East US Route 36 Sewer Extension
Addendum #1

To: **All Bidders**
From: **Tyler Bumbalough, City Engineer**
Date: **May 22, 2014**
Re: **Horizontal Directional Drilling Alternate #1; Soil Boring Report for Pump Station; Addition of Miscellaneous Bid Item; Minor Corrections to Bid Sheet; Designer or Engineer Certification; Federal Requirements; Questions/Answers**

Horizontal Directional Drilling Alternate #1

The prospective bidders shall submit an add or deduct alternate bid, termed Alternate #1, to allow an alternate method of installation/material for the 4" force main from Station 1+00 to 47+00 and from Station 49+50 to 54+12.55. For this alternate, all 4" C900 PVC pipe shall be exchanged for 4" HDPE, DR 17 pipe. The alternate method of installation shall be horizontal directional drilling, a trenchless technology. The included, three-page set of plans shall describe the method and specifications.

A new bid form has been included with this addendum that creates an add/deduct column to assist the bidder in developing the alternate #1 prices in addition to the original base bid. If the bidder feels an item will cost $500.00 less than the item's total base bid cost, he/she will put -$500.00 in the add/deduct column for that item, and vice versa for costs in excess of the base bid. If the bidder feels his/her price is still applicable, enter a $0 or dash in the applicable blank.

Due to the inherent nature of trenchless installation methods, the City Engineer anticipates less quantity in the following restoration items under the force main and pump station bid: Item 253 Pavement Repair (both asphalt and gravel drives) and Item 659 Seeding and Mulching (both class 1 and class 2).

Although quantity shall remain the same, Item Special 4" Force Main, As Per Plan (5,063 L.F.) is expected to change in overall cost due to the pipe material and installation difference. The City Engineer anticipates that the pole holding of utility poles may be minimized by the alternative pipe material and installation method. Any anticipated savings for pole holding shall be incorporated into the alternate proposal cost for the force main. All ductile iron force main and the proposed boring and jacking under US 36 shall remain the same as originally proposed. Also, the contractor shall not be permitted to directionally drill any portion of the gravity sewer.

The Champaign County Commissioners and the City of Urbana (Owners) shall reserve the right to accept the installation method/material for the force main sewer line that is deemed to be in the best interest of the Owners. If the alternate is chosen, the Owners shall work with the selected contractor to settle changes in quantities and unit costs used in the contractor's calculations of add/deduct prices. The selected contractor shall not be permitted to adjust pricing after the bid is submitted. However, the selected contractor shall be prepared to provide a quantity/unit price breakdown of how he/she arrived at his/her alternate bid price prior to commencing work.

Soil Boring Report for Pump Station

In November 2013, a subsurface exploration was completed by means of a single soil boring at the proposed pump station location. The report from Bowser-Morner is attached for reference.

Addition of Miscellaneous Bid Item

Item Special, Miscellaneous, As Per Plan was erroneously left out of the plan estimated quantities (pg. 4 of 19 of the force main plans) and the subsequent bid form. However, the plan note explaining this item is already included on pg. 2 of 19 of the plans. The new bid form attached now includes Item Special, Miscellaneous, As Per Plan under the force main/pump station section.

Minor Corrections to Bid Sheet

The following changes were made to the revised bid sheet attached.

- Item 253 Pavement Repair, As Per Plan – Added "(Dugan)" wording under the gravity portion to match the plans.
- Item Special Miscellaneous, As Per Plan – Changed the unit of measure from "Each" to "Lump" under the gravity portion.
- Item 253 Pavement Repair (Asphalt Drive), As Per Plan – Quantity changed from 29 s.y. to 36 s.y. under the force main/pump station portion to reflect plan quantity.

Designer or Engineer Certification

Engineer's Certification and Designer Certification documents shall be executed by the Champaign County Commissioners and the City of Urbana and included in the contract document for the successful bidder for this project. These documents shall not be required to be included with the bidder's response.

Federal Requirements

All bidders shall be made aware that this project is a federally assisted project. As a result, federal requirements are part of this bidding process and subsequent contract.

Furthermore, all bidders shall be advised that the following documents are to be executed and returned with the bidder's response:

a) Section 3 Plan Format
b) Proposed Subcontracts Breakdown (Table A)
c) Table B (Estimated Project Workforce Breakdown)
d) Certification of Bidder Regarding Equal Employment Opportunity (Contractor's Certification)
e) Certification of Bidder Regarding Equal Employment Opportunity (Subcontractor's Certification)
f) Certification of Bidder Regarding Section 3 and Segregated Facilities
g) Certification of Proposed Subcontractor Regarding Section 3 and Segregated Facilities

Furthermore, all bidders shall be advised that the following documents are to be executed and returned upon contract award. These documents (h-j) shall not be required to be submitted with the bidder's response.

h) Certificate of Compliance with Federal Labor Standards Provisions
i) Contractor's Certification Concerning Labor Standards and Prevailing Wage Requirements
j) Subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements

Questions/Answers

Question #1
Could you explain the CDF (LSM) backfill requirement? The ODOT states if it's within 8' from edge of asphalt it needs used to the surface. On your plan I think you show it a little different. Maybe I am overlooking something, but the pipe bedding details are confusing to me. Do we use CDF or not?

Answer #1
The way the City Engineer interprets ODOT's requirement is that low strength mortar (LSM) backfill must be used in pavement or driveway *crossings* up to 8' off the edges of pavement. In places of grassed, parallel installation (as is most of the project), native fill is still desired as backfill per the leftmost detail on pg. 3 of 19 of the force main plans.

Basis of Bid (BID FORM)

BIDDER will complete the Work in accordance with the Contract Documents for the following prices:

EAST US ROUTE 36 SEWER EXTENSION
Gravity Portion (100% Funded by City of Urbana Sewer Capital Improvement)

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITY (a)	UNIT COST (b)	TOTAL COST BASE (a x b)
253	PAVEMENT REPAIR (DUGAN), AS PER PLAN	S.Y.	35		
611	8" CONDUIT, TYPE B, SDR-35, AS PER PLAN	FEET	1400		
611	12" CONDUIT, TYPE B, RCP, REMOVE AND RELAY, A.P.P.	FEET	78		
611	SANITARY MANHOLE, TYPE 3	EACH	5		
614	MAINTAINING TRAFFIC, AS PER PLAN	LUMP	1		
659	SEEDING AND MULCHING CLASS 2, AS PER PLAN	S.Y.	4500		
SPECIAL	MISCELLANEOUS, AS PER PLAN	LUMP	1		
	GRAVITY SEWER (TOTAL #1)			**TOTAL #1:**	

