CITY OF TAMPA

Bob Buckhorn, Mayor **CONTRACT ADMINISTRATION DEPARTMENT**

David L. Vaughn, AIA, Director

ADDENDUM NO. 1

DATE: July 17, 2013

Contract 13-C-00020; Osborne Pumping Station Rehabilitation

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: Delete Workmanship and Material Section W-58.

Item 2: Replace Workmanship and Materials Section W-38 with the revised, attached Section W-38.

Item 3: Replace Workmanship and Materials Section W-46 with the revised, attached Section W-46.

Item 4: Change on page SP-8, SPECIFIC PROVISIONS – SP-60 Contingency in the first two paragraphs “Twenty” to read “Fifty”.

Item 5: Attached for reference is the Pre-bid meeting sign-in sheet.

Item 6: A subsurface report is provided for reference.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect. Questions are to be e-mailed to Contract Administration@tampagov.net.

Jim Greiner

Jim Greiner, P.E., Contract Management Supervisor

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SECTION 38 - SEWAGE PUMPING EQUIPMENT

W-38.01 General

Sewage pumping equipment shall include the installing of totally submersible, electrically operated sewage pumps complete with all accessories and appurtenances necessary for a complete installation in the pumping station.

Each pump shall be an ITT Flygt, Pump, and shall comply with the drawings and specifications for this project. A single source certificate of conditions and circumstances was executed for this pump. The certificate states that no other pump shall be considered an "or equal" for this project in accordance with the City's standardization program. The "or equal" clause applies to all other equipment in this project, unless specifically excluded by a single source certificate.

Each pump shall have a substantial guide bracket to permit vertical sliding along not less than two unthreaded stainless steel guide rails from an automatic pump discharge connection at the bottom of the wet pit to the wet pit access cover for inspection, maintenance, and removal of the pump without requiring personnel to enter the wet pit. The pump shall be easily removable from the guide rails and shall require no bolts, nuts, or other fasteners to be disconnected. The guide brackets shall be of stainless steel and shall be an integral part of the pumps. The guide rails shall be Type 304, Schedule 40 stainless steel pipe and shall be connected to the automatic pump discharge connection at the bottom and supported at the top by substantial stainless steel brackets bolted to the concrete sides of the wet pit access opening. The automatic pump discharge connection shall be cast-iron, flanged by plain-end, 90 degree vertical bend with an integral cast-iron support. The support shall be bolted to the floor with not less than four, 3/4-inch diameter stainless steel anchor bolts cast into the concrete. The pump volute discharge shall have a machined flange, which when the pump is lowered into pumping position will automatically and firmly mate with the plain-end of the discharge connection without the need of adjustment, fasteners, clamps, or similar devices. No motion other than vertical shall be required to seat the mating flange of the pump volute to the discharge connection. Sealing of the discharge interface shall be accomplished by only metal contact and the use of a diaphragm, O-ring, or other device will not be permitted. The pump, with its appurtenances, shall be capable of continuous submergence under water without loss of watertight integrity to a depth of 65 feet. No portion of the pump shall bear directly on the floor of the wet pit. Each pump shall be fitted with a stainless steel, welded link chain of adequate length to permit the raising and lowering of the pump for inspection and removal.

W-38.0 Pump Characteristics

SEE SPECIFIC PROVISIONS

W-38.03 Construction

The stator casing, oil casing, sliding bracket, volute, and impeller of each pump shall be of hard, closegrained gray cast iron. All surfaces coming into contact with sewage shall be protected by a coat of Nylon-II, heat fused to the metal. All external bolts and nuts shall be of stainless steel.

The impeller of each pump shall be of non-clog design capable of passing a 3-inch spherical solid, fibrous material, and heavy sludge and shall be constructed with long throughlet without acute turns. The impeller shall be statically and dynamically balanced. Static and dynamic balancing operations shall not deform or weaken the impeller. The impeller shall be firmly secured to the shaft by a stainless steel key and lock nut in such a way that it cannot unscrew or become loosened due to torque resulting from rotation in either direction.

A renewable Buna-N rubber wearing ring shall be installed at the inlet of each pump to provide protection against wear to the impeller.

Each pump shaft shall be of stainless steel conforming to ASTM Des: A 582, Type 416. The shaft shall be accurately machined and polished and of sufficient diameter to carry the maximum load imposed, to assure rigid support of the impeller and to prevent excessive vibration at all operating speeds. The shaft shall be provided with two guide bearings of the ball type of ample size to carry the loads imposed under continuous service without overheating.

Each pump shall be provided with a tandem double mechanical seal running in an oil reservoir having separate, constantly hydro-dynamically lubricated lapped seal faces. The lower seal unit between the pump and oil chamber shall contain one stationary and one positively driven rotating tungsten-carbide ring. The upper seal unit between the oil sump and motor housing shall contain one stationary tungsten-carbide ring and one positively driven rotating carbon ring. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Shaft seals without positively driven rotating members or conventional double mechanical seals with a common single or double spring acting between the upper and lower units, requiring a pressure differential to offset external pressure and effect sealing shall not be considered acceptable nor equal to the dual independent seal system specified. The shaft sealing system shall be capable of operating submerged to depths of or pressures equivalent to 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

The pump motors shall be housed in an air-filled watertight casing and shall have Class F moisture resistant insulation. The temperature at any point in the windings shall not exceed 155 degrees C at any load which could be imposed by the pump at any point on its curve. The motors shall be 460-volt, 3-phase, 60-hertz, squirrel-cage induction motors. Each motor shall have a minimum full load efficiency of 85 percent and a minimum full load power factor of 80 percent. Each motor shall be U.L., Inc. or Factory Mutual Engineering Corporation listed for installation and operation in a Class I, Division 2, Group C and D hazardous locations. Each motor shall have a facility for winding high temperature alarm. Each motor shall be provided with a leakage sensor to provide an alarm indication prior to liquid reaching the stator coils. The pumps shall not load the motor beyond its nominal (nameplate) rating at any point on the pump curve. Each pump motor shall be furnished with a minimum service factor of 1.15 or the horsepower rating of the motor shall be a minimum of 15 percent greater than the maximum BHP required over the full range of the pump curve. Electrically and mechanically each pumping unit (pump and motor) shall be capable of a minimum of ten (10) starts per hour.

The motor cable entry water seal shall be such that precludes specific target requirements to ensure watertight and submersible seal. Epoxies, silicones, or other secondary sealing systems shall not be required or used. The cable entry junction box and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign materials gaining access through the pump top. The pump motor cable shall be suitable for submersible pump applications, and this shall be indicated by a code or legend permanently embossed on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be adequate size to allow motor voltage conversion without replacing the cable.

All mating surfaces of major parts shall be machined and fitted with nitrile O-rings where watertight sealing is required. Machining and fitting shall be such that sealing is accomplished by automatic compression in two planes and O-ring contact made on four surfaces, without the requirement of specific torque limits to affect this. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate or equal. Tolerances of all parts shall be such that allows replacement of any part without additional machining required to ensure sealing as described above. No secondary sealing compounds, greases, or other devices shall be used.

Each unit shall be provided with an adequately designed cooling system. Thermal radiators integral to the stator housing, cast in one unit, are acceptable. Where water jackets alone or in conjunction with radiators are used, separate

circulation shall be provided. Cooling media channels and ports shall be non-clogging by virtue of their dimensions.

W-38.04 Field Tests

After installation of the pumping units, control equipment, and all appurtenances, each pumping unit will be subjected to a field running test of not less than 24 hours duration under actual operating conditions. The field test shall be made by the Contractor in the presence of and as directed by the Engineer. The field test shall demonstrate that under all conditions of operation, each unit:

1. Had not been damaged by transportation or installation.
2. Has been properly installed.
3. Has no mechanical defects.
4. Is in proper alignment.
5. Has been properly connected.
6. Is free of overheating of any parts.
7. Is free of all objectionable vibration.
8. Is free of overloading of any parts.

The tests shall also demonstrate that the control systems perform as specified and meet all operating criteria.

Any defects in the equipment or operating controls or failure to meet the requirements of the Specifications shall be promptly corrected by the Contractor.

W-38.05
Service

Authorized service facilities must be available in Florida. The pump supplier will stock at the facility one set of recommended spare parts as described below for the pumps specified in this Contract.

Inspection Plug Washers
Impeller Bolt
Impeller Key
Upper Bearing
Lower Bearing
Upper Mechanical Seal
Lower Mechanical Seal
Wear Rings
Motor Cable
Cable Entry Washer/Grommet
Complete Set of O-rings

W 38-.06 Mix-Flush Valves

The Contractor shall supply pumps with mix-flush valves installed on the volutes. The volute shall have an integral mounting pad on which to mount the mix-flush valve. The mounting of the valve shall not void the pump manufacturer's warranty. The valve shall be mounted by the valve manufacturer or agent to assure proper installation and operation.

