



COMMITTEE WORK SESSION FEBRUARY 2, 2015

Committee Members Present: Scott Pelot
Dennis McGlone
Danny Grether
Dennis Pierson
Paul Tousley
Charlotte Whipkey
Rich Rodgers

Also Present: Mayor Mike Zita
Valerie Wax Carr
Ron Messner
Justin Markey
Karla Richards
Ann Campbell

The Committee Work Session convened on Monday, February 2, 2015 at 7:05 PM, in the Council Chambers of the Safety Administration Building. The meeting was called to order by Rick Rodgers, President of Council. Following a salute to the flag and the Pledge of Allegiance, there was a moment of silent prayer.

General Topics of Discussion:

Nash Heights Assessments-Discussions Continued from Finance-Utility Meeting Earlier

Mr. McGlone asked about the maintenance fee if we have a figure on this yet and if someone has to be there every day? Mr. Demboski noted that we are working on the life cycle costs, and this will determine what is the best route to go. Mr. Rodgers noted that Council is going on a fact finding mission to Portage and Mahoning County if anyone would like to also attend this Thursday, to discuss just that. Ms. Whipkey discussed the research Mrs. Richards did for the Village of Forest and they indicated they monitor just one day a week. Mrs. Richards concurred and added that she was told its just one day a week but it is all day. Mr. Tousley stated he still does not understand why the savings between the two options is not reflected. Mrs. Carr noted that the surcharge money is money that is paid by all customers. Where exactly does that savings go? Mrs. Carr explained the surcharge money is everyone's money. Depending on the system and how the bids comes in, and its less, then that would mean that everyone is supplementing Nash Heights less. Mr. Tousley asked wouldn't the savings being paid by the Nash Heights residents be supplementing everyone else? Mrs. Carr stated we would need to see numbers as to what Nash Heights is bringing.

Mr. Pierson stated the battle cry all along is that residents have paid for their sewer when they build or purchased their home, so why should I have to pay for Nash Heights? Mr. Pierson stated now it seems to him the situation has been turned around. Mr. Pierson stated we are not here to generate money; we are here to take care of the EPA mandate. Mrs. Carr stated that under the MOU we are trying to use the surcharge money to offset the costs. Mr. Markey stated the base rate would be reflected by Barberton in line #45 to come back and benefit new customers. That's not something that Barberton would be discussing to offset the Norton customers. Mr. Demboski stated that over the 20 years the surcharge pays for the debt services. Mr. Tousley asked which surcharge are you referring to? Mr. Demboski stated that is the City's decision, and Mr. Rodgers clarified that is all of the Councils and the Administrations decision. Ms. Whipkey asked if we use roll back money can we go back to that \$5,000.00 figure? Ms. Whipkey asked how many times can we go back to that same well? Mrs. Carr noted we have called or bonding underwriters and asked how much money can the city borrow before it affects our bond rating process. Mrs. Carr stated our fiscal rating of our city could be in jeopardy here. Mr. Rodgers stated that was an action by the past council and we can amend this and extend that 25 year time line. Mr. Rodgers stated if this helps the city and continue to grow, he is willing to continue to pay this. Mr. Grether questioned last week and again now, are we able to sustain this now and in the future for all the residents of Norton? Mr. Grether stated if you really want to help people is to limit the amounts you want to take out of their pockets. Mr. Grether stated that unless you go out and get a home equity loan, it has to be paid when the work is done. The out of pocket expenses are an additional burden to pay the tap in fees. Mr. Grether stated that historically Norton has paid the tap in fees for other projects, and what is good for them should be good for all. Mr. Rodgers discussed using the 1.5 million and divide that into 304 benefits that comes up to \$4,000.00 so wouldn't that be a savings of \$4,000.00? Mr. Demboski replied yes and that is why you should go out for the bids in April and decide on those actual prices, you would also know who the contractor is. You still cannot award the contract until after July because of the OPWC Loan, so more like August or September. Mr. Rodgers stated if we waive the tap in fee for the one year, which would be coming off of the tax credit roll back fund. Mr. Demboski concurred. There was discussion about the \$3,000.00 tap in fee per unit and in the model the city would still be paying that for the residents if you decide to waive it for them in the first. Mr. Markey concurred it is part of all of the accounting coming in and that would be for the new customers. Mr. Rodgers stated last week he wanted to borrow \$6,000.00 for each house, but now would like to look at borrowing only \$3,000.00. Mr. Rodgers discussed the current debts and the dates when the fall off our schedule or expire and Mr. Messner indicated that was spelled out in the 2015 Budget that Council passed. Mr. Grether stated he is concerned with taking care of the residents right now and then focus on commercial. Ms. Whipkey stated that her main concern is that we have the funds for the next neighborhood. Mr. Grether stated that he was also concerned with the presentation of the model and if the costs for vacuum are lower, and how that affects the figures and the MOU with Barberton, seems all theoretical to him at this point. Mr. Demboski stated the surcharge funds will come into the funds. Mr. Rodgers asked where does the money go to when the County assesses the resident, and Mr. Demboski stated that would be who holds the debt, which would be Barberton.

Mrs. Carr stated she felt we should show the 3 scenarios of reducing the assessment, for true costs. Mr. Rodgers stated that \$8,000.00 has to be a conservative number to send out to the residents so that we don't have to come back and redo this. Mr. Rodgers stated if the vacuum comes in cheaper, then it would not affect the model because we won't have the debt with going with the higher cost system. Mr. Markey reminded everyone that no matter how the city offsets the assessment costs, the city still is legally required to pay the city's portion. Mr. Rodgers clarified that the city's portion does not come out of the tax credit roll back; it comes from all of that comes from the residents from surcharges, and other sources of funds. The reality is that it is all paid for by the residents, and Mrs. Carr agreed that was correct, the city has no magic money tree. Mrs. Carr stated we did get an additional loan of 1.4 million for Nash Heights West. Mr. Reese asked what the interest on the \$8,000.00 is and what was that the only model presented. Mrs. Carr stated the County will determine that, and Mr. Markey stated once we know how much we are borrowing we will then know what that interest is. Mr. Reese asked what were the past examples of interest rates in past projects? Mr. Demboski stated some were around 5% or slightly lower. Mr. Reese asked again about the \$8,000.00 was the only model used? Mrs. Carr stated that number of \$8,000.00 because it was based on the MOU agreement. Mr. Reese asked why wasn't the model used with \$4,000.00? Mr. Demboski stated the model was used with \$8,000.00 and could we afford to have Barberton take over the system and for us to not go into the red in any particular year. Mr. Reese asked what would have happened if Summit County came in and did that what chance would Barberton have? Would they have to pump the sewage father? Mrs. Carr stated we have not resolved it yet. Mr. Markey stated that the County or Barberton would not accept any waste without an agreement in place. Mr. Rodgers stated to make this model work it's based on this \$8,000.00 and Mr. Demboski concurred. Mr. Rodgers stated it's the 304 residents are paying that and Mr. Demboski stated there is also other revenue coming from the other projects in surcharge fees. Mr. Rodgers stated the assessment should only be enough to pay for the build in the Nash Heights. Mr. Demboski stated if you want to use the \$4,000.00 figure this model would not support that because that would not be enough to pay the construction costs. Mr. Grether asked if this would affect past assessments like Oak Street? Mr. Markey stated that the City has already borrowed the funds for that project and would not be offset. Mr. Rodgers stated he thought we could not collect on assessments on something we did not own. Mr. Markey stated in the past the lines were turned over to Summit County and now they would be turned over to Barberton. There was discussion as to the areas and streets of past assessment projects. Mr. Demboski stated if you have less construction costs, you would be borrowing less. Mr. Pierson discussed the difference in costs, and the letters going out to the residents would state it's just an estimate and Mrs. Richards concurred. Mr. Markey stated the Resolution of Necessity would spell out all of the project details and costs.