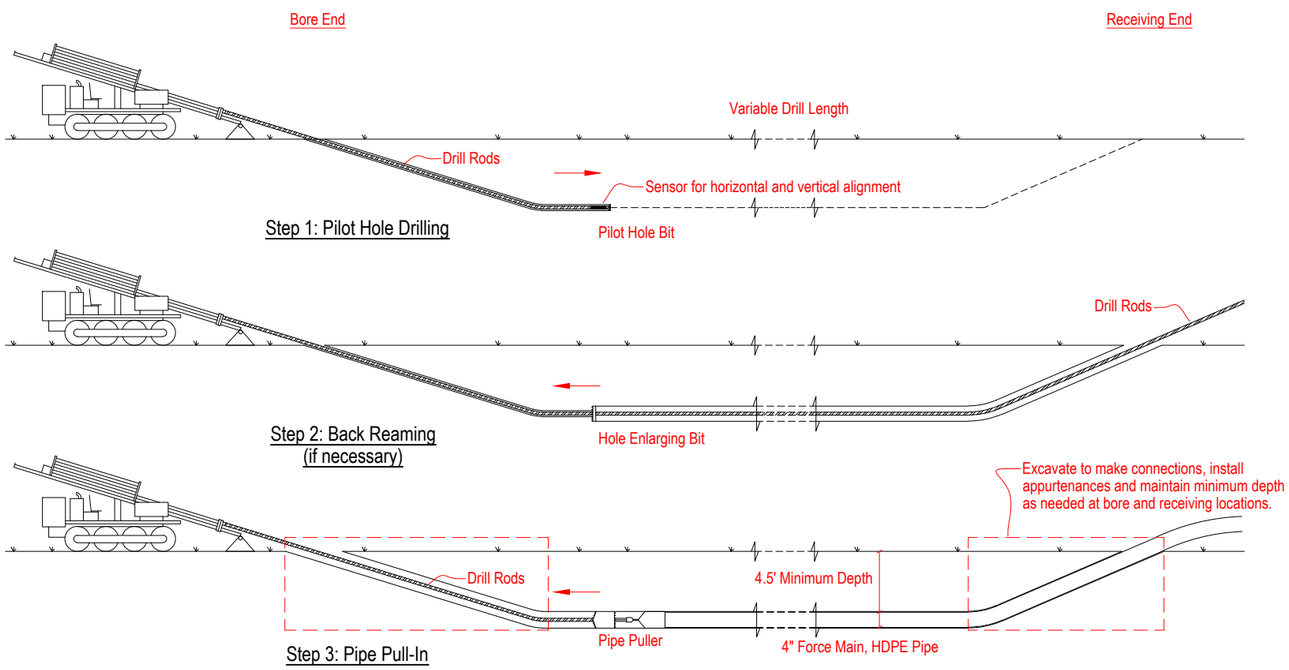
Force Main & Pump Station (Funded in part by CDBG Grant to Champaign County Commissioners, Balance Funded by City of Urbana Sewer Capital Improvement)

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	APPROX. QUANTITY (a)	UNIT COST (b)	TOTAL COST BASE (a x b)	ADD(+)/ DEDUCT(-) (c)	TOTAL COST W/ ALT. #1 (a x b + c)
201	TREE REMOVED, 18-INCH SIZE	EACH	3				
253	PAVEMENT REPAIR (ROADWAY), AS PER PLAN	S.Y.	8				
253	PAVEMENT REPAIR (ASPHALT DRIVE), AS PER PLAN	S.Y.	36				
253	PAVEMENT REPAIR (GRAVEL DRIVE), AS PER PLAN	S.Y.	74				
304	PUMP STATION AGG. BASE DRIVEWAY (12-INCH THICK)	C.Y.	47				
611	10" CONDUIT, TYPE B, SDR-35, AS PER PLAN	L.F.	185				
611	SANITARY MANHOLE, TYPE 3	EACH	2				
614	MAINTAINING TRAFFIC, AS PER PLAN	LUMP	1				
659	SEEDING AND MULCHING CLASS 1, AS PER PLAN	S.Y.	1450				
659	SEEDING AND MULCHING CLASS 2, AS PER PLAN	S.Y.	6200				

SPECIAL	4” C900 PVC FORCE MAIN, AS PER PLAN	L.F.	5063				
SPECIAL	4” DUCTILE IRON FORCE MAIN, AS PER PLAN	L.F.	192				
SPECIAL	BORING AND JACKING (INCLUDING CARRIER AND CASING PIPE) PER STD. DWG. 1167.27	L.F.	58				
SPECIAL	PUMP STATION, AS PER PLAN	LUMP	1				
SPECIAL	MISCELLANEOUS, AS PER PLAN	LUMP	1				
	FORCE MAIN AND PUMP STATION TOTAL (TOTAL #2 AND TOTAL #3, RESPECTIVELY)			**TOTAL #2:**		**TOTAL #3:**	
	PROJECT GRAND TOTAL (TOTAL #1 + TOTAL #2 AND TOTAL #1 + TOTAL #3, RESPECTIVELY)			**TOTAL #1 + TOTAL #2:**		**TOTAL #1 + TOTAL #3:**	

EAST US ROUTE 36 SEWER EXTENSION

Addendum #1 - Alternate #1



HORIZONTAL DIRECTIONAL DRILLING - TYPICAL PROFILES (NTS)

PROJECT DESCRIPTION

Alternate #1 shall consist of an add/deduct option alongside the current base bid. The prospective bidder shall submit prices to exchange all trenched 4" PVC C900 force main (plan quantity 5,063 LF) for horizontal directionally drilled 4" high density polyethylene (HDPE), DR 17. HDPE pipe and installation shall conform to ASTM D3350, ASTM F714, ASTM F2620 (or ASTM F1290) and ASTM F1962. HDPE pipe shall be dimensioned to ductile iron pipe size (DIPS). Fused butt joints shall be formed so the interior and exterior of the HDPE pipe is smooth at the transition. Bends, transition couplers and any other fittings shall be ductile iron. All HDPE force main is to be accompanied by a minimum 12-gauge copper insulated tracer wire. As shown below, Station 47+00 to 49+50 shall remain ductile iron pipe; the planned encasement pipe under US Route 36 shall also remain.

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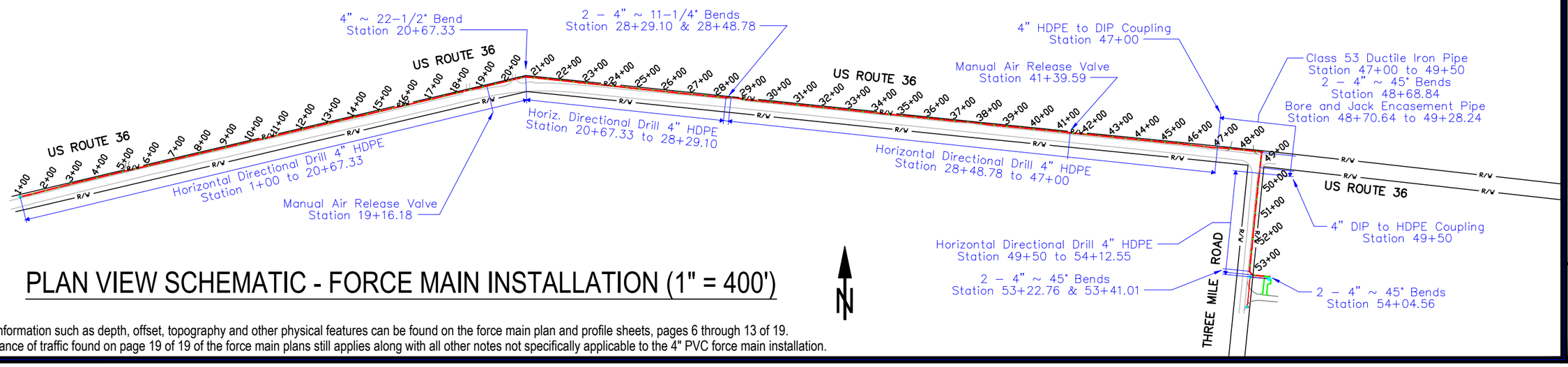
Approved: Tyler L. Bumbalough 5/21/14