The mix-flush (or flush) valves shall be hydraulically activated and shall not contain any electromechanical components. The mix-flush system shall be intrinsically safe and suitable for pumps used in hazardous locations

Class 1, Division 1, Groups C and D. The flush valve shall be fully automatic and shall operate each time the sewage pump cycles into running mode. The length of time for the flushing action shall be adjustable to a period of between 20 and 50 seconds. A means of adjustment shall be provided on the outside of the valve to obtain the desired flushing period.

The mix-flush valve shall be a standard production item of the pump manufacturer and warranted by the pump manufacturer for a period of 15 months from date of substantial completion. The warranty station shall be within 100 miles of the installation and replacement units shall be kept in stock at all times.

Each new pump shall be provided with a volute plug along with the mix-flush valves.

W-38.07 Spare Parts

One complete set of mechanical seals shall be furnished for each different model of pump furnished in this Contract (unless otherwise specified on the Plans).

* * *

SECTION 46 - CONTROLS

W-46.01 General

Control components shall comply with the latest ANSI, IEEE, and NEMA standards where applicable.

Maximum control voltage shall be 120 VAC, 60 Hz.

Control devices shall be of industrial grade, heavy-duty design, utilizing modular construction to increase flexibility.

W-46.02a Motor Starters-Full Voltage Starters

The motor starter shall be 3-pole polyphase, and have a NEMA rated contactor with a minimum Size 1 rating. It shall be designed for full voltage, non-reversing service.

Motor starter contacts shall be silver alloy, double break and shall be easily replaceable, with standard tools, without removing the starter from the enclosure; or removing the line, load, or control wiring from the starter.

Contactor coil shall be of the encapsulated type; and shall be easily replaceable, with standard tools, without removing the starter from the enclosure, or removing the line or load wiring from the starter.

The motor starter shall be provided with a Trip Class 20, bimetallic, ambient compensated, overload relay adjustable over a range of 85% to 115% of the nominal heater rating. The current in all 3-poles shall be sensed. The overload relays shall be field convertible from hand reset to automatic reset and vice-versa. When in automatic reset -- after tripping the relay -- the contacts will automatically reclose when the relay has cooled down. A manual “trip-to-test” feature shall be provided to facilitate a quick test of the mechanical and electrical operation of the overload relay. The overload relays shall include a “visible trip indicator” to easily identify a tripped overload block.

The motor starter shall have a 120VAC, 60Hz contactor coil and control circuit.

A minimum of one (1) N.O. holding contact shall be provided. The capability shall exist to install additional contacts in the field.

The motor starter shall be as manufactured by Square D, Cutler-Hammer, General Electric, Allen Bradley, or equal.

W-46.02b Motor Starters-Reduced Voltage Solid State Starter (RVSSS)

A. GENERAL

1. The reduced voltage solid state starter (RVSSS) shall be designed for use with a standard three-phase, three-wire, squirrel cage, induction motor.

The unit shall be microprocessor-based and programmed to slowly increase the voltage to the motor over an adjustable acceleration time, providing a shock free, smooth acceleration, while drawing the minimum current necessary to start the motor. The RVSSS shall be equipped with an internal by-pass contactor that will close at the end of acceleration time, thus reducing heating and saving power.

B. ACCEPTABLE MANUFACTURERS.

1. The reduced voltage solid state starter (RVSSS) shall be a Solcon Industries Ltd. Model Number RVS-DX72-480-115-3M-8-D-U-S with Conformal Coated control boards.

C. TECHNICAL SPECIFICATIONS

1. GENERAL

a. Supply Voltage (Vn): 480V +10%-15%

b. Frequency: 45 – 65 Hz

c. Control Supply: 115V +10% -15%

d. Load: 40 HP three phase, three wire, induction motors.

2. START-STOP PARAMETERS

a. Starter FLC: 72 Amps

b. Motor FLA: 44 Amps

c. Start/Stop Profile: Field Programmable

d. Kick Start: A pulse of 80% Vn, adjustable range 0.1-1 Sec.

e. Initial Voltage: 10-50% VN

f. Initial Current: 100-400% of Motor FLA

g. Current Limit: 100-400% of Motor FLA

h. Acceleration Time: 1-30 Sec

i. Deceleration Time: 1-30 Sec

3. MOTOR PROTECTION

a. Too Many Starts: Maximum number of starts, range: OFF or 1-10, during a time period of 1-60 min.

b. Starts inhibit: Period of 1-60 min, during which starting is prevented, after too Many Starts Fault.

c. Long Start Time: Maximum allowable starting time 1-30 sec.

d. Over Current (Instant): Two operation functions: during starting trips the starter at 850% and during running at 100-850% In, both within one Cycle (after internal delay).

e. Overload Class: Overload class shall be selectable between NEMA Class 10, NEMA Class 20, or NEMA Class 30. The cool down time after an overload shall be a non-adjustable, fixed time setpoint.

f. Under Current: Trips when current drops below 20-90% In, time delay 1-40 sec.

g. Under Voltage: Trips when main voltage drops below 50-90%, time delay 1-10 Sec. w/ optional automatic reset.

h. Over Voltage: Trips when main voltage increase above 110-125%, time delay 1-10 sec.

i. Phase Loss, U/O Freq: Trips when one or two phases are missing and frequency is below 45 Hz or above 65Hz w/ optional automatic reset.

h. Phase Sequence: Trips when phase sequence is wrong

j. Shorted SCR: Prevents starting / trips if motor is not connected or incorrectly connected to the starter, or in case one or more SCRs have been shorted

k. Heat Sink Over temp: Trips when heat-sink temperature rises above 85°C.

l. External fault: Trips when an External Contact closes for 2 sec.

4. CONTROL

a. Displays: LCD (2-lines of 16 characters) and 4 LEDs.

b. Keypad: 6 keys for easy setting

c. Fault Contact: 2 Contacts, 8A, 250VAC, 2000VA

d. Aux. Contact: 2 Contacts, 8A, 250VAC, 2000VA

5. TEMPERATURE/HUMIDITY

   a. Operating Temp.: -10° to 40°C

   b. Storage Temp.: -20° to 70°C

   c. Humidity: 95% at 50°C or 98% at 45°C.

6. STANDARDS

   a. Dielectric Test: 2500VAC

   b. EMC Emissions: EN 55011 CISPR 11 Class A

   c. EMC Immunity: EN 55082-2 ESD 8KV air, IEC 801-2 Electric RF field 10 V/m, 20-1000MHz, IEC 801-3 Fast transients 2KV, IEC 801-4

   d. Safety EN 600947-1 Related to safety requirements. Designed and assembled to conform with UL508C

W-46.03 Switches and Push Buttons

Switches and push buttons shall be heavy-duty, oil-tight, watertight, NEMA Type 4X, corrosion resistant units intended for industrial applications. The operator shall mount in a 1.20-inch diameter opening and be provided with the proper legend plate.

Switches and push buttons shall be as manufactured by Square D, General Electric, Allen Bradley, or equal.

W-46.04 Pilot Lights

Pilot lights shall be heavy-duty, oil-tight, NEMA Type 4X, corrosion resistant, push to test, light emitting diode (LED) type, rated for 120VAC, and intended for industrial applications. The operator shall mount in a 1.20-inch diameter opening and be provided with the proper legend plate and lens color.

Pilot lights shall be as manufactured by Square D, General Electric, Allen Bradley, or equal.

W-46.05 Circuit Breakers

Circuit breakers shall be of the molded case, air-break type designed for 600 volt, 60 Hz service or as shown on the Drawings. They shall have both thermal and magnetic elements on all three poles. These elements will actuate a common tripping bar to open all poles when an overload or short circuit occurs.

The circuit breakers shall have an AIC rating greater than the available fault current at the panel.

The equipment shall be as manufactured by Square D, General Electric, or equal.

W-46.06 Control Relays

a. Multicontact- Unless otherwise noted, relays shall have a minimum of two (2) form C contacts rated at 10 amp, 120 volt a-c. They shall be of the type which utilizes the circular plug system with hold down springs. Each relay shall be provided with an indicator lamp to show its status. The covers shall be dustproof, and manufactured of a clear polycarbonate material. The relays shall be Model KRPA as manufactured by Potter & Brumfield, Struthers Dunn, Square D, or equal.

b. Timing relays shall have DPDT, 10 amp, 120 VAC contacts. Timers shall be solid-state and adjustable as required. They shall utilize a plug in base mounting system. Timing relays shall be Model 328 as manufactured by ATC, Potter & Brumfield or equal.

W-46.07 Instrumentation Signal Multicontact Relays

Relays for switching instrumentation level signals shall have the following features: 120VAC coil; 4PDT Ag-Pd alloy bifurcated crossbar contacts; socket mount; sealed plastic cover; and hold-down spring.