Engineers Cost Estimate

Mr. Pierson discussed the original construction and the video being done for each version and questioned the difference in costs? Mr. Demboski stated that has been revised and as he explained earlier that was an error that he had caught earlier. Mr. Rodgers discussed the soil sample detail report Mr. Demboski had supplied (see attached).

Mr. Rodgers stated that he and others have asked the question as to why the pump station could not be built at Shellhart and Greenwich rather than Greenwich & Gulf Course Drive. Mr. Demboski stated we were told there is an old peat bog in that area. Mr. Demboski discussed the road borings that were done at Gulf Course Drive, and there was no drilling done at Shellhart. Mr. Demboski stated he has since called them and asked for them to take another look at this. Mrs. Carr stated we would do additional samples of necessary, however she suggested the bid process list this as an alternate. Mr. Demboski noted either location would be at the same depth. Mr. Demboski stated he has spoken with the church and they may be interested in extending the line to them. Mr. Rodgers stated the church is not part of the Nash Heights problem that we are trying to address. The additional cost to do this is being thrown onto the backs of the residents in Nash Heights. Why isn't this just limited to the area on the map? Mr. Demboski stated that the utilities facility plan was approved by the EPA and this does make the pump station available to service that area. Mr. Pierson noted when Grace Brethren built they paid to bring the lines in themselves, the City did not pay for this. Mr. Rodgers asked how many more homes do we have to include in the plans to satisfy the EPA and Mr. Demboski estimated around 100. Mr. Rodgers asked if we are designing both pump stations large enough to accommodate this and Mr. Demboski replied yes. Mr. Rodgers offered that anything over in size needed to satisfy the EPA should be paid by the City and not by the surcharges or half bus rates from the roll back. Mayor Zita asked if we wouldn't be better off to pay that out of the tax credit roll back fund; and keep the surcharges in the Nash Heights area. Mr. Markey indicated the final agreement with Barberton would be the roll back dollars would pay for the pump station, or any other items you select. Mayor Zita stated if there is any cost related to over sizing the pump stations; he would like to use the tax credit roll back fund. Mr. Pierson asked at what size does that pump station have to be to satisfy the EPA and Mr. Demboski replied at 300 gallons per minute. Mr. Pierson asked if those 300 gallons per minute would be enough to handle that farm west of the church if it were developed and Mr. Demboski replied yes. In designing the plans you have to look at all land as if it were to be developed; you cannot just look a few years into the future, you have to look long term. Mr. Demboski discussed the utility facilities study that was done in the late 70's and was updated in 1993 and every time we apply for funding, we have to go by that plan. Mr. Tousley stated he has a map from the EPA mandate from 2013 and none of the Golf Course Drive area is listed here. Mr. Demboski replied that relates to forced connections and he is talking about planning. Mr. Demboski stated that the 201 Facilities Plan is what he is working from. Mr. Tousley stated he would like to see a copy of that plan. Mrs. Carr clarified when we met with the EPA they indicated that this facilities plan needs to be updated. Mrs. Carr clarified that the map Mr. Tousley is referring to is the defined in the consent decree order. Mr. Demboski stated the EPA has accepted this plan in order to get this project rolling. Ms. Whipkey stated what the EPA is saying is that we have to have something bigger than just Nash Heights. What Council wants to know is what does it take to serve Nash Heights that they would have to pay; then the roll back money would be applied to what ever more the EPA requires. Mr. Pierson asked once Barberton assumes the EPA Order, can any of this be changed? Mr. Markey stated we can clarify this in the final agreement as a concern. Due to the timing, they would not assume the EPA Order until basically the contract is awarded and we are all moving down the field together.

Mr. Demboski stated we still have to follow our facilities plan and the study shows that area will still be served. Mr. Rodgers added that it's also because we are borrowing the money from the EPA. Mr. Pierson asked if those numbers are within the overall costs. Mr. Pierson stated being friends with the farm owners, he highly felt this property would not be developed. Mr. Pierson recalled when Grace Brethren Church built their sewer line they paid for it themselves. Mr. Rodgers asked Mr. Demboski how many homes do we need to add to build that pump stations and Mr. Demboski estimated about 100. Mr. Rodgers stated anything over what is required to satisfy the EPA mandate in Nash Heights should be paid entirely by the City. Mayor Zita stated that during the Barberton negotiations the roll back money was not a discussion. Mr. Markey stated that could be part of the agreement that will be worked on in the future. Mayor Zita stated if we are going to oversize the pump stations it should be paid out of the tax credit roll back. Mr. Pierson asked at what point would that pump station require more and Mr. Demboski stated the maximum would be 300 gallons per minute. Mr. Person asked then what is the minimum? Demboski stated if there is 400 homes its going to take 300 gallons per minute. Mr. Demboski stated the City has a facilities plan from the 1970's and was updated in 1993 and every time we apply for funding and planning we have no choice but to follow that plan. Mr. Tousley discussed the EPA map and the orders and asked if we are supposed to expand beyond that? Mr. Tousley asked to have proof of that planning and that the EPA is mandating this. Mrs. Carr stated the EPA meetings we attended we were advised by the EPA that our facilities plan/map is to be updated. Mrs. Carr noted the map Mr. Tousley is referring to is the mapping of the consent decree area that needs addressed. Ms. Whipkey stated that what Mr. Tousley is trying to get at is that the EPA is asking us to go above and beyond that. Mr. Demboski stated in the initial plan we had never intended on using any of the roll back money. Mr. Pierson asked once Barberton assumes the order, can it be changed, can Barberton come in and say they want to do more. Mr. Markey stated this would be clarified in the final agreement if this is a concern. Mr. Demboski stated this is no capacity unless Barberton builds a force main. Mr. Jack Gainer discussed the end of Shellhart his son-in-laws property and noted there is a natural gas line across the road, and obviously the pump station cannot sit on that property. Mr. Demboski stated it would be to the northwest corner and far enough back from that gas line. There was discussion as to where the pumping station would be located in connection to the sewer line. There was discussion as to the location of the sewer line being on the south side of Greenwich Road and the pump station would be on the opposite side and Mr. Demboski concurred, that is the area that we are looking at. Mr. Demboski stated there would be a manhole stub stopping from taking the sewer line farther. Mr. Gainer stated he may decide to build a house in this area and questioned where it would actually stop, and he wants to have access to sewer, but not if this has to connect from over 300 feet away. There was more detailed discussion on this location and how the sewer line would come into play. Mr. Rodgers asked is it cheaper to move a waterline or a sewer line and Mr. Demboski stated it's probably cheaper to move a water line. Mr. Gainer stated if you decided to stop the sewer line at Shellhart because land may not be suitable, wouldn't it be more sensible to do the pile drive on the south side of the roadway? Mr. Pierson discussed the Seiberling farm house and Mr. Demboski stated it's the parcel that faces Shellhart Drive near Hudson Run.