Tyler L. Bumbalough, P.E. Date
City Engineer

STATE OF OHIO
TYLER LEE BUMBALOUGH
E-78528
REGISTERED PROFESSIONAL ENGINEER



PLAN VIEW SCHEMATIC - FORCE MAIN INSTALLATION (1" = 400')

*Note: Information such as depth, offset, topography and other physical features can be found on the force main plan and profile sheets, pages 6 through 13 of 19.
Maintenance of traffic found on page 19 of 19 of the force main plans still applies along with all other notes not specifically applicable to the 4" PVC force main installation.

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EAST US ROUTE 36 SEWER EXTENSION
Tyler L. Bumbalough, P.E.
CITY ENGINEER

Addendum #1 - Alternate #1
CAD FILE: G:\Engineering\Construction Projects\Rothschild's Sanitary\RothschildSewer.dwg
DRAWN BY: TLB | APPRVD BY: TLB | SCALE: (shown) | ISSUE DATE: 5/15/14 | REVISION DATE: ---

Alt. #1
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SPECIFICATION FOR HORIZONTAL DIRECTIONAL DRILLING
STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
11/06/2012

Description
Materials
Construction
Equipment Requirements
Testing
Method of Measurement
Basis of Payment

DESCRIPTION

Use Horizontal Directional Drilling (HDD) method when the plan calls for such a method to be used, or when the engineer approves using this method via a value engineering process, to furnish and install underground utility/facility/product/pipe/conduit (referred to as product pipe in the rest of this section). The installation is according to the sizes and limits shown on the plans, and specified by these technical specifications herein. The work includes all services, equipment, materials, tools, and labor for a complete and proper installation and testing.

HDD is a trenchless method for installing a product pipe. It is a multi-stage process consisting of site preparation, equipment setup, pilot bore, product pipe pulling through the drilled bore, and site restoration. Alignment of the bore is accomplished by proper orientation of the drill bit head as it is pushed through the ground by the drill rig. Orientation and tracking of the drill bit is determined by using an acceptable tracking system from a transmitter located within the drill bit head. When necessary, enlarge the pilot borehole (back reaming) to accommodate a product pipe larger than the pilot borehole size. Back ream ahead of or at the same time pulling the product pipe through the pilot borehole.

In order to minimize friction and prevent collapse of the bore hole, introduce a soil stabilizing agent (drilling fluid) into the annular bore space from the front end of the drill bit. The rotation of the bit in the soil wetted by the drilling fluid creates slurry. The slurry stabilizes the surrounding soil, prevents the bore hole from collapsing, and provides lubrication. Select or design the drilling fluids for the site's specific soil and ground water conditions. Confine free flowing (escaping) slurry or drilling fluids at the ground surface during pull back or drilling.

MATERIALS

Product Pipe
Select the product pipe material according to the type of product indicated on the plans. The product pipe must comply with all applicable ODOT specification sections and ASTM standards depending on the purpose and material of the product pipe. Join the pipe sections so that the joined pipe sections are installable using HDD. Ensure that the joined product pipes have adequate strength and flexibility to withstand the installation stresses, overburden pressures, and operating pressures without compromising the structural stability of the pipe wall. Ensure that the product pipe meets the bend radius required for the proposed installation. Join the pipe sections so that the inner surfaces are flush and even.

The following material standards are the minimum in place standards.

Material Standards for HDD Installation

Material Type	Non-Pressure	Pressure
Polyethylene (PE)	ASTM D2447	ASTM D2513, ASTM D2447
High Density Polyethylene (HDPE)	ASTM D2447, ASTM D3350, ASTM F714	ASTM D2447, ASTM D3350, ASTM F714, ASTM D2513
Polyvinyl-Chloride (PVC)	ASTM F789	ASTM D1785, ASTM D2241
Steel	ASTM A139 Grade B(1)	AWWA C200 API 2B(2)

(1) No hydrostatic test required (2) Dimensional tolerances only

Detection Wire: Electronic detection material for non-conductive piping products. Select tracer wire designed for HDD to conductively locate underground utility lines according to ASTM D-1248. Use either a continuous green sheathed solid conductor copper wire line (minimum #12 AWG for external placement) or a coated conductive tape. Select a minimum 12-gauge copper clad steel wire and able to withstand the installation tension along the entire length of the line.

CONSTRUCTION

Submittals
Work Plan: Prior to beginning work, submit to the Engineer a Work Plan detailing the procedure and schedule to execute the project. The work plan will be comprehensive, realistic, and based on actual working conditions for this particular project. The work plan documents the planning required to successfully complete the project. The work plan includes complete descriptions of proposed plans, procedures, equipment, personnel, and if applicable, supporting material, for the following:

- Drilling operations: describe the pilot hole drilling procedure, the reaming operation, the pullback procedure, and illustrate the plan.
- Profile of the bore plotted at a scale appropriate for the crossing and acceptable to the Engineer.
- HDD site layout including entry and exit points.
- Directional drilling equipment list includes: drilling rig, drill bit, back-reamer, mud mixing and pumping systems, down-hole tools, guidance system, and rig safety system. Provide calibration records for guidance equipment.
- Drilling fluid management plan: drilling fluid types and specifications, cleaning and recycling equipment, estimated flow rates, procedures for minimizing drilling fluid escape, and the method/location for final disposal of waste drilling fluids. Provide the MSDS for all drilling fluid additives that will be used.
- Pipe storage and handling details.
- Pipeline assembly and installation procedures.
- MSDS of any potentially hazardous substances to be used.
- Contingency plans for possible problems.

Submit supporting calculations, certifications, or material demonstrating the strength of the product pipes for acceptance before the beginning of the installation. Submit for the Engineer's acceptance prior to construction, other product pipe material than those listed on the plans. Demonstrate that the proposed material satisfies the purpose of the utility and withstands the design and construction stresses and pressures.
If site conditions change and require modification to the work plan, resubmit revised drilling plans to achieve successful installation. Explain, in the revised submittal, the anticipated and encountered conditions that mandated the change in plans.

Daily Reports and Operator Logs
Submit the Daily Reports to the Engineer within 24 hours. Include, in the Daily Reports, log of boring operations and guidance system for each drill rod added or withdrawn during drilling, reaming, and pullback. The log covers downhole tools and equipment in use, drilling fluid, fluid pumping rate, drilling head location. Cover, in the report, details of and perceived reasons for any unusual events and delays greater than one hour excluding normal breaks.

