SECTION 01060

PRECONSTRUCTION INVESTIGATION BY CONTRACTOR

PART 1 G E N E R A L

1.1 SECTION INCLUDES

A. Subsurface Utility and Obstruction Evaluation to determine the presence of conflicts so the contractor can perform the conflict resolution in coordination with the City for final approval.

1.2 UNIT PRICES

A. No additional payment will be made for preconstruction investigation by contractor including subsurface utility and obstruction evaluation as well as process undertaken by contractor for obtaining City approval of their proposed conflict resolution plan. Include payment in the unit price for applicable bid items.

B. No separate or additional payment will be made for technologies and equipment used for remote or intrusive work to determine the presence of conflicts from private or public utilities, vegetation or structures, or for damages due to intrusive work that requires restoration by contractor to existing conditions. Include payment in the unit price for applicable bid items.

1.3 DEFINITIONS

Designating: The process of using a surface geophysical method or methods to interpret the presence of a subsurface utility and to mark its approximate horizontal position (its designation) on the ground surface. (Note: Utility owners and contractors sometimes call this process "locating.") Engineer The individual or firm providing engineering and design-related services as a party to the contract. The engineer produces the instruments of service or manages the instruments of service of the subconsultants.
Locating: The process of exposing and recording the precise vertical and horizontal location of a utility.
Minimally intrusive excavation method: A method of excavation that minimizes the potential for damage to the structure being uncovered. Factors such as utility material and condition may influence specific techniques. Typical techniques for utility exposures include air-entrainment/vacuum-extraction systems, water-jet/vacuum-extraction systems, and careful hand tool usage.
One-call notification center: An entity that administers a system through which a person can notify utility owners and operators of proposed excavations. Typically, the one-call center

notifies member utility owners that they may send records to the designer or designate and mark on the ground surface the existing indications of some or all of the utilities that may be present.
One-call statute: A local or state requirement that an excavator or designer of excavation call a central number to notify some or all existing utility owners of that planned excavation.
Subsurface utility evaluation (SUE): Potential obstruction investigation, utility coordination, utility relocation, utility condition assessment, and communication of utility data and approval of all concerned parties.
Surface geophysical method: Any of a number of methods designed to utilize and interpret ambient or applied energy fields for the purpose of identifying properties of, and structure within, the earth. Such methods typically include variants of electromagnetic, magnetic, elastic wave, gravitational, and chemical energies.
Survey datum: The points of reference used by the project owner and engineer to define a specific geographic location in three-dimensional space.
Test hole: The excavation made to determine, measure, and record the presence of a utility structure.
Utility: A privately, publicly, or cooperatively owned line, facility, or system for producing, transmitting, or distributing communications, cable television, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, or any other similar commodity, including any fire or police signal system or street lighting system.
Utility accommodation policy: A policy for accommodating utility facilities on the project. This policy includes, but is not limited to, establishing the horizontal and vertical location requirements and clearances for the various types of utilities; referencing applicable provisions of government or industry codes required by law or regulation; providing standards, specifications, detailed procedures, criteria, and methods of installation; providing requirements for the preservation and restoration of project facilities; setting forth limitations on the utility's activities within the project area; and establishing measures necessary to protect traffic, workers, and the general public during and after the installation of utility facilities.
Utility attribute: A distinctive documented characteristic of a utility that may include but is not limited to elevation, horizontal position, configurations of multiple non-encased pipes or cables, shape, size, material type, condition, age, quality level, and date of measurement.
Utility depiction: A visual image of existing utility information using a computer-aided design and drafting system or on project plan sheets.
Utility quality level: A professional opinion of the quality and reliability of utility information. Such reliability is determined by the means and methods of the professional. Each of the four existing utility data quality levels is established by different methods of data collection and interpretation.
Utility quality level A: Precise horizontal and vertical location of utilities obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, is shown on plan documents. Accuracy is typically set to 15-mm vertical and to applicable horizontal survey and mapping accuracy as defined or expected by the project owner.
Utility quality level B: Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Quality level B data should be reproducible by surface geophysics at any

point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced onto plan documents.

Utility quality level C: Information obtained by surveying and plotting visible above-ground utility features and by using professional judgment in correlating this information to quality level D information.

Utility quality level D: Information derived from existing records or oral recollections.