Mrs. Carr clarified that there was no solicitation of the church, those outlander areas we felt it was critical to inform those of the potential of the sewer line. We were not seeking additional parcels into the project, we were only advising. Mr. Reese discussed a presentation that Mr. Dougherty stated it would not be a big thing to add more capacity. Mr. Reese stated he felt it was stated a bigger pump could be used for future growth. Mr. Demboski stated the pump we are considering would be used during low flow until it's all built out and expanded. Mr. Demboski stated that downstream it cannot handle more than 3000 gallons per minute. Mr. Rodgers stated he wants to see the additional costs of both gravity and vacuum be shown separately so that we can address that later. Mr. Rodgers discussed the pump stations, and there are several styles of tanks we can use. We need to choose the proper one for the long life time expected. Mr. Demboski stated this is something he is working on to get the prices from Air Vac. Mr. Rodgers asked about the compact style pumps and Mr. Demboski stated that is what he is working on getting. There are three (3) choices of tanks, fiberglass, carbon steel and stainless steel and it just depends on how you build the stations. Mr. Rodgers stated that we as Council would like to see those final costs. Mr. Rodgers noted in Portage County, they did the building and the lines separate. Mr. Demboski stated Council will be looking at 8 total processes, and Mr. Demboski stated that would be reflected in the bid prices. Mr. Grether commented on the pump station and the size and anything above what is needed the Mayor stated he would support this. Mr. Grether stated he has already received some pushback and wants to see more dialog on this. Mr. Grether stated Mr. Rodgers has stated now at two (2) meetings that we would have enough money to build the sewers in Nash Heights and then also grow the residents as well. Mr. Rodgers stated he is all for commercial growth but we are not ready for that now. Mr. Grether disagreed with that statement. Mr. Grether stated that this MOU lays out our ability to grow financially as a community, and it all sounds rosy that we can do both and grow both. Mr. Grether encouraged having more open discussion on this. Mr. Pierson stated its all about the type of development you want. Mr. Pierson stated commercial is the way to go, but why not bring in more residents? Mr. Grether discussed the larger farmers and that it's up to them on what they want to do with their land, it's not up to us. Mr. Pierson stated the majority of this Council decides how that tax credit roll back is to be used. Mr. Rodgers cautioned about growth in the community and if we grow we have more demands on our police and fire departments. Mr. Rodgers stated we need to get a tax base built. Mr. Tousley stated his comments are so that he is doing his due diligence so that we do not over spend for the residents.

Unfinished Business:

None

New Business:

None

Topics for the next Work Session:

Heritage Homes Program. Mr. Rodgers stated he was really eager to move on this, and after discussions with Green it's really not suited for what he was looking for in assistance with the residents.

It's not really geared for low income homes and Ms. Whipkey stated it's more for historical purposes, to maintain a code in older neighborhoods. Ms. Whipkey stated the threshold was 1-2 persons making \$62,000.00 or less and was not required to live in the home. Ms. Whipkey stated she felt this is something we don't need to pursue. All of Council agreed this was best not to continue this discussion.

Codified Updates for 2014-Mr. Rodgers discussed moving this from the COTW next week. Mrs. Carr discussed in the past with Mr. Grether about having consultants about the CRC and it was decided to have the consultants here for presentation on Feb. 17th. Mr. Grether noted he had also asked about the status of the CIC and for Mr. Markey to present the details and Mr. Markey stated this could be discussed and Council would need to decide what direction they want to take. Mr. Grether asked if once the CIC is established could Council remove a member? Mrs. Carr stated that she would work with Mr. Markey on those issues.

Public Comment-Agenda and Non Agenda Items:

Mr. Gainer asked if it's the City Council or the City of Barberton that develops the maintenance costs? Mr. Rodgers stated we will all be involved with this decision. Mr. Gainer stated that there would be a cost determined for those on vacuum systems. Mr. Demboski replied there would be one. Mr. Rodgers stated the station would be located at either Shellhart or Golf Course Drive. Mr. Gainer asked then where would it all go once it reaches that new pump station and Mr. Demboski replied up to the station on Shellhart. Mr. Gainer stated so then there would be two (2) lines and Mr. Rodgers agreed that would also be true if it were gravity sewers. Mr. Gainer discussed the CIC and Section 508 of the Charter it states Council shall provide by ordinance for the Community Development and the Director of Community Development would be the head. Mr. Gainer asked if we have such a department and Mrs. Richards clarified there is legislation that created this department. Mr. Gainer asked why then if the department exists and it's not filled? Mr. Rodgers stated that funding was cut in the budget and we fully intend to staff this department this year. Mr. Gainer stated that this position is required by the Charter and felt we have been without one long enough and have been violating the Charter every day and asked Council forthwith to fill this position. Mr. Markey stated the Charter requires for the organization of this department, not to fill this position. Mr. Gainer asked Mr. Markey if that's this case then who is running this department, shouldn't that legislation state who runs this department. Mr. Markey stated he would have to look at the ordinance. Mrs. Carr stated that has always been her intention to fill this and if Mr. Rodgers feels the support is there she would be happy to work on something. Mrs. Carr stated we have to get a person there that can get things done and a support staff there. Mr. Gainer stated he felt this is needed because of the discussion by Mr. Rodgers and Mr. Grether and commercial development and how Mr. Rodgers felt you can have residential development without commercial development. Mr. Gainer stated you cannot have 300-400 people come here with no sewer or water. Development all has to tie together, one would help the other. Mr. Rodgers gave an example of Fairlawn that has not grown residentially, but they have the commercial development. Mr. Pierson clarified that part of the search for Planning Director is salary based. Mrs. Carr indicated she and Mr. Markey are working on that to bring to Council shortly.