Record Drawings
At the completion of the HDD product pipe installation, the general contractor will provide the Engineer marked up plans noting all deviations from the plans that result in change of location, material, type or size of work guided by the boring operations and guidance system log. Post, on the drawing, the x, y, and z coordinates of the starting and ending points of the line at minimum. Include in the marked up plans, the station number or reference to a permanent structure within the project right-of-way, name of person collecting data, including title, position and company name, detection method used, and elevations and offset dimensions. Certify the accuracy of the drawing to the capability of the tracking system. If the HDD contractor is the general contractor, the HDD contractor provides the Engineer with the marked up plans.

Installation
Site Preparation: Prior to any alterations to worksite, walk the area prior to the commencement of the HDD project and visually inspect the site for potential problems.
Utility Location: Contact the Ohio Utilities Protection Service (OUPS) at 1-800-362-2764 or 8-1-1 and contact the Oil & Gas Producers Underground Protection Service (OGPUPS) by dialing 1-800-825-0988 or 8-1-1 at least 48 hours, but no more than 10 working days (excluding weekends and legal holidays) before beginning work. Explore and locate existing underground utilities in the areas of Work. Verify the exact physical location and depth of existing utilities by exposing as needed. If utilities are to remain in place, provide adequate means of protecting the utility during excavation operations. Should uncharted or incorrectly charted piping or other utilities be encountered during the utility exploration, contact the Owner of the utilities and the ODOT Representative in the field.
Contractor is responsible for repairing damaged utilities to the satisfaction of the utility owner in accordance to the Ohio revised code 153.64 Protecting underground utility facilities during construction of public improvement and 3781.25 One-call utility protection service definitions. If the utility was accurately marked by the utility locater or on the drawing, repair it at no additional cost. If the damaged utility was not accurately marked by the utility locater or on the drawing, owner adjusts the contract value and/or time accordingly. Follow the additional instructions in section 105.07 Cooperation with Utilities of the Ohio Department of Transportation Construction and Material Specifications for cooperation with utilities.

Take control of the HDD operation at all times. Have a representative who is thoroughly knowledgeable of the equipment, boring and the owner procedures, present at the job site during the entire installation and available to address immediate concerns and emergency operations. Notify the Engineer 48 hours in advance of starting work. Do not begin installation until the Engineer is present at the job site and agrees that proper preparations have been made.

EQUIPMENT REQUIREMENTS

Match the HDD drill rig and its auxiliary pieces of equipment to the diameter and length of product pipe being installed and ensure that the drill rod can meet the bend radius required for the proposed installation. The directional drilling machine consist of a power system to rotate, push and pull back hollow drill pipe into the ground at variable angles while delivering a pressurized fluid mixture to a guidable drill head (bit). Select/design the power system to provide sufficient pressure to power the drilling operations through a leak-free hydraulic system. Anchor the directional drilling machine to the ground to withstand the pulling, pushing, and rotating pressure required to complete the HDD installation.

Select a drilling fluid mixing system that is self-contained and closed with sufficient size to mix and deliver drilling fluid to the drill bit. The mixing system will continually agitate the drilling fluid during drilling operations. Select fluids delivery system capable of pumping drilling fluid with sufficient volume and pressure from the mixing tank through the drill rods to the drill head (bit).

Minimize potential damage from soil displacement/settlement/heave by limiting the borehole diameter compared to the product pipe. Select the back-reamer size so it creates a large enough borehole to allow cuttings to transfer from the face of excavation to the surface with a minimum soil displacement.

Guidance System
Unless it is specified on the plan, select an acceptable guidance system to locate and track continuously and accurately the drill head during the pilot bore. The guidance system must be capable of tracking the drill bit in the expected underground environment and at the depth shown on the plans. The acceptable methods include: walkover, wire line, Magnetic Guidance System (MGS) probe, proven (non-experimental) gyroscopic probe, or any other system as accepted by the Engineer. Select the guidance system and the drill rig to deliver the required horizontal and vertical accuracy required for the product pipe. Use a locating and tracking system capable of ensuring that the proposed installation is executed as intended. If signal interference is encountered that significantly affects the ability to accurately track the drill bit, the Engineer may specify the use of a suitable tracking system. If the owner informs the contractor about signal interference or it is reasonable to expect interference at the site prior to bidding; select a suitable tracking system without extra cost to the owner; otherwise the owner adjusts the contract value and time accordingly. Select the locating and tracking system to provide information on: (a) Clock and pitch information (b) depth (c) transmitter temperature (d) battery status (e) position (x,y) (f) azimuth, where direct overhead readings (walkover) are not possible (i.e. subaqueous or limited access transportation facility). Ensure proper calibration of all equipment before commencing directional drilling operation. Take necessary measures to ensure accurate record drawing. Install all facilities such that their location can be readily determined by electronic designation after installation.

Drilling Fluids
Use a drilling fluids mixture composed of potable water and stabilizing agent - usually bentonite and/or polymer and/or appropriate additives continuously pumped to the drill bit.

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EAST US ROUTE 36 SEWER EXTENSION

Tyler L. Bumbalough, P.E.
CITY ENGINEER

Addendum #1 - Alternate #1

CAD FILE: G:\Engineering\Construction Projects\Rothschild's Sanitary\RothschildSewer.dwg

DRAWN BY:	APPRVD BY:	SCALE:	ISSUE DATE:	REVISION DATE:
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Alt. #1

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Drilling Fluids (cont'd)
Design/select the drilling fluid: to transport the spoils; maintain temperatures of bits and transmitter; clean cuttings from drill bit and reamers; reduce friction, pullback, and torque on drill rods and product pipe; stabilize the borehole; control ground water pressure; and reduce migration of drilling fluids in soil. Use water with pH between 7.5 and 10 and free of chlorine with calcium < 100ppm, sodium chloride < 500ppm, and chlorine < 50ppm. Hard water may be treated with soda ash to reach the required pH. Design the quantity and the mixture of drilling fluids to perform the preceding functions in the expected soil. Vary the fluid viscosity to best fit the encountered soil conditions. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the Engineer. Certify to the Engineer in writing that any added chemicals are environmentally safe and not harmful or corrosive to the product pipe and the environment. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds or fire hydrants. Any water source used other than potable water requires a pH test.

Drilling Operations
Prior to the start of the boring operation, survey the work site with x, y, z coordinates at control point at 100/LF intervals at minimum along the planned bore path. Provide stakes at offset distances (left or right) from the centerline at these control points and at all known existing utility crossings. Submit this information to the owner at least 24 hours before the start of pilot bore operations.

Drill the pilot hole along the path shown on the plans and profile drawings within the allowable tolerance of the type of utility. Provide and maintain instrumentation necessary to accurately locate the pilot hole (both horizontal and vertical placements). Ensure adequate removal of soil cuttings and stability of the bore hole by monitoring the drilling fluids parameters such as the pumping rate, pressures, viscosity and density during the pilot bore, back reaming, and product pipe installation. Relief holes can be used as necessary to relieve excess pressure down hole. Obtain the Engineer's approval of the location and all conditions necessary to construct relief Maintain proper disposition of drilling fluids and minimize inconvenience to other facility users.