The contact ratings shall exceed the requirements for the application, and shall be no less than 1 Amp at 120VAC. The expected life shall be a minimum of 200,000 operations at rated load.

The socket shall be of the surface or rail-mount design with screw terminals to facilitate circuit connections.

The relay shall be Idec model RY42, with model SY4S-05 socket, or equal.

W-46.08 Elapsed Time Meters

Elapsed time meters shall be furnished and installed where shown. Time meters shall register up to 9999.9 hours, be non-resetable, have square cases suitable for panel mounting, and have coils for 120 volt, 60 Hz operation. The units shall be as manufactured by Eagle Signal, Crammer, or equal.

W-46.09 Sewage Pump Controller / SCADA / Radio (PCSR)

The Sewage Pump Controller / SCADA / Radio subassembly comprises a programmable logic controller (PLC) based system engineered to provide triplex pump control, supervisory control and data acquisition (SCADA), and radio telemetry in one assembled package. The components shall be mounted on an aluminum sub-panel and be fully wired, tested, and ready for field connections via conveniently located interface terminals. The subassembly shall operate on a 120 Volt, 60 Hz, single-phase power supply and shall have integral transient voltage protection.

The PCSR shall be a Motorola ACE3600 package as distributed by DCR Engineering Services Inc. or ScadaOne, LLC. The Contractor shall coordinate his efforts with DCR, Inc. or ScadaOne, LLC to ensure system compatibility, performance, and security. The Contractor shall

provide and install a complete control system package as programmed by DCR, Inc. or ScadaOne, LLC. The existing Pump Station DCR controls shall revert to the City as a spare.

The following is a partial list of PCSR features:

1. Motorola ACE3600 remote terminal unit (RTU) with surge / lighting protection for power line and antenna shall be provided.
2. Two Mixed I/O modules shall be provided.
3. A Motorola CDM750 conventional radio, UHF band (403-512 MHz), shall be provided.
4. The pump controller shall operate independently of the SCADA / telemetry system in the event of communications loss.
5. DC power circuits derived from the RTU and feeding external loads shall be individually fused as required. Fuses shall have indicator LEDs to indicate fuse has blown.
6. A back-up pump controller shall be provided to facilitate emergency overflow protection in the event of RTU failure.
7. Interposing control relays shall be provided as required.
8. Terminal blocks shall be arranged, and separated as follows: main power distribution block; 120VAC power; 24VDC power; RTU DC power bus.
9. All wires shall be permanently identified using a computer generated labeling system. All terminal numbers and identifying nomenclature shall correspond to and be shown on the electrical diagrams and schematics.
10. All external wiring shall terminate on terminal blocks.
11. The RTU shall provide both digital and analog inputs for use in monitoring and control. Simultaneous monitoring of analog and digital level sensing devices shall be supported where the analog level sensing device shall be primary. The RTU shall contain routines for detecting sensor failures and utilize the alternate level sensing device(s).
12. Battery back-up power shall be provided for the RTU so that monitoring is maintained during Utility power failures. The batteries shall have the capacity of operating the RTU for a minimum of four hours. The power supply shall keep the batteries at float charge. The RTU shall contain a low battery cutout circuit, and the batteries shall not be damaged by deep discharges.
13. Local manual pump control is provided by Hand-Off-Auto (HOA) switches located in the pump control panel. In the absence of RTU power or in the case of RTU failure, the pump motor starters shall remain operational in the HAND position. In no case shall the RTU have the capability to operate or override the pumps in the HAND or OFF positions.
14. The capability to remotely override or disable individual pumps shall be provided (local switches must be in the AUTO position).
15. The RTU shall have the capability to test the back-up pump controller by creating a high level condition and verifying that the back-up controller functions properly. In the event of a controller failure, the RTU will send an alarm to the Central HMI.
16. Capability shall be provided to configure from two to four pumps.
17. Individual pump run status shall be reported to the Central HMI.
18. The following pump failures shall be reported to the Central HMI: fail to start; fail to stop; premature stop; drive fault; and stator over temperature.
19. RTU configuration parameters shall be adjustable locally and remotely from the Central HMI.

20. A fail-safe input shall be provided indicating cabinet intrusion.
21. The RTU shall have the latest RTU SCADA application license compatible with the existing Central HMI configuration.

W-46.10 Wet Well Level Monitoring System

The wet well level monitoring system shall be of the ultrasonic type. It shall consist of a transducer element and a transmitter/electronics package.

The transducer shall use a PZT ceramic element with a nominal operating frequency of 50kHz. The transducer shall have a range of 1 to 32.8 ft. The transducer shall convert a 24-volt input from the electronics package to a 3,000-volt peak-to-peak echo pulse. The transducer shall be Factory Mutual (FM) approved for use in a Class I, Div.1, group A, B, C, & D location. The transducer shall be rated intrinsically safe for zone 0. The transducer cable length shall be as required to provide a splice-free mechanization.

The transmitter/electronics package shall operate from 115Vac, 60Hz or 10 to 28Vdc power source. The unit will automatically switch to the dc source when Utility power is lost. The transmitter shall be compatible with a full line of transducers. The unit shall be simple to program via a hand-held programmer or laptop computer. Basic set-up and advanced echo analysis and diagnostics software shall be provided. A 4-20 mA output and two alarm relays shall be provided. A flashing LED shall indicate healthy status. An integral keypad and LCD display shall be provided. The accuracy shall be 0.25% of measured range and the resolution 0.1% of measured range. The unit shall be tropicalized and be housed in a NEMA 4X enclosure.

The wet well monitoring system shall be as manufactured by Pulsar, Inc., or equal (Transducer— dB10; Transmitter— Blackbox130, Part #: 130-110-300-00P-KP-TROP).

W-46.11 Type 1 Surge Protective (SPD)

The SPD shall be able to suppress lightning induced voltage surges three times greater than the industry standards. The rated line voltage for SPD shall be 277/480 VAC 3-phase, 3-wire, WYE. The maximum single impulse current shall be 100kA per phase.

1. The SPD shall have a 10-YEAR warranty. Under that warranty, the SPD shall be replaced if it is destroyed by lightning or other impulses.

2. The SPD shall have an LED failure indicator on all three phases.

3. The clamp voltages for the SPD shall be the following:

   Line to neutral – 1200 volts
   Line to ground – 1200 volts
   Neutral to ground – 1200 volts
   Line to line – 2000 volts

The Surge Protection Device shall be Advanced Protection Technologies model TE04XDS104X, or equal.

W-46.12 Seal Leak Detector

The seal leak detector shall be compatible with the submersible pump supplied and be Underwriters Laboratories (U.L) listed for use in sewage pumping applications. The detector shall have the following features:

1. The unit shall employ low voltage, low current, conductivity probe type liquid level detection.

2. 120 VAC, 60 Hz, operating voltage.

3. The alarm output shall be an SPDT 10 amp, 250 VAC relay contact with a minimum 2000 VAC isolation to probe.

4. Probe supply characteristics - sensitivity, 4.7K to 100K OHM, adjustable; voltage, 24 VAC, 60 Hz; current, 2mA maximum.

5. Eight pin octal-type plug (provide matching screw terminal sockets).

6. The unit shall be housed in a high-impact plastic dust cover.

The seal leak detector shall be Crouzet model PNRU110A or equal.

W-46.13 Panel Mount Fuse Holder and Fuse

Panel mount fuse holders shall be rated for a minimum of 15 amps, 250 VAC. They shall accommodate 0.25 by 1.25-inch glass fuses and have a bayonet type knob. Terminations shall be by 0.25-inch Quick-Connect. Fuse holders shall be Bussman HKP, or equal.

Fuses shall be 0.25 by 1.25-inch slow blow, dual element, glass body with ratings as shown or required. Fuses shall be Bussman MDL series, or equal.

W-46.14 Emergency Receptacle

The emergency receptacle shall be of the heavy-duty, circuit breaking type with a weatherproof aluminum housing. The current rating shall be as shown with an operating voltage of 600 VAC. The receptacle assembly shall include a wiring box and angle adapter. The receptacle shall be equipped with a 4 pole exposed contact interior (reversed contacts). The receptacle shall be provided with a spring-loaded cap to cover the contacts when the receptacle is not in use. The emergency receptacle shall be Crouse-Hinds Arktite model AR-1047-S22 w/ AJA6 angle adapter, or equal.

W-46.15 Lightning Arrester

The lightning arrester shall be suitable for use in a four wire grounded service and have a rating of 650 VAC phase to ground maximum. The unit shall have a 2300 - 3800 volt impulse sparkover and an 800 - 1600 volt rms 60 Hz sparkover. Provisions for mounting shall be as shown or required and shall be supplied by the same manufacturer as the arrester.