Public Updates:

Mayor Zita noted we have some Boards & Commissions that need filled, we have press releases seeking candidates. Mayor Zita noted Ms. Whipkey discussed the display boxes going up in the Community Center. Mayor Zita noted at the recent Building Bridges dinner hosted by the Norton Kiwanis. At this meeting these shadow boxes were presented, and they have a glass front with a locked box. Each of the civic organizations will have their own box for display. Mayor Zita stated that Mr. Nick Reinfeld who owns Yoder graphics paid for the sign above the boxes that says “*Norton-A community of Service*” which will be installed soon. Mayor Zita announced the Adopt a Spot program coming this year. The cost is \$150.00 to support a spot and our goal is to have 25 spots adopted by June 1. Mayor Zita announced that local civic groups came together with \$450.00 to work on the gazebo at Williams Park. Mayor Zita stated that Norton received word we will again be a Tree City for 2015. We have a simple recycling drop box here at City hall at the recycle area in the parking lot for soft textiles to be dropped off. Ms. Whipkey stated last week she attended the MAD meeting and Kim Trenary was elected as Chair, and Vice Chair is Karen Miller. There was a vacancy since Mike Saffron had resigned. They will be going to the Summit County Judge to determine how to properly fill this vacancy. They are also looking at how the decreased property taxes are affecting their revenue. Mr. Rodgers announced another town hall meeting at the end of February and that all Council is welcome to attend and we will be discussing the Nash Heights Assessments.

Adjourn

There being no other business to come before the Committee Work Session, the meeting was adjourned at 9:15 PM.

Rick Rodgers, President of Council

NOTE: THESE MINUTES ARE NOT VERBATIM

****ORIGINAL SIGNED AND APPROVED MINUTES ARE ON FILE WITH THE CLERK OF COUNCIL.****

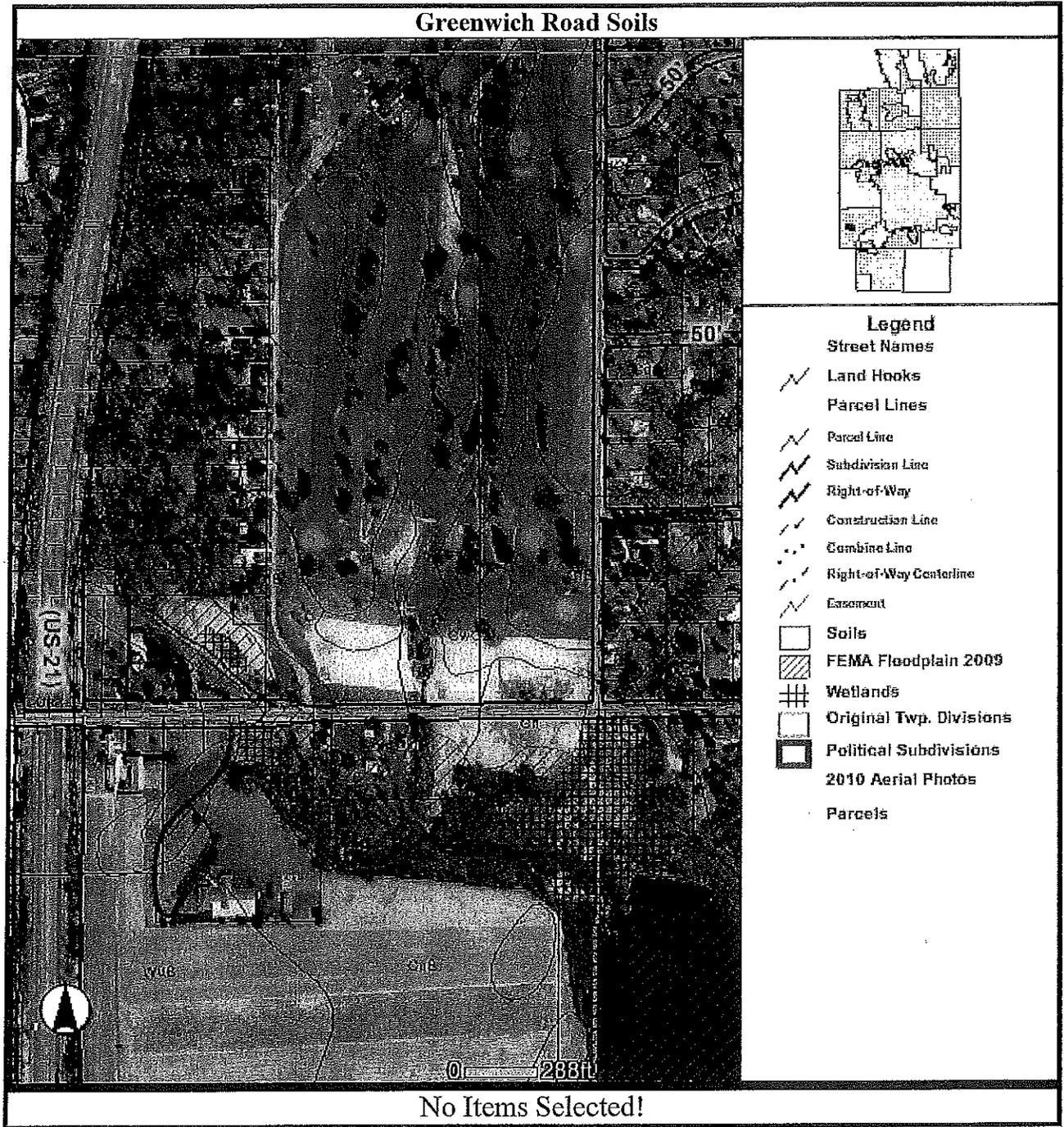
All Committee Meetings will be held at the Norton Safety Administration Building, unless otherwise noted.