To minimize heaving during pull back, determine the pullback rate in order to maximize the removal of soil cuttings without building excess down hole pressure. Contain excess drilling fluids at entry and exit points until the recycle, vacuum, or removal from the site during drilling operations. Ensure that entry and exit containments are of sufficient size to contain the expected return of drilling fluids and soil cuttings. Carry out excavation and backfill for entry, exit, recovery pits, connection pits, slurry sump pits, or any other excavation as specified in Section 611.

Ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the appropriate local, state, or federal regulatory agencies. When drilling in contaminated ground, test the drilling fluid for contamination and appropriately dispose of it. The Engineer will adjust the contract value and/or time if the contractor was not notified about the contamination during the bidding phase. Remove any excess material upon completion of the bore. Contact the Engineer immediately if it becomes evident that the soil is contaminated in the drilling process. Do not continue drilling without the Engineer's consent.

Install all facilities such that their location can be readily determined by electronic designation after installation. For non-conductive installations, attach a continuous conductive tracking (tracer wire) materials, either externally, internally or integral with the product. Tracking conductors must extend two feet beyond bore termini. Test conductors for continuity.

Within 48 hours of completing the installation, clean the work site of all excess slurry or spoils, de-mobilize equipment, and ensure that the site is safe and secured.

Environmental Protection
Take all necessary measures to eliminate the discharge of water, drilling mud, and cuttings to nearby waterways during the HDD work. If applicable, provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. Follow section 107.19 Environmental Protection of the Ohio Department of Transportation Construction and Material Specifications for environmental protection requirements.

Damage Restoration
Take responsibility for restoration of any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid, or from the directional drilling operation. If the negligence of the contractor causes damage to any facility, restore the facility to its original conditions or better at no additional cost to the Department. Follow sections 104.04 and 107.10 of the Construction and Material Specifications for other requirements regarding clean up and restoration. When remediation plans are required by the Engineer, provide detailed and acceptable-by-the-Engineer plans showing how the damage will be remedied before any work proceeds.

TESTING

Upon completion of the directional bore, test tracer wire continuity for each bore before acceptance.

METHOD OF MEASUREMENT

The Department will measure installed product by the number of feet (meters) in place measured from center-to-center of appurtenant small structures, connection points, or between open ends inclusive of lengths of pipe bends and branches. The Department will not deduct for catch basins, inlets, or manholes that are 6 feet (2 m) or less across, measured in the direction of flow. Where the location of an appurtenance, connection point, or an open end is changed with the approval of the Engineer, the Department will measure the length placed.

BASIS OF PAYMENT

The Department will fully compensate the contractor for all work specified, including furnishing and installing product pipe, from plan point of beginning to plan point of ending at plan depth, removal of excavated materials and spoils, removal and disposal of drilling fluids, backfilling, and complete restoration of the site according to the unit prices submitted in the bid. The price covers all other related incidental work and materials including layout and reference points, fence and shrub restoration, locate wiring and testing. The cost of the bore includes the furnishing and installing detection wire or tape. No payment will be made for failed bore paths, injection of flowable fill, products taken out of service or incomplete installations due to fault of the contractor.

No payment will be made for the HDD work until the daily boring logs has been delivered to the Engineer. After the Engineer's acceptance of the daily boring logs, payment will be made in the amount of 90% of the unit price bid for the HDD work. The remaining 10% of the unit price bid will be made after submittal of record drawings in accordance with ODOT requirements
Payment will be made under: Item Special Directional Bore - per foot (meter) for each diameter and pipe material.

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CITY ENGINEER

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CAD FILE: G:\Engineering\Construction Projects\Rothschild's Sanitary\RothschildSewer.dwg

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TLB	TLB	---	5/15/14	---

Alt. #1

SOIL EXPLORATION,
PROPOSED LIFT STATION,
CITY OF URBANA,
THREE MILE ROAD SOUTH OF STATE ROUTE 36,
URBANA, CHAMPAIGN COUNTY, OHIO

Burgess & Niple, Inc.
Attention: Mr. Bruce P. Frazier, P.E.
5085 Reed Road
Columbus, Ohio 43220-2513

BMI Report No. 164048-1113-4593

November 18, 2013

BOWSER MORNER®

BOWSER-MORNER, INC.

1419 Miami Street (43605) • P. O. Box 838 • Toledo, Ohio 43697-0838
419-691-4800

Geotechnical Laboratory Report

Report To:	Burgess & Niple, Inc.	**Date:**	November 18, 2013
Attention:	Mr. Bruce P. Frazier, P.E.	**Laboratory Job No.:**	164048
	5085 Reed Road	**BMI Report No.:**	164048-1113- 4593
	Columbus, Ohio 43220-2513	**Report Consists of**	**14 Pages**

Report On: SOIL EXPLORATION,
Proposed Lift Station, City of Urbana,
Three Mile Road South of State Route 36,
Urbana, Champaign County, Ohio

Ladies and Gentlemen:

Bowser-Morner, Inc. has completed the authorized subsurface exploration and geotechnical engineering evaluation at the above referenced project. The following report briefly reviews our exploration procedures, describes existing site and subsurface conditions, and presents our evaluations, conclusions, and recommendations.

1.0 AUTHORIZATION

The purpose of this subsurface exploration and geotechnical engineering evaluation was to determine the subsurface conditions at the project site and to analyze these conditions as they relate to foundation design and construction. All work was performed in accordance with Bowser-Morner technical proposal No. T-22085 dated October 30, 2013 and its attached *Proposal Acceptance Sheet* and the Agreement for Sub Consultation Services between Burgess & Niple, Inc. and Bowser-Morner, Inc. dated November 5, 2013. The scope of the exploration included subsurface drilling and sampling, limited laboratory testing, engineering evaluation of the field and laboratory data, and the preparation of this report.

2.0 WORK PERFORMED

2.1 Field Exploration

During this exploration, one soil test boring was drilled at the approximate location shown on the attached *Boring Location Plan*. The boring was drilled to a depth of 30 feet. Boring location was established in the field by Bowser-Morner, Inc. by measuring distances and estimating right angles from existing site features. Boring elevation was not obtained. Since

these measurements are not precise, the location shown on the *Boring Location Plan* should be considered approximate.

All soil sampling and standard penetration testing was conducted in general accordance with ASTM D 1586. The borings were advanced by a truck-mounted drilling rig by mechanically twisting hollow-stem augers into the soil. At regular intervals, soil samples were obtained with a standard 2-inch O. D. split spoon sampler driven 18 inches into the soil with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot was recorded and designated the "standard penetration resistance." The standard penetration resistance, or "N" value, when properly evaluated, is an index of the soil's strength, density, and ability to support foundations. The disturbed samples recovered by the split spoon sampler were visually classified in the field, logged, sealed in glass jars, and returned to the laboratory for testing and evaluation by a geotechnical engineer.