The lightning arrester shall be as manufactured by Square D, General Electric, or equal.

W-46.16 Control Enclosure and Panel

The control enclosure shall be rated NEMA 3 and be constructed of minimum 14 gauge, 304 stainless steel. The door shall have a handle with padlock provisions and three point latch mechanism. The door shall be provided with a positive stop mechanism to prevent it from closing while controls are being serviced. Stiffeners shall be provided on the enclosure and door as necessary to provide rigidity. The closing surfaces shall have rolled lips. The outside of enclosure shall be brush finished. All hardware shall be heavy-duty, stainless steel. A print pocket shall be provided on the inside of the door. The enclosure dimensions shall be as shown or required.

The panel shall be 12 gauge steel and sized to be accommodated by the enclosure. The periphery of the panel shall be formed to provide a 0.75 inch stiffener frame. The panel shall be primed, painted with white enamel and baked, after forming.

The enclosure and panel shall be as manufactured by Quality Metals, Hoffman Engineering, or equal.

W-46.17 Panel Mount Terminal Blocks

Control terminal blocks shall be single pole units constructed of a polyamide plastic base with wire clamp terminals attached. The terminals shall be rated for 30 amps, 600 volts. The terminals shall accommodate #30 to #10 AWG conductors. The block shall mount on an aluminum DIN rail.

The terminal blocks shall be style UK5N, as manufactured by Phoenix Contact, or equal.

W-46.18 Control Panel Intrusion Sensor.

The control panel intrusion sensor shall be of the inductive proximity type, with an 18mm diameter cylindrical, short barrel body. The supply voltage rating shall be 10-30 VDC. The interface circuitry shall be standard 3-wire, NPN, shielded, and rated for a maximum load of 200mA, 600Hz. The output shall be normally open (N.O.) with short circuit protection. The unit shall have a temperature range of –13 to 158 degrees F. The detecting distance shall be 5mm, with a LED indicator.

The proximity sensor shall be Omron, model E2F-X5E1 (Grainger # 6C826) with Square D mounting hardware model XSZB118 (Grainger 5B233), or equal.

W-46.19 Power Phase Monitor

A Phase Monitor shall be provided and installed on the line-side of the utility main circuit breaker as shown on the Drawings and specified herein. The unit provided shall have the following features:

1. input— 480 volt, 3-phase, 60Hz, 4-wire, OPEN DELTA, utility service
2. adjustable voltage range control
3. SPDT relay operation and LED indication shall be triggered by phase loss, low voltage, power failure, or improper phase sequence.

4. LED indication shall be on when voltage is normal— off with fault
5. relay shall operate if fault lasts more than 2.0 seconds.
6. relay shall release after voltage is normal for 5.0 seconds
7. relay contact rating— 10 Amps
8. mounting— 8-pin plug-in— provide socket for DIN rail

Phase Monitors PM1, PM2, PM3, and PM4 shall be model SLA-440-ASA as manufactured by ATC Diversified Electronics, or equal.

W-46.20 Phase Monitor Fuse Holders and Fuses

The Fuse Holders shall be three-pole, 600V rated units suitable for use with Class CC, rejection type fuses. They shall be UL listed for branch circuit protection, and have a fuse withstand rating of 200 kA. The handle shall isolate the fuse from the circuit when installing or removing fuses— no special tools shall be required to insert or remove fuses. The fuse holder shall be provided with a blown fuse indicator to allow for easy troubleshooting. The fuse holder shall mount on a standard DIN rail.

The Fuse Holder shall be model 1492-FB3C30-L as manufactured by Allen Bradley, or equal. The fuses shall be Bussmann Limitron fast acting model KTK-R or equal, with the ampacity shown on the Drawings.

W-46.21 Control Transformers

The control transformer shall be an individual output type for primary and secondary voltages as shown. The secondary shall be grounded and circuit breaker protected. The control transformer shall have sufficient capacity to provide the energy demands for all connected control components including relays, solenoids, and other indicated items.

The electrical performance shall exceed the requirements of ANSI/NEMA ST-1. The transformers shall be as manufactured by Square D, General Electric, Westinghouse, or equal.

W-46.22 AC Current Sensor

The AC Current Sensor shall be a split core transducer used to convert a monitored AC current to a proportional 4-20mA output. The sensor shall comprise a current transformer, power circuit, precision rectifier, high-gain servo amplifier, and span and zero adjustments in one UL listed package. The sensor shall have three user selectable ranges. The two-wire loop powered 4-20mA output shall be available on two 6-32 screw terminals. The sensor shall meet the following performance parameters:

1. operating temperature— -55 to +65ºC.
2. accuracy— +/- 0.5% of full scale
3. repeatability— +/- 0.1% of full scale
4. frequency— flat from 20-100 Hz
5. response time— 100 msec (10 to 90%)
6. ripple— less than 10 millivolts
7. voltage supply— 21 to 40VDC

The AC Current Sensor shall be model SC200-1 as manufactured by Enercorp Instrument Ltd, or equal.

W-46.23 Back-Up Pump Controller

The Back-Up Pump Controller shall be designed to run one or two pumps for a fixed time interval, set by the user, when the primary wet well level controls fail. The unit shall monitor a backup level alarm in the wet well, and start up to two pumps when the high alarm switch closes. When the high level switch closes, the back-up unit closes a relay that starts Pump #1 and starts an internal Timer #1. When Timer #1 reaches its set time, and the level alarm switch is still closed, Pump #2 is started. Pump #1 and Pump #2 will run until the level alarm switch opens. When the switch opens, Timer #2 is started and both pumps continue to run until Timer #2 reaches its set time.

The Back-Up Pump Controller shall be Wilkerson model DR1920; DCR Engineering Services, Inc. model BR560, or equal.

W-46.24 Level Monitor Battery Backup System

The Level Monitor Battery Backup System shall comprise an Absorbent Glass Matt (AGM) battery and compatible three-level battery charger.

Battery:

1.) AGM technology
2.) Valve regulated, spill-proof construction to allow safe operation in any position
3.) Rugged impact resistant ABS case and cover (UL94-HB)
4.) U.L. recognized under file number MH 20845
5.) Nominal Voltage—12 Volts (6 cells)
6.) Nominal Capacity— 20-hr. (350mA to 10.5V)..... 7.0 AH
10-hr. (650mA to 10.5V) ..... 6.5 AH
5-hr. (1.2A to 10.2V)..... 6.0 AH
1-hr. (4.5A to 9.0V) ..... 4.5 AH
15-min. (14A to 9.0V) ..... 3.5 AH
7.) Energy Density (20-hr. rate)— 1.49 W-h/cu in
8.) Specific Energy (20-hr. rate)— 17.5 W-h/lb
9.) Internal Resistance— 23 milliohms
10.) Max Discharge Current (7 min.)— 21.0 A
11.) Max Short-Duration Discharge Current (10 sec.)— 70.0 A
12.) Shelf Life (% of normal capacity at 68deg.F)
1 Month..... 97%
3 Month..... 91%
6 Month..... 83%
13.) Terminals— Quick Disconnect Tabs, 0.25” X 0.032”

The battery shall be model PS-1270-F2 as manufactured by Power-Sonic Corporation, or equal.

Battery Charger:

1.) Waterproof, single output, for 12 Volt battery
2.) Input Voltage— 100 to 240 VAC, 50/60 Hz
3.) 3-Step Charging— Qualification, Bulk, & Float Maintenance
4.) Output Voltage— Absorption Charge Peak..... 14.4 VDC max.
Maintenance Charge..... 13.2 VDC constant
5.) Output Current— Bulk Charge— 800mADC constant.
6.) Operating Temperature— -4 ºF to +122 ºF
7.) Short Circuit Protected
8.) Reverse Polarity Protected

The battery charger shall be Battery Tender- Waterproof 800 as manufactured by Deltran Corporation, or equal.