Fund 128 Roll Back
Revenue and Expense
2009 - 2015

Year	Revenues	Expenses	Balance
2009	-	-	\$ -
2010	\$ 300,324.50		\$ 300,324.50
2011	\$ -	Engineering - Nash Heights \$ 25,000.00	\$ 275,324.50
2012	\$ 965,136.00	Permits and Fees \$ 2,875.00	
		Engineering - Nash Heights \$ 1,118,265.84	
		Engineering \$ 12,600.00	
		Total \$ 1,337,408.84	\$ 1,106,719.66
2013	\$ 689,672.95	Permits and Fees \$ 1,600.00	
		Engineering - Nash Heights \$ 26,605.05	
		Cleve Mass Road \$ 68,339.50	
		Construction Costs \$ 3,400.00	
		31st Street/Cleve Mass \$ 202,790.00	
		Dorothy Court Sewer \$ 19,657.04	
		Total \$ 322,391.59	\$ 1,474,001.02
2014		Permits and Fees \$ 19,000.00	
		Engineering - Nash Heights \$ 1,119,010.26	
		31st Street/Cleve Mass \$ 98,025.03	
		Dorothy Court Sewer \$ 84,173.14	
		Dorothy Court Water \$ 97,734.10	
		Barber Road - Principal \$ 75,600.00	
		Barber Road - Interest \$ 23,788.80	
		Total \$ 499,331.30	\$ 974,669.72
2015	\$ 612,357.00		\$ 1,587,026.72 *

Total Revenues \$ 2,567,490.45
 Total Expenses \$ 980,463.73
 Nash Heights \$ 288,881.12
 Dorothy Court \$ 201,564.28
 31st Street \$ 300,815.03
 Cleve Mass \$ 68,339.50
 Barber Road \$ 99,388.80
 Misc. \$ 21,475.00
 \$ 980,463.73

*Represents an unexpended cash balance of \$1,587,026.72. There are currently \$179,655.62 in outstanding encumbrances, which leaves an ending balance of \$1,407,371.19 as of January 26, 2015.



Kristen M. Scalise, CPA, CFE, **Fiscal Officer**
 Alan Brubaker, P.E., P.S., **Engineer**
 Russell M. Pry, **Executive**



PRINT

SUBSURFACE EXPLORATION REPORT

For

NASH HEIGHTS SANITARY SEWER IMPROVEMENTS,
Norton, Ohio

December 17, 2012

Prepared for

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ST&I PROJECT N^o. G11-9204

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Norton, Ohio*

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SUBSURFACE EXPLORATION REPORT

The following is the report of the subsurface exploration that we performed for the proposed sanitary sewer improvements. This study was made in order to determine subsoil characteristics across the planned sewer improvements so that our engineers could render opinions about geotechnical engineering aspects of the project.

1.0 DESCRIPTION OF PROPOSED PROJECT

The proposed sanitary sewer improvement project consists of constructing new main lines (i.e., 8.0 to 12.0 inch diameter PVC pipe) and manholes along existing residential roads as detailed on the attached boring location plans in Appendix A. Several preliminary pump station/wet well locations were explored to assist in determining final locations. The invert elevations of the main lines were indicated to vary between 8.0 and 11.0 feet below existing pavement surfaces while pump stations/wet wells will bear 25.0 to 30 feet below existing ground surfaces.

2.0 FIELD EXPLORATION

The first phase of the field exploration was completed December 27th and 28th, 2011 when a total of (18) test borings (B-5 and B-7 through B-23) were advanced with a truck mounted drill rig with a tabular summary presented in Appendix B.

The second phase was performed on April 13th and 18th, 2012 that consisted of advancing a total of (11) soil borings (B-26 through B-36) with either a truck or ATV mounted drill rig. Again, a summary of these tests results are presented in Appendix B.

The third phase of the project consisted of advancing a total of (2) soil borings (B-37 and B-38) with an ATV track rig. These borings were located on the Dellagnese Property and delayed due to permission of access.

Due to safety concerns, the test holes were immediately backfilled upon measuring depth to groundwater. Please see the see attached "Subsurface Exploration Logs" and "Boring Location Plan" for more detail in Appendix A and C, respectively.

While drilling, split spoon samples of the subsurface soils were obtained during execution of the Standard Penetration Tests (SPT). The soils were visually/manually classified in the field by either our engineer or members of the drill crew and representative portions of each sample were sealed in glass jars for transport to our soil mechanics laboratory for further evaluation.

3.0 LABORATORY TESTING

No laboratory testing was performed at this time due to the consistency of the observed soils.

4.0 SUBSURFACE PROFILE

Based on the information acquired in this exploration and the necessary assumption that subsurface conditions between, away from and below individual sampling locations and depths are similar to those found in this study, the subsurface profile can be generally described as follows:

4.1 Soil Profile

Initially, the augers penetrated a 7.5 to 24.0 inch thick surface pavement structure consisting of 1.0 to 10.0 inches of asphalt underlain by 1.0 to 24.0 inches of granular base or 1.0 to 12.0 inch thick topsoil layer. The preceding surface profiles were followed by randomly deposited layering of cohesionless silt, sandy silt, silty sand, sand, and sand & gravel or cohesive silty clayey / clayey silty soils to termination depths of 15.0 to 35.0 feet below the respective ground surfaces. *Exceptions to the preceding general subsurface profile existed at the following locations:*

1) Test locations B-7, B-9, B-11, B-12, B-16, B-20, B-29, B-32, and B-34 identified fill layers between 0.5 and 7.5 feet in thickness beneath the surface topsoil or pavement structure; and

2) Test borings B-8, B-16, B-33, B-34, B-35, B-37, and B-38 terminated in sandstone or shale bedrock between depths of 10.0 to 29.0 feet below the ground surface.

According to the SPT results (N-value column on the "Subsurface Exploration Logs") the cohesionless soils had relative densities varying from very loose to dense, the cohesive silty clayey soils possessed consistencies of very soft to hard, while the bedrock had "rock hardness" varying from soft to hard. Soil color was noted to be brown or mottled brown/gray in the upper layers and then turning to gray with increasing depth. Please see the attached "Subsurface Exploration Logs" in Appendix C for more detail.

4.2 Groundwater

Upon the completion of the soil borings groundwater was sounded with 16 of the 31 test holes (B-5, B-8, B-9, B-11, B-12, B-17, B-18, B-26 through B-29, B-32, and B-35 through B-37) having water at depths between 3.0 to 9.5 feet below the respective ground surface. The preceding borings plus test holes B-23, B-30, and B-38 identified wet to saturated water bearing soil layers (via "Depth To Seepage" on logs) that started between 3.5 to 14.5 feet beneath the respective pavement / ground surfaces. All test holes were measured to have "Depth To Collapse" between 5.5 to 23.0 feet below the respective ground surfaces. *To note, test hole B-37 measured an increase in water elevation of 22.0 feet upon penetrating the sandstone formation that started at a depth of 28.0 feet below the ground surface that represents significant hydrostatic pressure.* For safety reasons all test holes were immediately backfilled thus no subsequent groundwater soundings were made.

Based on the preceding information, it is our opinion that conventional sumps will adequately control groundwater during the shallow short-term excavations of 8.0 to 11.0 feet below the respective pavement / ground surfaces while a more complex dewatering

system consisting of well points will be required for construction of pump stations / wet wells in the vicinity of test borings B-26, B-27, B-28, B-37 and B-38. The fine grain silty sandy soils encountered near the planned invert elevations will be difficult to dewater therefore an experienced and qualified dewatering contractor **MUST** be consulted to design and maintain an effective system throughout construction.