Boring Log indicating soil descriptions, penetration resistances, and observed groundwater levels is attached.

2.2 Laboratory Testing

In the laboratory, each of the samples recovered from the borings was examined and visually classified by a geotechnical engineer. In addition, samples of cohesive soils from the split spoon samplers were tested to determine the soil's approximate strength using a hand-held, calibrated spring penetrometer. These values were used by the geotechnical engineer to assist in the evaluation of the relative strengths of the subsurface soils and to aid in classification of the samples.

Natural moisture content determinations were made on 4 split spoon samples recovered from the soil test boring. The results of the moisture content determination tests are shown on the attached *Moisture Content Summary Sheet.*

Soil samples are normally retained in our laboratory for a period of 60 days before they are discarded. To view the samples or arrange for longer storage of samples, please contact us.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Description

The proposed site is located on the east side of Three Mile Road and about 450 feet south of U.S Route 36 in Urbana Township, Champaign County, Ohio.

3.2 Soil Profile

Data from the soil test boring is shown on the attached *Boring Log*. The subsurface conditions discussed in the following paragraphs and those shown on the *Boring Log* represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Geologically, the project site is situated in a glacial ground moraine consisting of till containing an unsorted, unstratified mixture of clay, silt, sand, and coarser fragments deposited discontinuously by advancing ice.

Topsoil covers the ground surface of the boring location and was recorded by the drillers as 12 inches in thickness. Below the topsoil is glacial till deposit that was described as brown and gray clay and silt with some sand and traces of gravel. With depth, the till deposit contains a higher percentage of sand and extended to a depth of 16 feet. Underlying the glacial till is sand and gravel with some silt. The sand and gravel becomes saturated at a depth of 16 feet and extended to the bottom of the boring.

The apparent undrained shear strength of the glacial till varied from about 3,000 to greater than 4,500 psf. The consistency of the sand and gravel deposit is medium dense to very dense.

3.3 Groundwater Observations

During the field exploration, the drilling rods and sampling equipment were continuously checked by the drillers for indications of groundwater or seepage. The *Boring Log* lists our driller's observations of groundwater or seepage. Three readings are recorded on the logs. The initial groundwater level indicates the depth(s) at which groundwater or seepage was initially noted by the drillers as the boring was being advanced and the intensity of the seepage. The completion groundwater level represents the depth groundwater was observed in the borehole immediately after the completion of the hole. The last reading on the *Boring Log* represents the depth groundwater was observed in the borehole after an increment of time has passed. In this case, both the depth and time are listed.

Groundwater was encountered in the boring at a depth of 16 feet.

Groundwater levels fluctuate with seasonal and climatic variations and may be different at other times. More specific information regarding groundwater levels, standard penetration resistances, and soil descriptions is detailed on the attached *Boring Log*.

4.0 PROPOSED CONSTRUCTION

It is our understanding the proposed construction is to consist of a sanitary sewer pumping station, with an approximate diameter of 6 feet and a depth of about 14 to 15 feet.

5.0 EVALUATIONS AND CONCLUSIONS

The following evaluations and conclusions are based on our interpretation of the field and laboratory data obtained during the exploration and our experience with similar subsurface conditions. Soil penetration data and laboratory data have been used to estimate allowable bearing pressures using commonly accepted geotechnical engineering practices. Subsurface conditions in uninvestigated locations between borings may vary considerably from those encountered in the borings. If structure location, loadings, or levels are changed, we request we be advised so we may re-evaluate our recommendations.

5.1 Foundations

The subsurface soil conditions at this site are acceptable for the support and construction of the proposed lift station. At the bearing level of 14 to 15 feet, the natural soils are very stiff clay and silt with a net allowable soil bearing capacity of 4,000 psf.

5.2 Pump Station Construction

As previously described, the clay soil present at the site is relatively strong, and we do not anticipate significant problems with excavations for the pump station and/or support of the excavation sides.

Typically, construction of this type consists of constructing manhole-type structures, and the total weight of the structure and equipment in the pump station is normally less than the weight of the soil removed. Under these circumstances settlement of the structure is normally extremely small. Backfill behind the walls of the lift station should consist of lean concrete or controlled density fill so as to prevent uplift due to flotation.

5.3 Soil Seismic Site Classification

We have evaluated the available soil profile data developed during this study to determine the Site Class in accordance with the 2009 International Building Code. The test borings for this project did not extend to 100 feet deep and, therefore, we have estimated the depth to rock based on records we keep on file. We have also estimated the soil strength and soil types below the bottoms of the on-site borings. Based on this analysis, we have determined the Site Class is D. We may be able to upgrade the class to C with seismic wave testing. We can perform this service.

5.4 Groundwater Control

During the field exploration, groundwater was encountered below a depth of 16 feet. It is possible that a pressure head may exist within the sand and gravel found below the glacial till layer. This may result in heaving of the base of the excavation. Temporarily dewatering of the sand and gravel layer before beginning excavation will reduce the possibility of heave of the bottom of the excavation.

The amount and type of dewatering required during construction will depend on the weather and groundwater levels at the time of construction and the effectiveness of the contractor's techniques in preventing surface runoff from entering open excavations. Typically, groundwater levels are highest during winter and spring months and lower in summer and early fall.

5.5 Slopes and Temporary Excavation

The owner and the contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including current OSHA excavation and trench safety standards. Construction site safety generally is the sole responsibility of the contractor. The contractor shall also be solely responsible for the means, methods, techniques, sequences, and operations of construction operations. Bowser-Morner is providing the following information solely as a service to the client. Under no circumstances should Bowser-Morner's provision of the following information be construed to mean Bowser-Morner is assuming responsibility for construction site safety or the contractor's activities; such responsibility is not implied and should not be inferred.

The contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state,

or federal safety regulations, e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if not followed, the owner, the contractor, or earthwork or utility subcontractors could be liable for substantial penalties.

For this site, the overburden soil encountered in our exploration is mostly silty clay of glacial origin. We anticipate OSHA will classify this material as Type B unless excavation extends into the sand and gravel soil (Type C) underneath this deposit.

Note: Soils encountered in the construction excavations may vary significantly across the site. Our preliminary soil classifications are based solely on the materials encountered in widely spaced borings. The contractor should verify similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are encountered at the time of construction, Bowser-Morner recommends we be contacted immediately to evaluate the conditions encountered.

If any excavation, including a utility trench, is extended to a depth of more than 20 feet, OSHA requires the side slopes of such excavation be designed by a professional engineer.

6.0 QUALIFICATIONS

The evaluations, conclusions, and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the exploration, our understanding of the project, and our experience with similar sites and subsurface conditions. Data used during this exploration included, but was not necessarily limited to:

- one exploratory boring performed during this study;
- observations of the project site by our staff;
- results of limited laboratory soil testing;
- preliminary site plans and drawings furnished by Burgess & Niple, Inc.;
- limited interaction with Mr. Bruce Frazier of Burgess & Niple, Inc.; and
- published soil or geologic data of this area.

