. The Contractor agrees to hold harmless and defend the City and/or its Engineer against any claim resulting from failure of the trench safety system or lack of one.

PART TWO - PRODUCTS

2.1 REGULATORY REQUIREMENTS

(1) Conform to applicable Occupational Safety and Health Administration (OSHA) Standards as contained in 29 CFR, Part 1926, Subpart P - Excavations (as may be amended) including OSHA "Proposed Rules: Excavations Federal Register, Vol. 52, No. 72 Wednesday, April 15, 1987, pages 12325-12339. The sections that are made part of these specifications by reference include Sections 1926.652 and 1926.653.

(2) The Contractor's Trench Safety System shall be designed by "a registered professional engineer" or "a qualified person or a qualified engineer", such a person shall be a Professional Engineer registered in the State of Texas.

(3) The Contractor's "Engineer" shall develop a specific trench safety system design for the project in general compliance to the requirements set forth by House Bills 662 and 665 of the 70th Legislature, and in accordance with Part 1926.652 (c)(4) of OSHA "Proposed Rules".

2.2 DEFINITIONS

(1) Angle of Repose: The greatest angle above the horizontal plane at which a material will lie without sliding.

(2) Bank: A mass of soil rising above a digging level.

(3) Braces: The horizontal members of the shoring system whose ends bear against the uprights or stringers.

(4) Excavation: Any man-made cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.

(5) Hard Compact Soil: All earth materials not classified as running or unstable.

(6) Kickouts: Accidental release or failure of a shore or brace.

(7) Sheet Pile: A pile or sheeting that may form one of a continuous interlocking line, or a row of timber, concrete or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth or other materials.

(8) Sides, Walls, Faces: The vertical or inclined earth surfaces formed as a result of excavation work.

(9) Slope: The angle with the horizontal at which a particular earth material will stand indefinitely without movement.

(10) Stringers, Wales: The horizontal members of a shoring system whose sides bear against the uprights or earth.

(11) Trench: A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

(12) Trench Jack: Screw or hydraulic type jacks used as cross bracing in a trench shoring system.

(13) Trench Shield: A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

(14) Unstable Soil: Earth material, other than running, that because of its nature or the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

(15) Uprights: The vertical members of a shoring system.

2.3 CONSTRUCTION MATERIALS AND MAINTENANCE

(1) Materials used for sheeting, sheet piping, cribbing, bracing, shoring and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions as called for in the latest revision of OSHA Construction Standards, Subpart P, "Table P-2 - Trench Shoring - Minimum Requirements", of which is made a part of these specifications. All materials that are found to be defective in any way shall be immediately removed from the job site. It shall be the responsibility of the Contractor to regularly check all trench safety equipment for soundness and adequacy.

(2) Steel trench shields shall be constructed of steel plate sides, welded to a steel framework. All shields shall be constructed in order to provide protection equivalent to or greater than sheeting of shoring required for the trench. The Contractor shall provide written certification from the manufacturer's engineer to the City of adequacy before using any trench shield. Adjustable jacks may be used in order to adjust the shield to varying trench widths. An access ladder shall be provided at the midpoint. Pipe or flat steel runners or wheels shall be installed under the sidewalls for ease of movement of the shield during trenching operations. Substantial lifting eyes and /or rings shall be welded at proper points for moving the shield. For adaptability to deep and shallow trenches, the shield may be made with top and bottom sections. When the sides of the trench extend above the top of the shield, a reinforced roof with hatches shall be provided. Forced ventilation shall be provided for fully enclosed shields.

(3) All maintenance of the trench safety equipment shall be the sole responsibility of the Contractor.

PART THREE - EXECUTION

3.1 GENERAL

Within fifteen (15) days after the bid opening, or at least ten (10) days prior to beginning construction, the Contractor shall submit a written plan for a Trench Safety System specifically for construction of trench excavation, together with the general safety program required by OSHA standards governing the presence

and activities of individuals in and around trench excavations. Failure to submit a Trench Safety System submittal as required may result in forfeiture of the bid bond. The Trench Safety System submittal shall be all inclusive of specific requirements of OSHA and the City.