Utility relocation policy: A policy (typically of the project owner or utility owner) for the relocation of utility facilities required by the project. This policy includes, but is not limited to, establishing provisions for compensating utility owners; for removing and reinstalling utility facilities; for acquiring or permitting necessary rights-of-way at the new location; for moving, rearranging, or changing the type of existing facilities; and for taking necessary protective measures.

Utility search: The search for a specific or unknown utility or utilities using a level of effort in accordance with the specified quality level, within a defined area.

Utility trace: The process of using surface geophysical methods to image and track a particular utility.

Utility Records: Submit record of location of utilities as installed, referenced to survey control points. Include locations of utilities encountered or rerouted. Give stations, horizontal dimensions, elevations, inverts, and gradients.

Protecting Utilities:

A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within the grading limits as designated on the Drawings, and in accordance with requirements of Section 01535 - Tree and Plant Protection.

B. Protect and support above-grade and below-grade utilities which are to remain.

C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities are indicated on the Drawings.

3.1 PRE-CONSTRUCTION INVESTIGATION BY CONTRACTOR (**NO SEPARATE PAY**)

A. Horizontal and vertical location of various underground lines shown on Drawings, including but not limited to water mains, gas lines, storm sewers, sanitary sewers, telephone lines, electric lines or power ducts, pipelines (petrochemical or petroleum product), concrete and debris, are based on best information available but are only approximate locations. At critical locations field verify horizontal and vertical

locations of such lines within a zone 2 feet vertically and 4 feet horizontally of proposed main. Verify location of existing utilities prior to commencing construction. Use extreme caution and care when uncovering these lines. Any damage to known on unknown utilities or obstructions occurring during Potential Obstruction Investigation will be full responsibility of Contractor. No separate payment shall be made for performing such efforts.

B. Prior to actual field verification phase, notify all utility companies involved and request that their respective utility lines be marked in field. If any utility or pipeline company requires their line be excavated, or exposed prior to construction, comply with that request and utilize a methodology approved by the said company in locating or exposing their lines. Provide Owner's Representative with 48 hours notice prior to any field excavation or related work.

C. Once known, unknown or potential obstructions have been uncovered, survey vertical and horizontal locations relative to project baseline and datum and plot on 11" X 17" copy of Drawings.

D. Submit 11" X 17" copy of Drawing with plotted utility or obstruction location titled Potential Obstruction Report to Owner's Representative before or simultaneous with pipe shop drawing submittal.

E. Owner's Representative will promptly review Potential Obstruction Report and approve construction of proposed main as designed or modify design if necessary. Contractor will be promptly notified of any design modifications.

F. The accurate location of all utilities, structures, landscaping, irrigation, etc., as shown is approximate and all may not be shown on the plans, quantified on the bid forms, or detailed in the specifications. Contractor is responsible for confirming the material, size, location, quantity, and other details of all objects including pipelines, structures, conduits, cables, surface, subsurface and environmental conditions (ex: water depth, abandoned duct banks, rails, concrete blocks,), etc.

G. The City of Galveston requires the Contractor to pre-locate, pre-verify and pre-investigate all utilities, obstructions and surface and subsurface environmental conditions (shown or not shown) before construction of this project, by whatever method, subject to approval by the owner which includes but is not limited to the following:

1. Utilization of metal detection equipment and probes
2. Excavation, ex: Hydrovac pot holing
3. Opening manholes to determine the flow line of storm pipes and sanitary sewer

4. Measuring the depth to valve nut and adding 18" to determine the depth to waterlines
5. Probing to identify sprinklers, storm system, water/sanitary services, etc.
6. Subsurface Utility Investigation (SUE) Level A through D survey which includes 1 through 5.

H. All investigative work done and all repairs required after investigation shall be accomplished by the contractor.

I. Contractor agrees to be fully responsible for increase in cost, delays in schedule, impact to the public, changes in their construction scope, including any and all damages which might be caused by their failure to exactly locate and preserve all utilities, structures and other obstructions.

J. Contractor shall be responsible for contacting all utility companies through an "811 Call Before You Dig" at least 14 calendar days prior to construction in area of known and unknown utilities which may or may not be shown on the plans.

K. If the contractor requests the City Staff to assist with locating utilities, structures or other surface and below ground features, the City will invoice the contactor fully for such services.