In the event changes in the project characteristics are planned, or if additional information or differences from the conditions anticipated in this report become apparent, Bowser-Morner, Inc. should be notified so the conclusions and recommendations contained in this report can be reviewed and, if necessary, modified or verified in writing.

The subsurface conditions discussed in this report and those shown on the *Boring Los* represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring location on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Regardless of the thoroughness of a subsurface exploration, there is the possibility conditions between borings will differ from those at the boring locations, conditions are not as anticipated by designers, or the construction process has altered the soil conditions. As variations in the soil profile are encountered, additional subsurface sampling and testing may be necessary to provide data required to re-evaluate the recommendations of this report. Consequently, after submission of this report, it is recommended Bowser-Morner be authorized to perform additional services to work with the designer(s) to minimize errors and/or omissions regarding the interpretation and implementation of this report.

Prior to construction, we recommend that Bowser-Morner:

- work with the designers to implement the recommended geotechnical design parameters into plans and specifications;
- consult with the design team regarding interpretation of this report;
- establish criteria for the construction observation and testing for the soil conditions encountered at this site; and
- review final plans and specifications pertaining to geotechnical aspects of design.

During construction, we recommend that Bowser-Morner:

- observe the construction, particularly site preparation, fill placement, and foundation excavation or installation;
- perform in-place density testing of all compacted fill;
- perform materials testing of soil and other materials as required; and
- consult with the design team to make design changes in the event differing subsurface conditions are encountered.

If Bowser-Morner is not retained for these services, we shall assume no responsibility for construction compliance with the design concepts, specifications, or recommendations.

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, expressed or implied, is made.

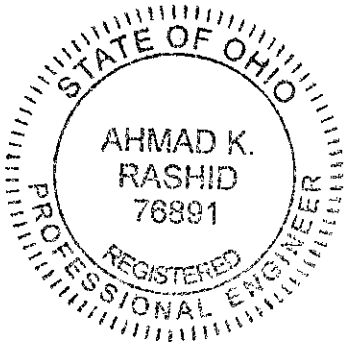
The scope of our services did not include an environmental assessment for the presence or absence of hazardous or toxic materials in the soil, surfacewater, groundwater, or air, on, within, or beyond the site studied. Our work also did not include anything related to mold. Our scope of services also did not include an evaluation for the presence or absence of wetlands or protected species. Any statements in the report or on the *Boring Log* regarding odors, staining of soils, or other unusual items or conditions observed are strictly for the information of our client.

To evaluate the site for possible environmental liabilities, we recommend an environmental assessment, consisting of a detailed site reconnaissance, a record review, and report of findings. Additional subsurface drilling and sampling, including groundwater sampling, may be required. The presence or absence of wetlands or protected species should be determined by a wetlands study. Bowser-Morner, Inc. can provide these services and would be pleased to provide a cost proposal to perform these studies, if requested.

This report has been prepared for the exclusive use of Burgess & Niple, Inc. for specific application to the proposed Lift Station for the City of Urbana located on Three Mile Road South of State Route 36 in Urbana, Champaign County, Ohio. Specific design and construction recommendations have been provided in the various sections of the report. The report should, therefore, be used in its entirety. This report is not a bidding document and shall not be used for that purpose. Anyone reviewing this report must interpret and draw their own conclusions regarding specific construction techniques and methods chosen. Bowser-Morner is not responsible for the independent conclusions, opinions, or recommendations made by others based on the field exploration and laboratory test data presented in this report.

BOWSER-MORNER, INC.

Ahmad K. Rashid, P.E.
Senior Geotechnical Engineer



AKR:dnh
Attachments: *Boring Location Plan*
Boring Log Terminology
Boring Log
Moisture Content Summary Sheet
1-Client (via email to bruce.frazier@burgessniple.com)

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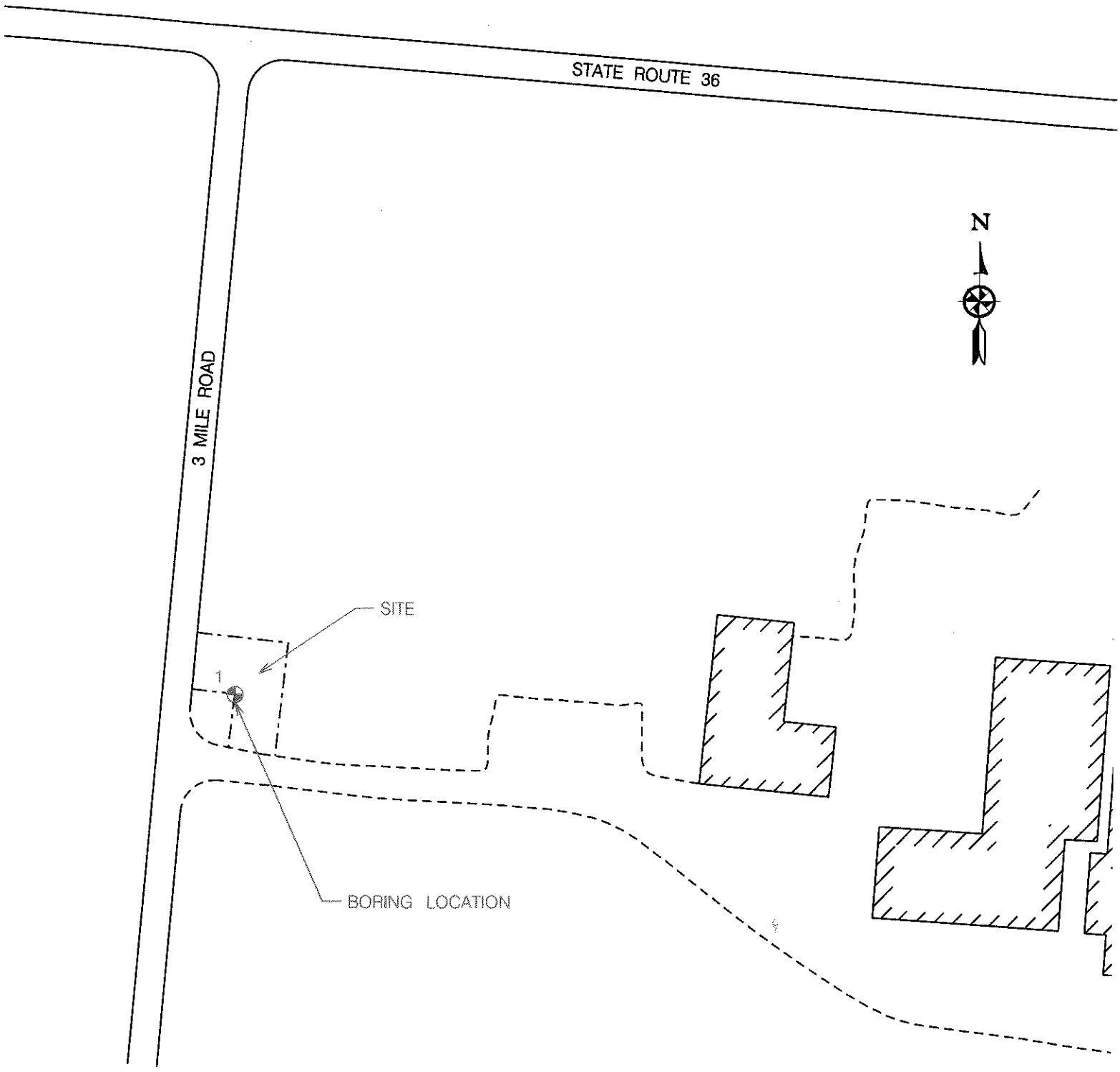

SCALE: 1" = 100' Approx.