Relative to groundwater control, each bidding contractor should be required to conduct their own investigation into the effect groundwater will have on construction so that adequate allowance can be made in their bids.

5.0 ENGINEERING ANALYSIS

Based on the information contained in this report, it is our opinion that the proposed sanitary sewer lines will be properly supported by the sampled soils. While conventional sumps will control groundwater in the vicinity of test locations B-5, B-8, B-9, B-11, B-12, and B-30 we cannot rule out minor undercutting (i.e., 6.0 to 18. inches) of the bedding aggregate due to "boiling" of saturated fine grain sandy silty soils. The saturated fine grain sandy silty soils are considered very sensitive to vibrations and will quickly become unstable thus requiring undercutting. An effective dewatering system will limit the need to undercut below the bedding elevation. Minimal rock excavating (i.e., less than 2.0 feet) may be required in the vicinity of borings B-8, B-16, B-18, B-33 and B-34 where rock was encountered between 9.0 to 13.0 feet below the respective grounds surfaces.

In respect to the construction of the pump stations / wet wells, it is our opinion that a complex dewatering system consisting of well points will be required for both locations B-26 through B-28 and B-37 and B-38. *While well points do not appear necessary in the vicinity of B-37 and B-38 we point to the significant hydrostatic pressure (i.e., 22.0 feet rise of groundwater within the augers upon penetrating the sandstone formation) observed at test location B-37.* An experienced and qualified dewatering contractor **MUST** be consulted to design and maintain an effective system throughout construction.

Driven sheeting will likely be required at the Golf Course Drive pump station (i.e., test locations B-26 through B-28) to protect adjacent roadway and underground utilities. At this time we do not foresee a need for seismographs or "Pre-Construction Surveys" as no buildings are within 100.0 feet of the planned pump stations / wet wells.

6.0 RECOMMENDATIONS

Based on our interpretation of the results of this exploration and the necessary assumption that subsoil characteristics between, away from and below individual sampling locations and depths are similar to those described herein, the following recommendations are offered for your consideration and use in completing this project.

6.1 Lateral Earth Pressure / Sheeting Design

The following lateral earth pressure parameters have been estimated for use in design of earth retention systems that may be required for the project:

Design Parameter	Soil Description		
	Silty Clay/ Clayey Silt	Sand/ Silty Sand	Washed #57 Aggregate
Total Unit Weight, γ (PCF)	135	125	105
Internal friction angle, ϕ	15°	30°	40°
Active Pressure Coefficient, K_a	0.600	0.333	0.217
At Rest Pressure Coefficient, K_o	0.750	0.500	0.357
Passive Pressure Coefficient, K_p	1.670	3.000	4.598
Cohesion, c (PSF)	1000	0	0
Coefficient of (Sliding) Friction, f	0.237	0.364	Not Applicable

6.2 Groundwater Control

It is our opinion that conventional sumps will adequately control groundwater during the shallow short-term excavations of 8.0 to 11.0 feet below the respective pavement / ground surfaces. The pump station / wet well locations will require a more complex dewatering system consisting of well points due to the shallow groundwater elevations and/or excessive hydrostatic pressure. Again, an experienced and qualified dewatering contractor MUST be consulted to design and maintain an effective system throughout construction.

To repeat, contractors bidding the project must be required to make their own assessment of how groundwater may affect construction so that they can include adequate allowances in their bids.

6.3 Backfilling

We recommend that placement and compaction of backfill achieve the percentages set forth in the ODOT 203 specification. We further recommend that all fill be tested for in-place density to help assure that the compaction percentages specified in ODOT 203 are achieved.

6.4 Field Observation

Field observation comprises the second phase of a complete geotechnical engineering service, permitting those who developed the report to observe site excavation and thereby assess the reliability of their subsurface profile and the appropriateness of their preliminary recommendations. Actual conditions often differ from those expected, and that situation can create serious problems unless a qualified individual is available to decide what to do about them, where and when they are found. Decisions such as these are "judgment calls," and the quality of judgment can have a profound impact on the project's bottom line. The geotechnical engineers of record are most qualified to make effective judgment calls, because they are the individuals who are most familiar with the report and its original findings and preliminary recommendations. Further, the geotechnical engineer of record is in the best position to respond quickly to unanticipated conditions that are encountered.

7.0 GENERAL CONSIDERATIONS AND LIMITATIONS

This exploration and report are based on the proposed project as described herein. Should the project description, location, structural characteristics or proposed use change, we must be contacted to review the changes and modify our report as we deem necessary. In addition, in order for us to prepare this report, it was necessary to assume that subsurface conditions between, below and away from individual sampling locations and depths are similar to those described herein. If differing subsoil characteristics subsequently become evident, we must be asked to review the new information and then be allowed to modify our report as necessary. Conclusions about this site drawn by others from the data presented herein are strictly their responsibility.

7.1 Standard of Care

Summit Testing & Inspection has endeavored to provide its services in a manner that is consistent with appropriate professional practice and the level of care and skill ordinarily exercised by members of the profession currently practicing in this locality, at the same time, and under similar conditions as this project. No other representation, expressed or implied, is included or intended in this document.

Respectfully submitted,

SUMMIT TESTING & INSPECTION COMPANY



Steven C. Porpora, P.E., M.S.C.E.

PC: FILE

APPENDIX A

(Boring Location Plan)

BORING LOCATION PLAN

(Page 1 of 3)

NASH HEIGHTS SANITARY SEWER IMPROVEMENTS,

Norton, Ohio

Project No. G11-9204

NTS:

Drawn By: S.C.P.