* * *

13-C-00020; Osborne Pumping Station Rehabilitation Pre-Bid Conf. 7-9-13 10:00

E-Mail to **Register as a Bidder** and E-Mail All **Questions** to; ContractAdministration@tampagov.net

Sign-In Sheet Please Print — City of Tampa, Contract Administration Department

	Name	Organization	E-Mail OR Phone
1	Jody Gray	Tampa Contract Administration Dept.	jody.gray@tampagov.net
2	Nick Collard	Contract Admin	
3	Eric Mattlin	COT Wastewater	eric.mattlin@tampagov.net
4	Helia Yazdian	Wharton-Smith	Estimatingtampa@whartonsmith.com
5	Kevin Mathes	Scada One	Kmathes@scadaone.com
6	Jack Church	Xylem Dewatering	jed.church@xyleminc.com
7	Mark Johnson	Contract Admin	
8	Scott Mercer	Carl Hankins Inc	Smercer7@TAmpaBay.rr.com
9	Greg Doan	TLC Diversified	gdoan@tlcdiversified.com
10	JOHNNY GRANGER	GRANGER MAINT. CONST.	813-478-4826
11	Mike Keegan	Holland Pump	MikeK@HollandPump.com
12	Tom Secord	Secord Contracting	Tsecord@verizon.net.
13	Rick Morriss	COT/CAD	rick.morriss@tampagov.net
14	CARLOS MARTINEZ	COT/CAD	CARLOS.MARTINEZ@TampaGov.Net
15	William "Ian" Rovira	MC Squared (Materials Testing)	wrovira@mc2engineers.com
16	Lashonda Green	C.O.T	lashonda.green@tampagov.net
17	Michael Salgado	C.O.T	MichaelF.Salgado@Tampa.gov.net
18	John Bebuka	Reliable Electric (Manatee Electric, Inc)	Reliableelectricuse.com
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TEST LAB INC.
GEOTECHNICAL & MATERIALS
ENGINEERING, TESTING & INSPECTION

February 8, 2013

City of Tampa
Wastewater Department
306 East Jackson Street
Suite 6E
Tampa, Florida 33602

Attention: Mr. Jack Ferras, P.E.

Reference: Report of Subsurface Exploration
Proposed Pump Station
4717 Thatcher Avenue
Tampa, Hillsborough County, Florida
Test Lab Project No: GE-13-3772

Dear Mr. Ferras:

As authorized, a subsurface exploration was performed for the proposed pump station in Tampa, Hillsborough County, Florida. The proposed field exploration consisted of performing one (1) exploratory boring within the limits of the proposed pump station footprint. The following report briefly describes the field test procedures used for this study and presents the findings, an engineering evaluation of the subsurface conditions, and geotechnical recommendations for the proposed pump station.

PROJECT INFORMATION

The project site is located at 4717 Thatcher Avenue, Tampa, Hillsborough County, Florida. Based on your electronic mail correspondence dated January 23, 2013, we understand that the project consists of a proposed pump station and associated concrete driveway and parking area.

EXPLORATION PROGRAM

One (1) exploratory Standard Penetration Test (SPT) boring was performed with a CME-45 truck mounted drilling rig at the location shown on the enclosed Boring Location Plan. The split-barrel soil samples were obtained at intervals of 2 feet to a depth of 10 feet, and at 5 foot intervals, thereafter. Conventional rotary drilling procedures were utilized along with a bentonite drilling fluid to stabilize the borehole. The following is a brief description of this field test procedure:

The exploratory boring was performed in general accordance with ASTM Specification D-1586, entitled "Standard Method for Penetration Test and Split-Barrel Sampling of Soils." After drilling to the required depth and cleaning the bore hole, the sampler (2 inch O.D.) was driven 18 or 24 inches into the undisturbed soil by

a 140-pound drop-hammer falling 30 inches. The number of blows required to drive the sampler the second and third 6-inch increments is known as the Standard Penetration Resistance (N). The various soils encountered in the borings were visually classified in the field and representative soil samples obtained for further examination by a geotechnical engineer. The soils encountered in the borings were classified utilizing the Unified Soil Classification System. At the completion of the drilling operations, the borehole was sealed and grouted in general accordance with local water management district guidelines.

SITE CONDITIONS

The project site is located at 4717 Thatcher Avenue, Tampa, Hillsborough County, Florida. At the time of this exploration, the referenced site was open and accessible by our truck mounted drill rig. With the exception of the single-story structure located in the southwest portion of the site, the site was vacant and covered with grass.

WEB SOIL SURVEY INFORMATION

The Web Soil Survey of Hillsborough County indicates that natural shallow soils at the site are Map Unit 34 – Ona-urban land complex. Ona has a landform setting of flatwoods on marine terraces with parent material consisting of sandy marine deposits. Urban land has a landform setting of marine terrace. Ona consists of SP, SM and SP-SM [sandy material according to the Unified Soil Classification System (USCS)] to a depth of 80 inches or more, with an estimated historic Seasonal High Ground Water Table of 6 inches below natural grade from June to September during normal years.

SUBSURFACE CONDITIONS

The following is a generalization of the subsurface conditions encountered during the field exploration. For more specific information refer to the enclosed Boring Location Plan and Soil Profile.

Boring B-1

The boring encountered medium dense to loose SAND to SAND With Silt (SP/SP-SM) to approximately 6 feet; underlain by loose Clayey SAND (SC) to approximately 8 feet; underlain by stiff Sandy CLAY (CL/CH) to approximately 10 feet; underlain by medium dense SAND to SAND With Silt (SP/SP-SM) to approximately 20 feet; underlain by medium dense Clayey SAND (SC) to approximately 25 feet; underlain by medium dense SAND to SAND With Silt (SP/SP-SM) to the boring termination depth of approximately 30 feet.

GROUND WATER CONDITIONS

The groundwater level was recorded within boring B-1 approximately 5 feet below existing grade, immediately after drilling. Ideally, a 24-hour stabilization period should be maintained prior to determining the ground water level; however, the borehole was grouted after completion for safety reasons. Fluctuations of

the water table should be expected during the year due to local amounts of rainfall, site development and other factors. The Web Soil Survey of Hillsborough County indicates that natural shallow soils at the site are Map Unit 34 – Ona-urban land complex. Ona has an estimated historic Seasonal High Water Table of 6 inches below natural grade from June to September during normal years.

EVALUATION

Considering the expected loading on the slab for the pump station and backfilling the excavation for the proposed wet well, the results of the boring generally indicate that the native soils will provide adequate support for the foundation and wall system when prepared in accordance with the recommendations provided within this report. Water in the excavation may be problematic during installation of the wet well and may require pumping from low points and/or well point dewatering depending on the time of year that construction takes place and the depth of excavation. We recommend that the contractor determine the actual water table levels at the time of construction to determine groundwater impact on this construction procedure.

RECOMMENDATIONS

Site Stripping

To prepare the site for construction, all of the existing vegetation and large root systems should be removed. As a minimum, it is recommended that the clearing operations extend at least five feet beyond the development perimeters.

Deleterious materials were not encountered during the subsurface exploration. However, it is possible that deleterious materials may be encountered in other areas throughout the site, and may be encountered during the excavation of the wet well. Deleterious materials are not satisfactory for placement as structural fill (as defined in this report). These materials can, however, be used in non-structural and landscaped areas. A like-volume of structural fill must be imported to compensate for stockpiling or haul off of these deleterious materials, if encountered.

Subgrade Preparation and Fill Placement

Following the clearing operations, the exposed existing subgrade should be evaluated and proofrolled as directed by representatives of Test lab to confirm that all unsuitable materials have been removed, if encountered. The area should be compacted using a fully loaded 2 cubic yard capacity front-end loader or approved equivalent.

Proofrolling should be closely monitored by our engineering technician to observe for unusual deflection of the soils beneath the wheel loads. If unusual or excessive deflection is observed, then the areas should be undercut to firm soils and backfilled with structural fill placed in maximum one-foot thick loose lifts. Some undercutting and backfilling should be expected and budgeted accordingly. The proofrolling equipment should make a minimum of eight overlapping passes over the pump station footprint and pavement areas with the successive passes aligned perpendicular.

Following satisfactory completion of the initial proofrolling, the pump station and pavement areas may be brought up to finished grade and subgrade levels, respectively, as needed. Backfill soils and soils used to bring the pump station and pavement areas up to finished grade and subgrade levels should be of the same composition and be compacted to the same criteria as structural fill soils. After proofrolling and compaction, foundation and wall excavation may begin. We recommend the upper 1-foot below the slab and pavement be compacted to at least 98 percent of modified Proctor maximum dry density. Approved structural fill to provide slab constraint should be placed in loose lifts not exceeding 4 inches. Since this will require backfilling in a restricted working area around the wet well, backfilling beneath the slab on grade may require the use of light-weight manual compaction equipment.

Structural fill is defined as fine sand, free of organics and debris and containing less than 12 percent material by weight that is finer than a number 200 sieve (fines) (materials conforming to SP and SP-SM in the USCS). All fill should be approved by the Geotechnical Engineer prior to placement.

Approved sand fill should be placed in loose lifts not exceeding 12 inches in thickness and should be compacted to a minimum density of 95% of the modified Proctor maximum dry density. Density tests to confirm compaction should be performed in each fill lift before the next lift is placed. Prior to beginning compaction, soil moisture contents may need to be controlled in order to facilitate proper compaction. If additional moisture is necessary to achieve compaction objectives, then water should be applied in such a way that it will not cause erosion or removal of the subgrade soils. Moisture content within the percentage range needed to achieve compaction is recommended prior to compaction of the natural ground and fill.