L. Above ground utility information may be obtained by standard land surveying methods. Underground utility locations may be determined by conventional survey methods, newer technologies, or by Subsurface Utility Evaluation (SUE). The SUE process combines surveying and geophysics to accurately identify, characterize, and map underground utilities. To avoid construction issues and delays that create cost overruns, the contractor should AVOID, MITIGATE, or ADJUST for project utility conflicts. Early design and planning phases should include subsurface site characterization of various geologic, environmental, and utility features.

M. Locate existing utilities. This task involves physically locating, marking, and surveying the physical features of utilities. If utility maps are not available, knowledge and survey of the aboveground structure types can indicate the complexity.

N. This task identifies utilities specifically and determines elevations as well as horizontal positions. Examples might include manhole covers, gas pipes, overhead lines, and fiber-optic cables. There are standard location methods and newer technologies used for underground utility locating survey, such as subsurface utility evaluation (SUE), metal detection (MD), ground-penetrating radar (GPR), and electromagnetic line location (EMLL). Topographic surveys may be adequate for project locations with few underground utilities (i.e., in rural areas).

O. Undocumented utilities may have been installed without a record of their location. EMLL or GPR should be used to mark locations on the ground followed by invasive potholing or excavation to determine the utility type. GPR can detect non-metallic targets without tracer wire. SUE is a non-destructive utility investigation to accurately locate, identify, and map underground utilities.

Subtasks.

1. Locate, log, and survey visible features of utilities.
2. To confirm and survey locations of strategic subsurface features, it may be necessary to "pothole" or excavate down to the utility after using MD, GPR, or EMLL.
3. Mark and label locations of subsurface utilities on the ground with stakes, laths, or other means.
4. Survey utility locations.
5. Manhole covers and other obstructions may need to be adjusted for resurfacing projects.

Critical Sequencing.

1. To avoid costly conflicts utility location data needs to be collected before beginning construction.
2. Utility data is needed before establishing final alignments of the roadway and related features (e.g., storm drains, utilities, and other excavation work) to avoid these conflicts and eliminate construction delays or service outage..

Authority.

1. Utilities Code Chapter 251 Underground Facility Damage Prevention and Safety

P. Subsurface Utility Evaluation (SUE). Contractors should be competent and knowledgeable, experienced, insured, timely, and have the equipment and financial capacity to provide the service prior to construction and at no cost to the City (No Separate Pay). Major activities involved in SUE are:

Designating: Surface geophysical techniques to determine the existence and horizontal position of subsurface utilities. Above ground surface markers (stakes, flags, etc.) or on the ground surface marking (paint) mark the location.

Locating: Process of exposing precise horizontal and vertical position, size, and configuration of subsurface utilities.

Data Management: Process of locating, surveying, and designating information and transferring it into project GIS files, plans, or CAD system.

Conflict Analysis: Using a conflict matrix to do an evaluation and compare designating information with proposed plans to inform all stakeholders of potential conflicts, possible resolutions, and costs to resolve.

Quality Level D (QL-D). The most basic level of information. It comes from existing utility records or oral recollections. Its usefulness should be confined to

project planning and route selection activities.

Q. **Quality Level C (QL-C)**. It involves surveying visible aboveground utility facilities, such as manholes, valve boxes, posts, etc., and correlating this information to Quality Level D. Its usefulness should be confined to rural projects where utilities are not prevalent, or are not too expensive to repair or relocate.

R. **Quality Level B (QL-B)**. Using appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. This two-dimensional horizontal mapping information is usually sufficient to accomplish preliminary utility conflict elimination preliminary goals which needs to be further confirmed. Decisions can be made on where to place storm drainage systems and other design features in order to avoid conflicts with existing utilities. Slight adjustments in the design can produce substantial cost savings by eliminating utility relocations.

S. **Quality Level A (QL-A)**. Precise vertical and horizontal location of subsurface utilities obtained by exposure and subsequent measurement, usually at a specific point. Information provides the highest level of accuracy presently available. When surveyed and mapped, precise plan and profile information is available for use in making final design decisions. The use of nondestructive digging equipment, particularly vacuum excavation, eliminates damage to underground utility facilities traditionally caused by backhoes.

END OF SECTION