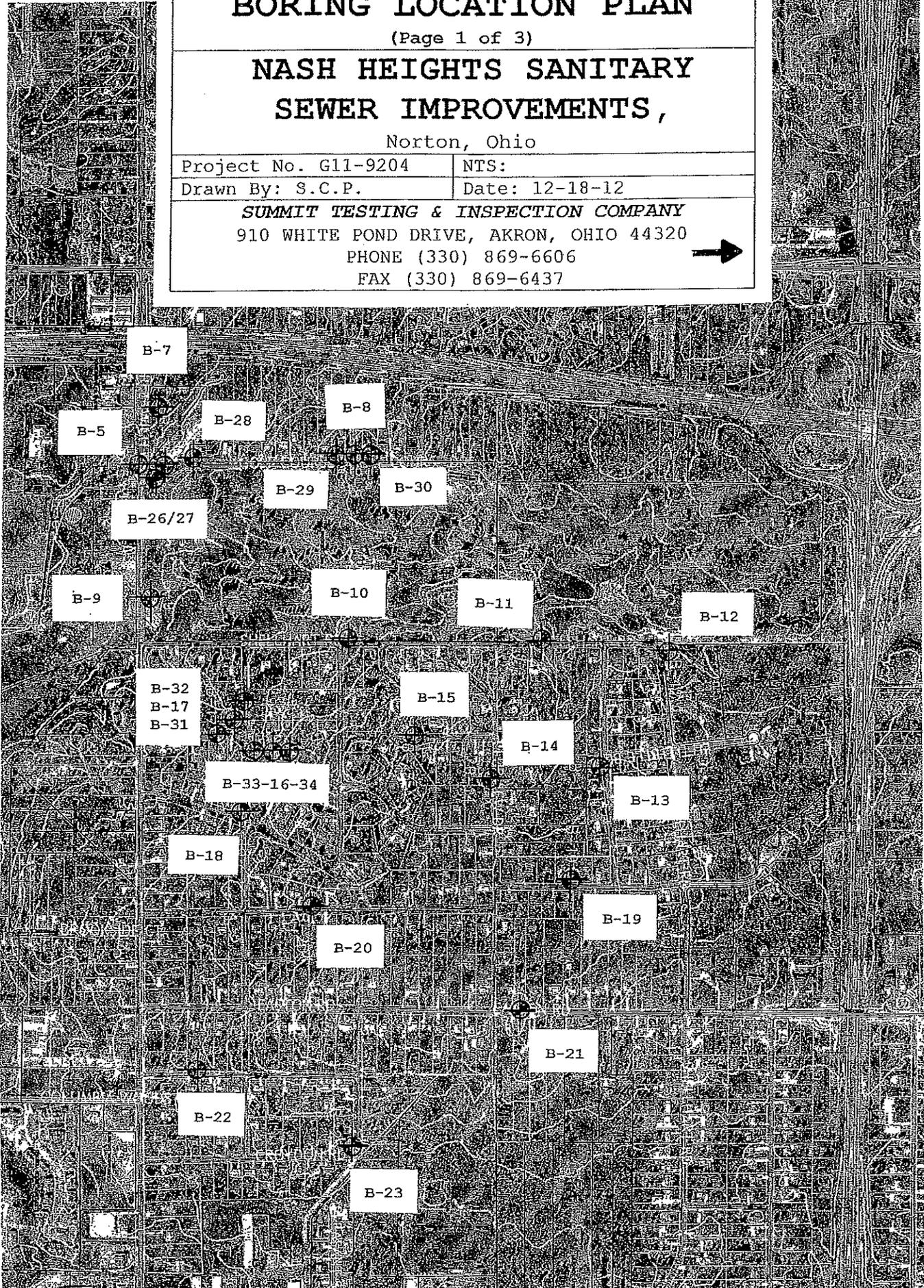
Date: 12-18-12

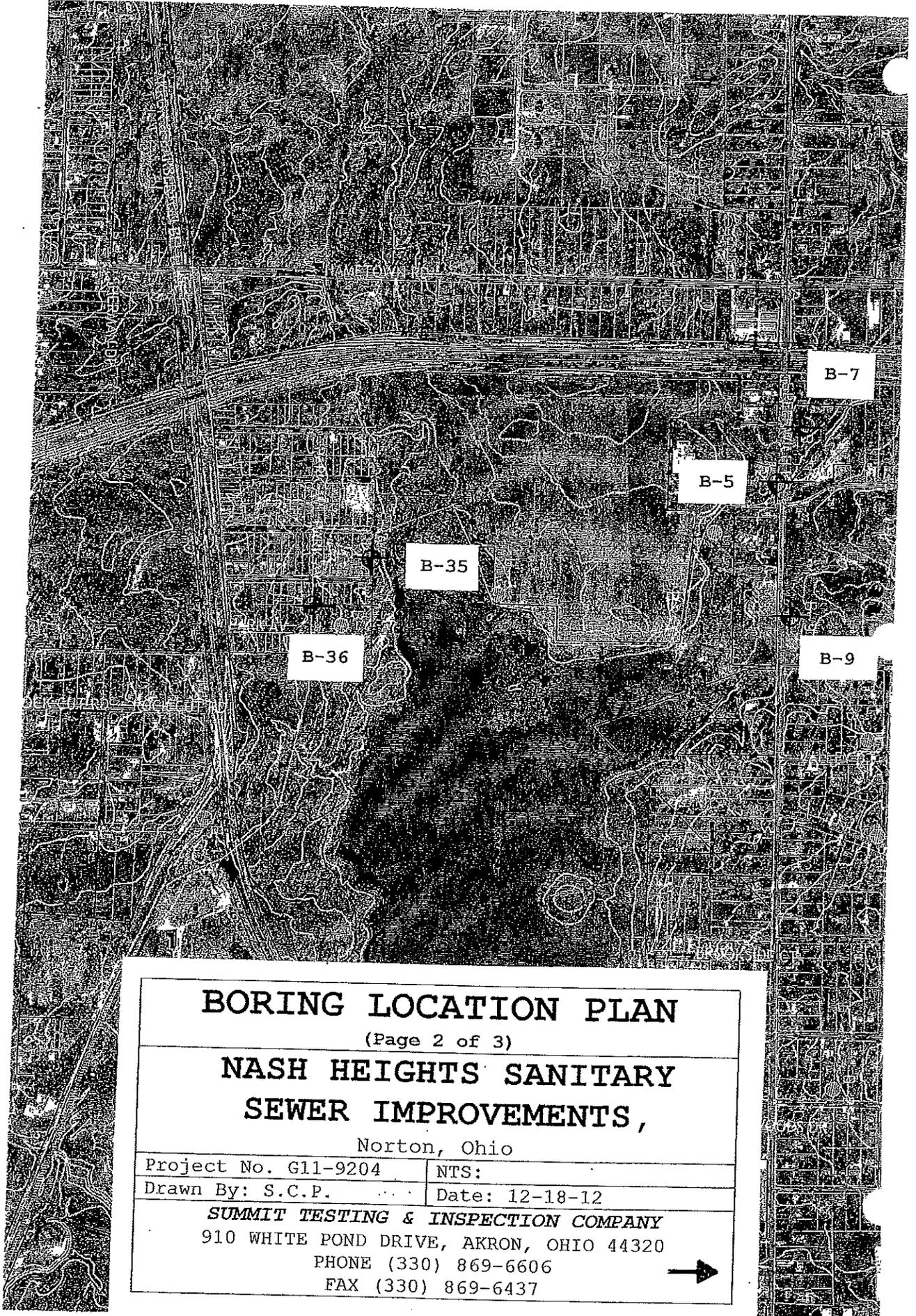
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FAX (330) 869-6437





BORING LOCATION PLAN

(Page 2 of 3)

NASH HEIGHTS SANITARY SEWER IMPROVEMENTS,

Norton, Ohio

Project No. G11-9204

NTS:

Drawn By: S.C.P.