Ground Water Control

The groundwater levels presented in this report are the levels that were measured at the time of our field activities. Fluctuations should be anticipated. We recommend that the contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on this construction procedure. Groundwater control may be necessary for the construction of the proposed wet well. Groundwater can normally be controlled in shallow excavations or rim ditches with a sump pump, with

well-points being utilized for deeper excavations. During subgrade soil preparation, any soils below design grade could become disturbed by construction activities. If this occurs, the contractor may be directed by the owner's representative to remove the disturbed or pumping soils to a depth of 12 to 18 inches below design grade and backfill the area with structural fill.

Water should not be allowed to collect on the slab area, or on prepared subgrades of the construction, during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of the slab. The grades should be sloped away from the slab and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and slab areas.

Retaining Walls

We expect that the design will include retaining walls associated with the pump station, including the wet well. Retaining wall foundations should be designed for a maximum allowable soil bearing pressure of 2,500 psf.

Soils behind the retaining walls are assumed to exert a triangular stress distribution which can be modeled in terms of an "equivalent fluid" for both the active and at-rest cases. If the top of the wall is free to rotate, the active earth pressure condition can be used. If the top of the wall is fixed and not free to rotate, the at-rest earth pressure condition should be used. If a uniform area surcharge is applied behind the wall, a portion of the surcharge is transferred to the wall in the form of a uniform or rectangular lateral stress distribution. The magnitude of the lateral stress transferred to the wall is a function of the soil's strength and the permissible degree of deflection or rotation. It is computed by multiplying the soil's "earth pressure coefficient" by the magnitude of the surcharge.

The following table presents values for earth pressure coefficients and equivalent fluid unit weights for both the at-rest and active conditions previously discussed. These values assume a horizontal backfill behind the walls.

Earth Pressure Condition	Earth Pressure Coefficient	Recommended Equivalent Fluid Unit Weight (pcf)
Active, Horizontal Backfill	0.33	36
At-Rest, Horizontal Backfill	0.5	55

The recommended equivalent fluid unit weights also assume that constantly functioning drainage systems are installed between walls and soil backfill to prevent the build-up of hydrostatic pressures and lateral stresses in excess of those calculated for drained conditions.

Passive earth pressure of soil adjacent to the footing as well as soil friction of the footing base can be used to resist sliding, where applicable. The ultimate soil friction force can be computed by multiplying the footing's applied compressive force by 0.63. The ultimate passive restraint of wall footings embedded adjacent to a horizontal grade can be modeled assuming a fluid with an equivalent unit weight of 330 pcf. We recommend that a safety factor of at least 2 be used when computing restraining forces, as no strength test analysis was performed and a simplified (Rankine) earth pressure distribution was used.

Sand with less than 5 percent finer than the Number 200 sieve (SP sand) should be used as backfill directly behind the retaining walls. This material should be compacted to at least 95 percent of its standard Proctor maximum dry density. Either light, hand-operated compaction equipment must be used within 4 feet of walls to reduce the risk of over-stressing the walls or the walls must be designed to resist the stressed imposed by large compaction equipment.

The retaining walls should be provided with a drain system or properly designed weep holes to allow for dissipation of water, where applicable. Sand backfill should be placed, as a minimum, in a wedge drawn upward and away from a line located at least 3 feet outside of the bottom edge of the wall at 45 degree angle or flatter.

Slab-on-Grade Design

We assess that no unusual loads will be applied to the slab. No extraordinary slab performance criteria, such as very low allowable deflection/settlement, are expected. The upper 1-foot of soil beneath the slab area should be compacted to at least 98 percent of its modified Proctor maximum dry density.

It has been our experience that prior to slab construction, slab subgrades can be significantly disrupted by construction equipment, utility construction, and inclement weather. The soils exposed at the slab subgrade will consist primarily of sands. These materials are particularly susceptible to disturbance. Placement of concrete in these areas must occur promptly, or these areas will likely need re-compaction and re-testing.

Pavement Considerations

In areas where heavy loading is anticipated, we recommend Type B stabilized subgrade (LBR = 40%) as specified by the FDOT Standard Specifications for Road and Bridge Construction. A soil cement base should be designed according to FDOT or PCA modified short cut design procedures. Strength of 300 psi

should be achieved on laboratory cured compressive strength specimens molded from samples taken from the base material as it is placed. A stabilized subgrade need not be incorporated with a soil cement base. Traffic should not be allowed on the subgrade as the base is placed to avoid rutting. Before paving, the subgrade should be checked for soundness and be true to line and grade prior to paving.

The choice of pavement base type will depend on final pavement grades. If a minimum separation of 18 inches between the bottom of the base and the seasonal high groundwater level is obtained, then a limerock, shell, or crushed concrete base can be utilized. A soil cement base should be utilized if the separation between final grade and the Seasonal High Groundwater Table (SHGWT) is a minimum of 12 inches and less than 18 inches. Base material elevations should not be designed for saturated conditions. If the designer wishes to have base material closer than 12 inches to the SHGWT, then an underdrain system should be utilized that will maintain the 12 inches of separation. The SHGWT should be re-established relative to a known elevation prior to setting final grades. Limerock and shell base material should meet FDOT requirements including compaction to a minimum density of 98% of the modified Proctor maximum dry density and a minimum Limerock Bearing Ratio (LBR) of 100%. Crushed concrete should be graded in accordance with FDOT Standard Specification Section 901-5. As a guideline for pavement design, we recommend that the base course be a minimum of 6 inches thick in parking areas and 8 inches thick in heavily traveled drives. Before paving, the base should be checked for soundness.

It is our understanding that a rigid (concrete) pavement design will be used. The concrete should have a minimum compressive strength of 4,000 psi at 28 days when tested in accordance with ASTM C-39. Based on our experience, a minimal thickness of five (5) inches should be utilized for standard duty applications and a minimal thickness of six (6) inches should be utilized for heavy-duty applications. The steel reinforcement within the concrete pavement should be designed by the project Civil Engineer. The subgrade should be prepared to achieve a minimum LBR of 20% as mixed and pulverized to a depth of 12 inches below the pavement base elevation. The subgrade soils should be compacted to a minimum density of 98% of the modified Proctor maximum dry density.

Actual pavement section thickness should be provided by the design Civil Engineer based on traffic loads, volume, and the owners design life requirements. The above sections represent minimum thicknesses representative of typical load and construction practices and as such periodic maintenance should be anticipated. All pavement materials and construction procedures should conform to the FDOT and appropriate city requirements.

LIMITATIONS

Generally accepted geotechnical engineering practices were utilized in the preparation of this report and no other warranty, either expressed or implied, is made as to the professional advice provided. The report is based upon the design information provided, as discussed in this report. Consequently, we can assume no responsibility for misinterpretation or misapplication of these recommendations unless given an opportunity to review any changes in the design, which may affect their validity. This report has been prepared solely for the use of our client and may not contain sufficient information for other uses or for the purposes of other parties. Therefore, conclusions or recommendations based upon this data but made by others, are not our responsibility. The following are other limitations that are applicable to this report.

The SPT boring location was located by handheld GPS equipment, which has a limited degree of accuracy. Therefore, the test location shown on the enclosed Field Test Location Plan should be considered approximate.

The enclosed Soil Profile represents our interpretation of the conditions encountered at the boring location. The stratification lines indicated on the Soil Profile represent the approximate boundaries between soil types; however these transitions may be more gradual than indicated.

The depth to the groundwater table measured at the site during the investigation is only indicative of the conditions at the time of the exploration. Ground water levels fluctuate with time due to seasonal moisture changes and locally heavy precipitation events. Therefore, future ground water levels may be encountered at depths different from those identified in our boring.

This site is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden. Construction in a sinkhole prone area is, therefore, accompanied by some risk that internal soil erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole related problems. In any event, the Owner must understand and accept this risk.

The engineering evaluation, opinions, and recommendations presented in this report are based upon the data obtained from the boring performed at the approximate location indicated on the enclosed Boring Location Plan; and are only valid so long as the site and subsurface conditions remain unchanged. The nature and extent of subsurface variations at the site may not become evident until during construction. Such variations should be observed to note their nature, re-evaluate and modify, if necessary.

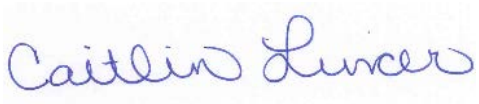
In view of the possibility of variations in subsurface conditions being encountered during construction, it is suggested that we be retained to perform on-site review of the site preparation phase of the construction process. Otherwise, we can assume no responsibility for construction compliance with our site preparation recommendations.

Test Lab, Inc. appreciates the opportunity to have been of service. If there are any questions concerning this project, or if we may be of any further assistance, please do not hesitate to contact us.

Respectfully submitted,

Test Lab, Inc.