The Contractor shall provide a trench safety system for all trench excavations that exceed a depth of five (5') feet or are in unstable or unsuitable soils as designated by the responsible Engineer. The Trench Safety System shall conform to the OSHA standards, latest revision, the same of which is made a part of these specifications, along with the following additions and revisions. The types of trench safety systems currently allowed include shoring, bracing, solid shoring, sloping of the ground and trench shields. The Contractor may submit an alternative method of trench safety, but may not implement until the City approves a sealed submittal by a Registered Professional Engineer from the State of Texas. Should the Contractor decide to slope the sides of the trench, he shall have the angle of repose of the soil determined by as approved independent soils testing laboratory. At a minimum, the Contractor's design for sloping of the trench sides shall conform to the latest revision of OSHA Construction Standards, Subpart P, "Table P-1 - Approximate Angle of Repose For Sloping of Sides of Excavations", which is made a part of these specifications. Soil core samples taken to a depth of at least the depth of the trench plus four (4') feet shall be taken a minimum of every 700 feet. A minimum of two (2) copies of the results of the lab tests shall be provided to the City.

(1) Each Contractor shall be responsible and liable for his own Trench Safety System, including self-inspections, whether or not a project representative is present on the job site. The Contractor shall install additional safety equipment if requested to do so by the Engineer or City, whose decision shall be final.

(2) Before beginning any excavation the Contractor shall make an inspection of the job site. He shall pay special attention to the type of soil or soils in which he will be working, any adjacent roads, highways, railroads and any previous excavations. All underground installations shall be located, including utility lines, pipelines, etc., before any excavation begins.
The Contractor shall provide a trench safety system in every trench. The trench safety system shall be installed in a true horizontal position, be spaced vertically and shall be secured to prevent sliding, falling or kickout. The trench safety system shall be effective to the bottom of the excavation. All trenches shall be provided with an adequate means of exit at all times with spacings of 25 feet or less.
These means of exit shall be anchored in place in order to aid in the event a quick exit is necessary. During trench excavation, the excavated material shall be placed a minimum of two (2') feet away from the edge of the trench.

(3) The Contractor shall make an inspection of all trench excavations. He shall check for any evidence of cave-ins, slides, etc. If any change in soil conditions or failure of the trench is found, the Contractor shall remedy such. All water shall be diverted by suitable means to prevent the entrance of same into any excavation. No water shall be allowed to accumulate in any excavation and shall be removed as soon as possible.

3.2 INDEMNIFICATION

(1) The Contractor shall indemnify and hold harmless the City, its employees, agents and Engineer, from any and all damages, cost (including without limitation, legal fees, court costs and investigation costs), judgments or claims by anyone for injury or death of persons resulting from the collapse or failure of trenches constructed. These specifications for the trench safety system in no way relieve the Contractor of his responsibilities and liability to ensure the safety of the workers or any other party from the hazards of the construction operations.

(2) The Trench Safety System plan by the Contractor's Engineer shall cover the situations that may be encountered during construction. It should be recognized that information contained in the required Geotechnical Report is based on the data obtained from the soil borings and conditions along the line route may differ from those found at the soil boring locations. It is the Contractor's responsibility to detect varying conditions that may be hazardous and take appropriate action.

(3) The Contractor is responsible for determining the appropriate trench safety systems necessary for specific locations based on actual subsurface conditions encountered during construction. The City and its Engineer shall be held harmless from any claim or liability for injury or loss that results from failure on the part of the Contractor to implement the Trench Safety System plan properly or to make necessary changes to the trench safety systems necessitated by conditions encountered during construction.

PART FOUR - MEASUREMENT AND PAYMENT

Not applicable