DATE: 11–13–13
JOB NO. 164048

BORING LOCATION PLAN
PROPOSED LIFT STATION
CITY OF URBANA
THREE MILE ROAD SOUTH OF STATE ROUTE 36
URBANA, CHAMPAIGN COUNTY, OHIO

BOWSER MORNER.

BORING LOG TERMINOLOGY

Stratum Depth:

Distance in feet and/or inches below ground surface.

Description of Materials:

When the color of the soil is uniform throughout, the color recorded will be such as brown, gray, or black and may be modified by adjectives such as light and dark. If the soil's predominant color is shaded by a secondary color, the secondary color precedes the primary color, such as gray and brown, yellow and brown. If two major and distinct colors are swirled throughout the soil, the colors will be modified by the term mottled, such as mottled brown and gray.

There are two types of visual classification methods currently used by Bowser-Morner, Inc. The first is ASTM D2488. This method results in classifications such as "lean clay". The second method is the ASEE system or Burmister system. This system results in classifications such as "silt and clay, with traces of sand" and is described below.

Particle Size		Visual
Boulders		Larger than 8"
Cobbles		8" to 3"
Gravel:	Coarse	3" to 3/4"
	Fine	3/4" to 2 mm
Sand:	Coarse	2 mm to 0.6 mm (pencil size)
	Medium	0.6 mm to 0.2 mm (table sugar & salt size)
	Fine	0.2 mm to 0.06 mm (powdered sugar size)
Silt		0.06 mm to 0.002 mm
Clay		0.002 mm and smaller (particles of silt and clay size are not visible to the naked eye)

Soil Components	
Major Components	**Minor Component Term**
Gravel	Trace.....1 - 10%
Sand	Some.....11 - 35%
Silt	And.....36 - 50%
Clay	

Moisture Content	
Term	**Relative Moisture**
Dry	Powdery
Damp	Moisture content below plastic limit
Moist	Moisture content above plastic limit, but below liquid limit
Wet	Moisture content above liquid limit

Condition of Soil Relative to Compactness (Granular Material)	
Condition	**N**
Very Loose	5 blows/ft or less
Loose	6 to 10 blows/ft
Medium Dense	11 to 30 blows/ft
Dense	31 to 50 blows/ft
Very Dense	51 blows/ft of more

Condition of Soil Relative to Consistency (Cohesive Material)	
Condition	**Approximate Undrained Shear Strength**
Very Soft	Less than 250 psf
Soft	250 to 500 psf
Medium Stiff	500 to 1,000 psf
Stiff	1,000 to 2,000 psf
Very Stiff	2,000 to 4,000 psf
Hard	Greater than 4,000 psf

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Sample Number:

Sample numbers are designated consecutively, increasing with depth for each boring.

Sample Type:

"A" Split spoon, 2-inch O.D., 1-3/8-inch I.D., 18 inches in length.
"B" One of the following:
Power Auger Sample
Piston Sample
Liner Sample
Denison Sample
Sonic Sample
"C" Shelby Tube 3-inch O.D., except where noted.

Sample Depth:

The depth below top of ground at which the sample was taken.

Blows per 6 inches on Sampler:

The number of blows required to drive a 2-inch O.D., 1-3/8-inch I.D., split spoon sampler, using a 140-pound hammer with a 30-inch free fall, is recorded for 6 inch drive increments. (Example: 3/8/9)

"N" Blows/Feet:

Standard penetration resistance. This value is based on the total number of blows required for the last 12 inches of penetration. (Example: 3/8/9 : N = 8 + 9 = 17)

Water Observations:

The depth of water recorded in the test boring is measured from the top of ground to the top of the water level. Initial depth indicates the water level during boring, completion depth indicates the water level immediately after boring, and depth after "X" number of hours indicates the water level after letting the water rise or fall over a time period. Water observations in pervious (sand and gravel) soils are considered reliable ground water levels for that date, Water observations in impervious (silt and clay) soils cannot be considered accurate unless records are made over a time period of several days to a month. Factors such as weather, soil porosity, etc. will cause the ground water level to fluctuate for both pervious and impervious soils.

CLIENT
Burgess & Niple, Inc.

PROJECT
Proposed Lift Station, City of Urbana, Three Mile Road South of State Route 36, Urbana, Champaign County, Ohio

JOB NO.		
164048		
BORING STARTED **11/7/13**	BORING COMPLETED **11/7/13**	
DRILLER **MC DC**	METHOD **3 1/4" HSA**	
TYPED BY **dnh**		

1 Boring No.

Sheet 1 of 1

PROJECT LOCATION
LAT. LONG.
SURFACE ELEVATION
BORING LOCATION
Offset 5' east due to tree

DEPTH	SAMPLE NO.	SAMPLER TYPE / RECOVERY / GRAPHIC LOG	VISUAL CLASSIFICATION OF THE MATERIAL	BLOW COUNTS	N VALUE, blows/ft. (10 20 30 40 50 60 70 80 90)	REMARKS
0.0			Topsoil			
1.0	1A		Stiff brown clay and silt, some sand, trace of gravel, moist	3 6 8	◇14	
4.0	2A		(Becomes very stiff at 3.5')	12 12 14	◇26	
6.0	3A			8 10 10	◇20	
9.0	4A			7 12 27	◇39	
14.0	5A			11 11 25	◇36	▼ ▼
16.0			Medium dense brown sand and gravel, some silt, wet			
19.0	6A			8 11 13	◇24	
24.0	7A		(Becomes dense at 28.5')	17 20 24	◇44	
29.0	8A			35 26	◇62	
30.0			Bottom of boring at 30.0 feet	36		
32.0						

COMMENTS

WATER LEVEL MEASUREMENTS

	DEPTH	DATE
INITIAL	16.0 ▽	11/7/2013
AT COMPLETION	16.0 ▼	11/7/2013
OTHER	15.0 ▼	

A — SPLIT SPOON
B — ROCK CORE
C — SHELBY TUBE
D — SOIL PROBE
E — AUGER CUTTINGS
F — SONIC

Bowser-Morner
Telephone:
Fax:
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MOISTURE CONTENT SUMMARY SHEET

Job No. 164048

Boring No.	Sample No.	Depth (Feet)	Moisture (%)
1	1A	1.0-2.5	22.6
	2A	3.5-5.0	7.7
	3A	6.0-7.5	8.4
	4A	8.5-10.0	9.3
	5A	13.5-15.0	-
	6A	18.5-20.0	-
	7A	23.5-25.0	-
	8A	28.5-30.0	-

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