Jeanne Berg, P.E.
Florida License No. 50699



Caitlin Lincer, E.I.
Project Manager

Copies Submitted: (2) Client

Enclosures: Boring Location Plan
Soil Profile
Web Soil Survey/Topography Map
Soil Legend

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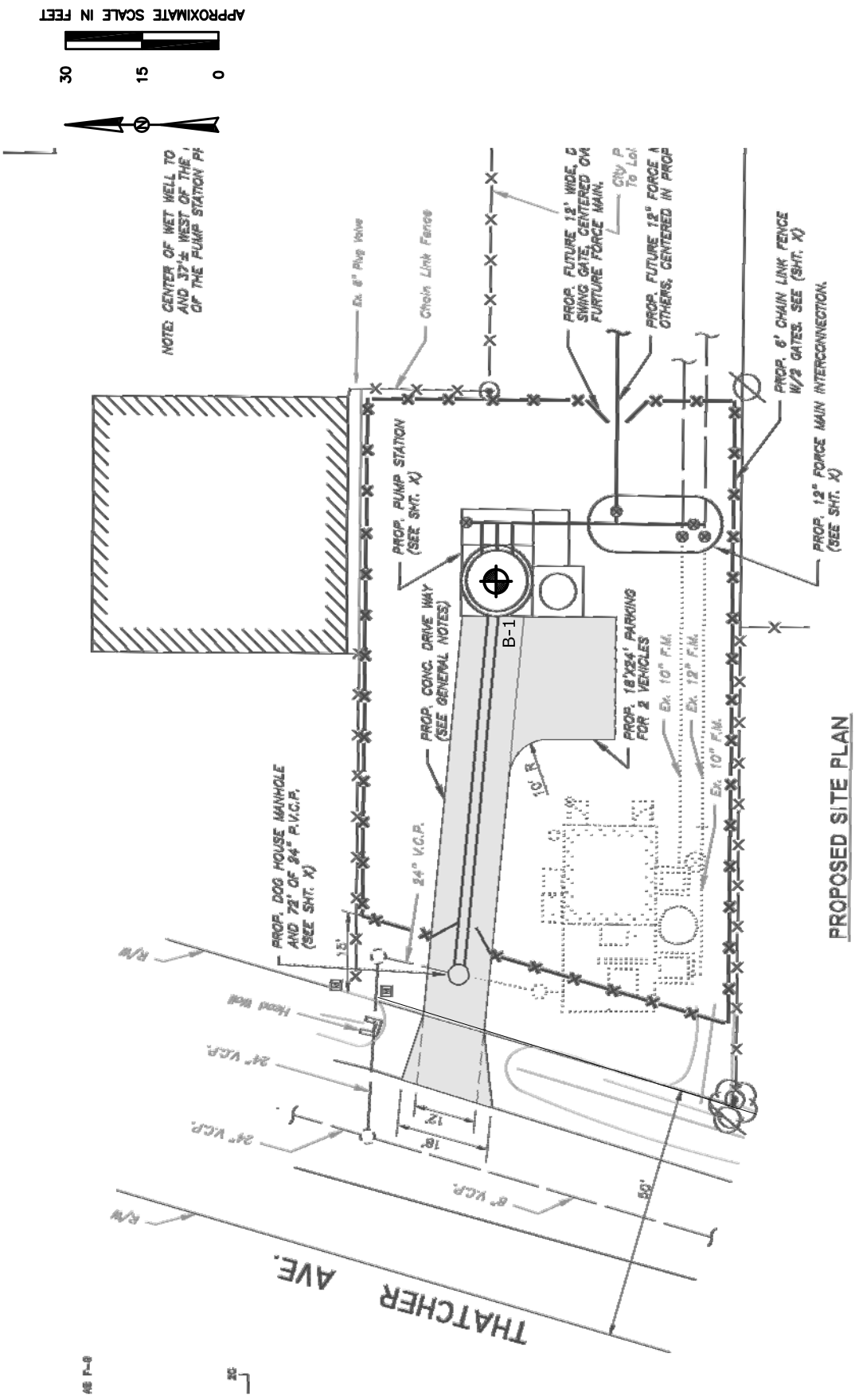

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Tampa, FL 33614
CA No. 1450
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Fax (813) 872-1876

Engineer of Record

Jeanne A. Berg, P.E.
License No. 50699

Proposed Pump Station
4717 Thatcher Avenue
Tampa, FL

Project	Sheet
GE 13-3772	1
Date: February 8, 2013	
Scale: As Shown	

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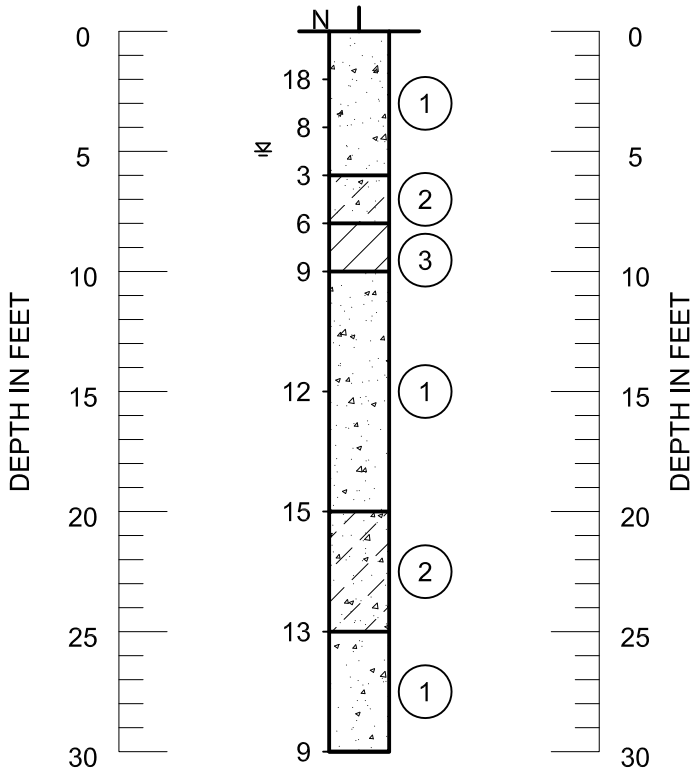
Proposed Pump Station
4717 Thatcher Avenue
Tampa, FL

Project: GE 13-3772
Date: February 8, 2013
Scale: Not To Scale
Sheet: 2

SOIL PROFILE

B-1



LEGEND

1. Light Brown to Brown to Gray-Brown SAND to SAND With Silt (SP/SP-SM)
2. Light Brown to Gray-Brown Clayey SAND (SC)
3. Gray Sandy CLAY (CL/CH)

SP — Unified Soil Classification System (ASTM D 2488) Group Symbol As Determined By Visual Review

▽ — Groundwater Level

N — SPT N-Value In Blows/Foot For 12 Inches Of Penetration (unless otherwise noted)

Notes:

1. The profiles depicted are of a generalized nature to highlight the major subsurface stratification features and material characteristics. The soil profiles include soil description, stratifications and penetration resistances. The stratifications shown on the boring profiles represent the conditions only at the actual boring location. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual.
2. Groundwater levels generally fluctuate during periods of prolonged drought and extended rainfall and may be affected by man-made influences. In addition, a seasonal effect will also occur in which higher groundwater levels or temporary perched conditions are normally recorded in rainy seasons.
3. SPT boring performed utilizing an automatic hammer.

Granular Materials			*Silts and Clays*		
Relative Density	**Safety Hammer SPT N-Value (Blow/Foot)**	**Automatic Hammer SPT N-Value (Blow/Foot)**	**Consistency**	**Safety Hammer SPT N-Value (Blow/Foot)**	**Automatic Hammer SPT N-Value (Blow/Foot)**
Very Loose	Less than 4	Less than 3	Very Soft	Less than 2	Less than 1
Loose	4 - 10	3 - 8	Soft	2 - 4	1 - 3
Medium Dense	10 - 30	8 - 24	Firm	4 - 8	3 - 6
Dense	30 - 50	24 - 40	Stiff	8 - 15	6 - 12
Very Dense	Greater than 50	Greater than 40	Very Stiff	15 - 30	12 - 24
			Hard	Greater than 30	Greater than 24

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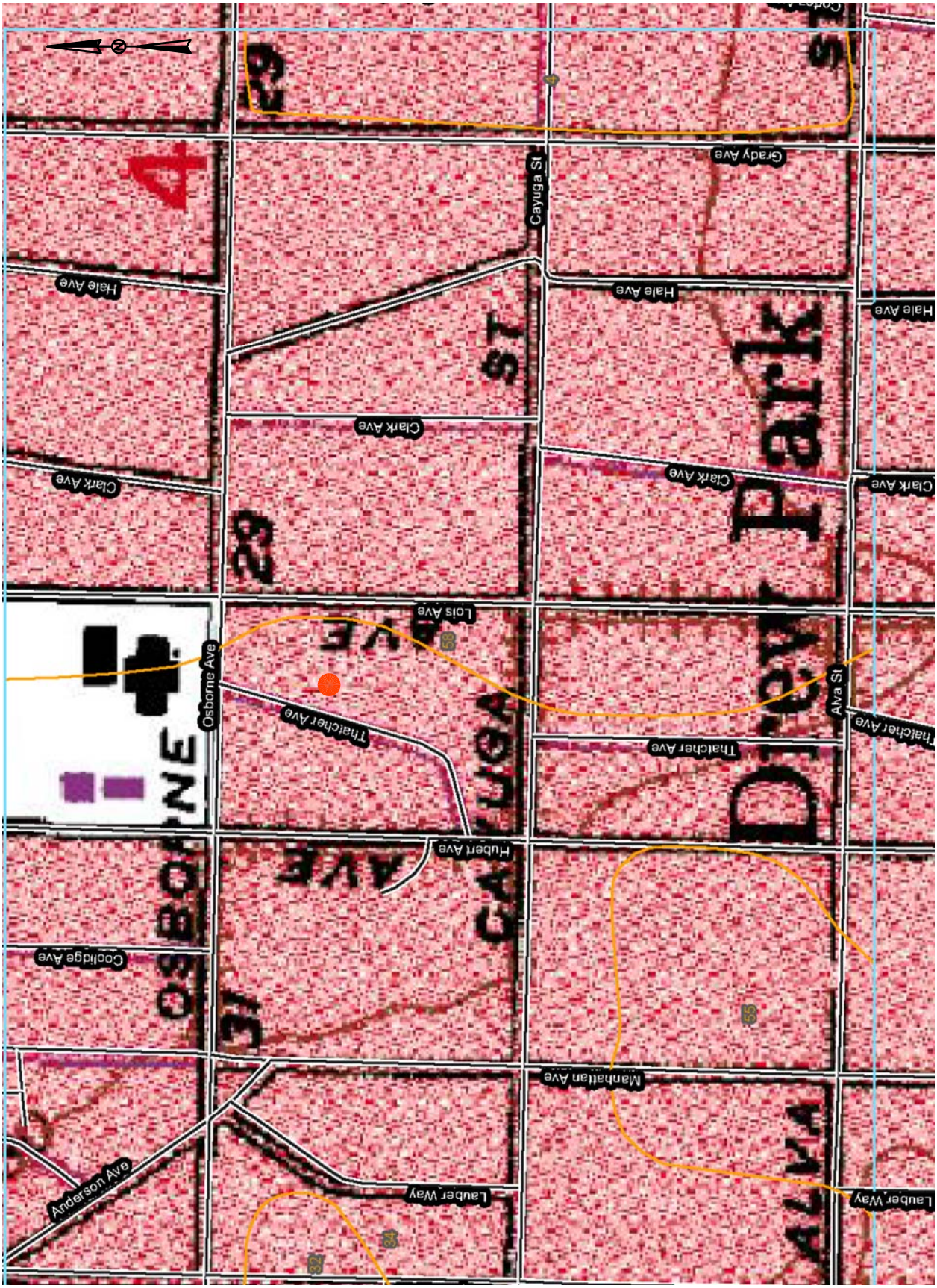

WEB SOIL SURVEY/TOPO MAP

(PRODUCED BY THE NATIONAL COOPERATIVE SOIL SURVEY)

LEGEND

Approximate Site Location

39 Note: Yellow number indicates Web Soil Survey Map Unit

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Proposed Pump Station
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Project	Sheet
GE-13-3772	3
Date: February 8, 2013	
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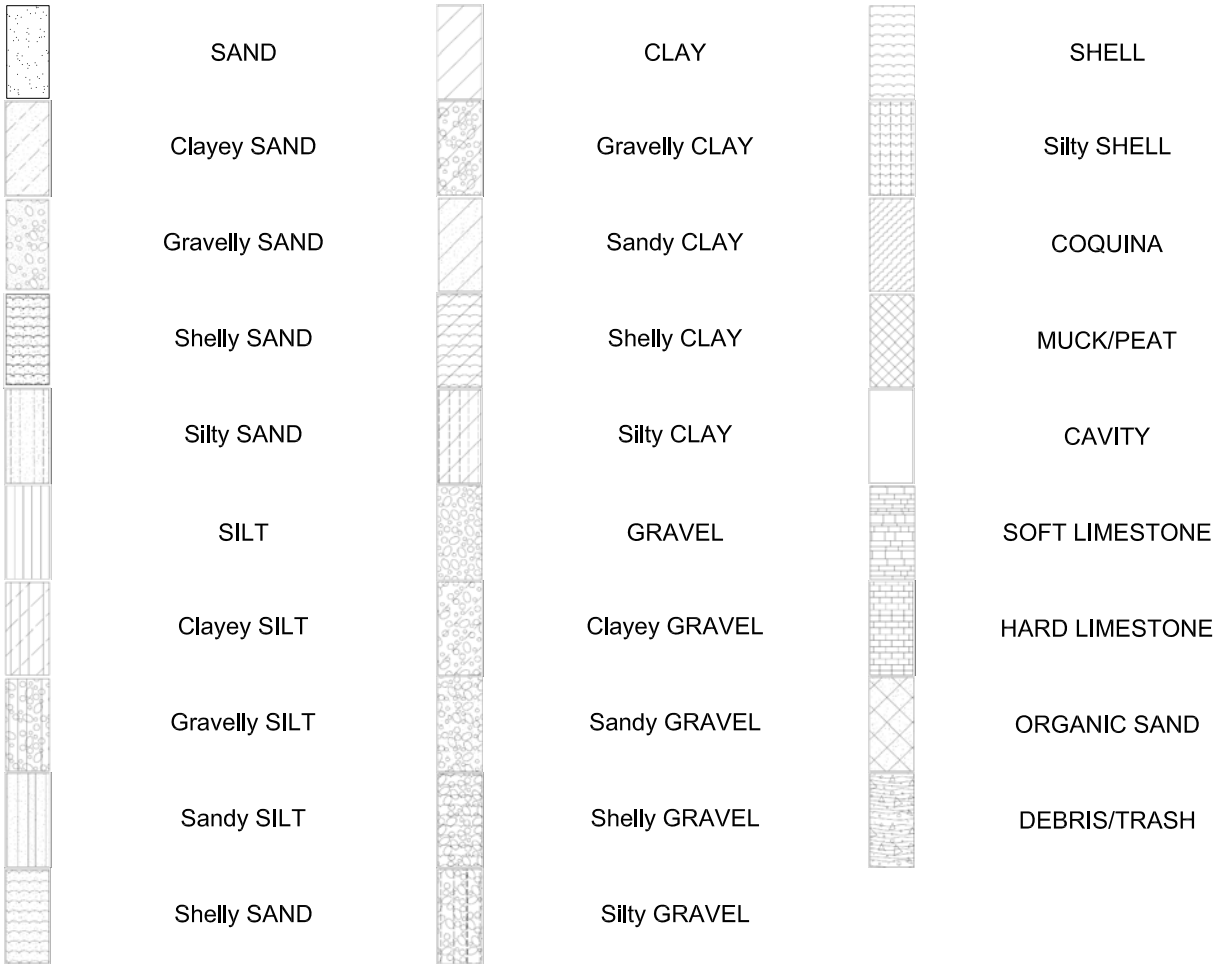
SOIL SYMBOLS



Granular Materials			*Silts and Clays*		
Relative Density	**Safety Hammer SPT N-Value (Blow/Foot)**	**Automatic Hammer SPT N-Value (Blow/Foot)**	**Consistency**	**Safety Hammer SPT N-Value (Blow/Foot)**	**Automatic Hammer SPT N-Value (Blow/Foot)**
Very Loose	Less than 4	Less than 3	Very Soft	Less than 2	Less than 1
Loose	4 - 10	3 - 8	Soft	2 - 4	1 - 3
Medium Dense	10 - 30	8 - 24	Firm	4 - 8	3 - 6
Dense	30 - 50	24 - 40	Stiff	8 - 15	6 - 12
Very Dense	Greater than 50	Greater than 40	Very Stiff	15 - 30	12 - 24
			Hard	Greater than 30	Greater than 24

Strata Changes - In the column "Soil Descriptions" on the drill log the horizontal lines represent strata changes. A solid line(——) represents an estimated observed change.

Ground Water - Observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc. may cause changes in the water levels indicated on the logs.

SOIL LEGEND

TEST LAB INC.
GEOTECHNICAL & MATERIALS
ENGINEERING, TESTING & INSPECTION