Date: 12-18-12

SUMMIT TESTING & INSPECTION COMPANY

910 WHITE POND DRIVE, AKRON, OHIO 44320

PHONE (330) 869-6606

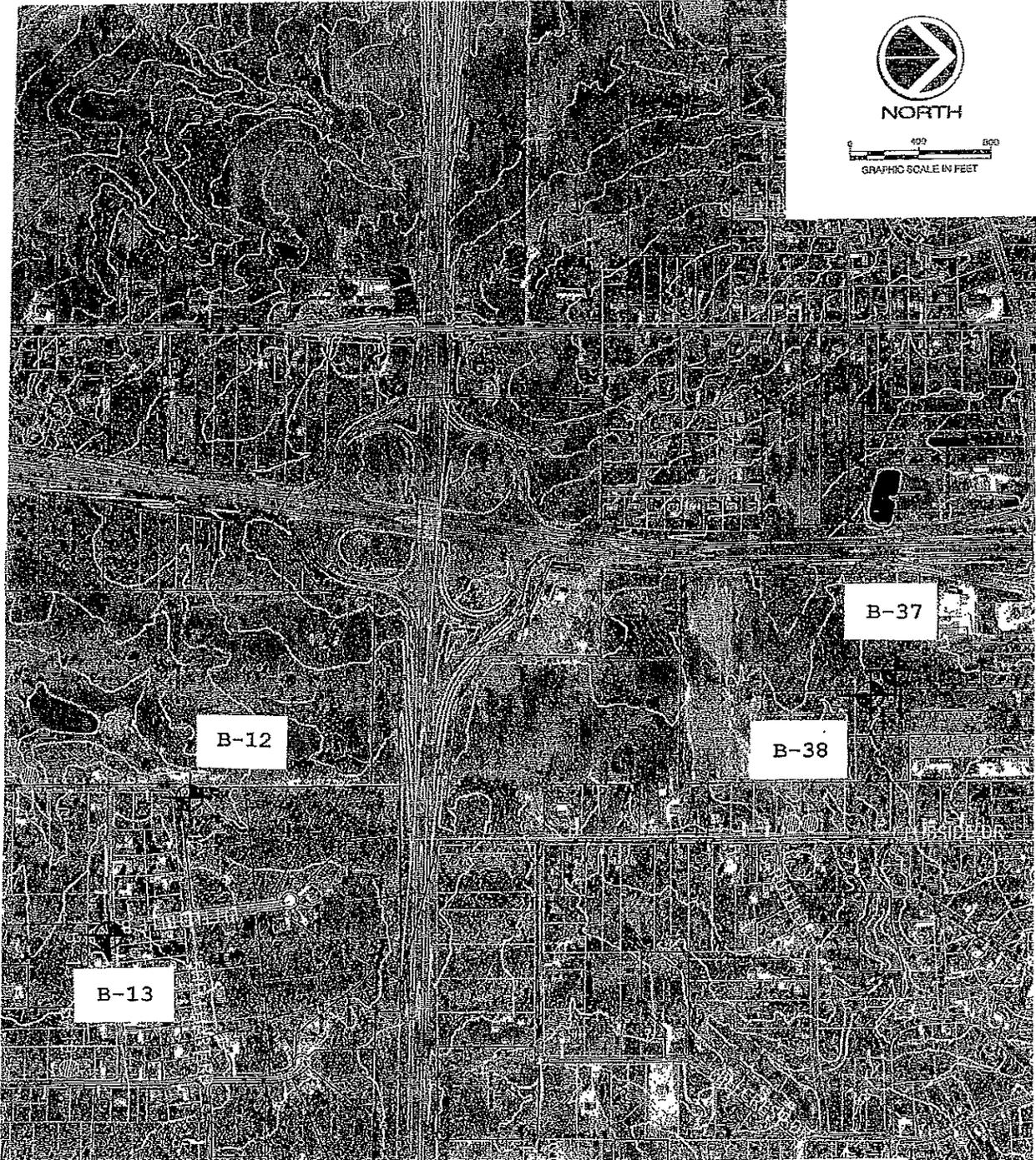
FAX (330) 869-6437





NORTH

0 400 800
GRAPHIC SCALE IN FEET



BORING LOCATION PLAN (Page 3 of 3)	
NASH HEIGHTS SANITARY SEWER IMPROVEMENTS, Norton, Ohio	
Project No. G11-9204	NTS:
Drawn By: S.C.P.	Date: 12-18-12
SUMMIT TESTING & INSPECTION COMPANY 910 WHITE POND DRIVE, AKRON, OHIO 44320 PHONE (330) 869-6606 FAX (330) 869-6437	



APPENDIX B

(Boring Summary)

Nash Heights Sanitary Sewer Improvements

Norton, Ohio

(ST&I PROJECT NO. G11-9204)

TEST HOLE NO.	BORING DEPTH (ft.)	DEPTH TO GROUNDWATER (WET SOILS)	COMMENTS
B-5	15.0	6.0' (6.0')	
B-7	15.0	None (None)	Fill to 8.0+/- feet deep.
B-8	15.0	7.5' (6.0')	Auger refusal @ 13.0 feet due to bedrock or boulder.
B-9	15.0	5.0' (8.5')	Fill to 8.5 feet deep.
B-10	15.0	None (None)	
B-11	15.0	9.5' (8.5')	Fill to 6.0 feet deep.
B-12	15.0	8.0' (8.5')	Fill to 6.0 feet deep.
B-13	15.0	None (None)	
B-14	15.0	None (None)	
B-15	15.0	None (None)	
B-16	15.0	None (None)	Fill to 2.0' deep. Shale bedrock @ 10.0' deep.
B-17	15.0	5.0' (6.0')	
B-18	15.0	3.0' (6.0')	Boulder @ 9.0'.
B-19	15.0	None (None)	
B-20	15.0	None (None)	Fill to 2.0' deep.
B-21	15.0	None (None)	
B-22	15.0	None (None)	
B-23	15.0	None (9.0')	
B-26	35.0	4.5' (9.0')	
B-27	35.0	6.5' (7.0')	
B-28	20.0	3.0' (3.5')	
B-29	15.0	7.0' (8.5'+)	Fill to 1.5' deep.
B-30	15.0	None (9.0')	
B-31	15.0	None (None)	
B-32	15.0	5.5' (5.0')	Fill to 4.0' deep.
B-33	15.0	8.5' (9.0')	Shale bedrock @ 13.0' deep.
B-34	14.0	None (None)	Shale bedrock @ 10.5' deep.
B-35	15.0	2.0' (12.0')	Sandstone bedrock @ 11.5' deep.
B-36	15.0	8.5' (14.5')	
B-37	35.0	6.0' (11.0')	Glacial till @ 23.5' deep. Sandstone bedrock @ 28.0' deep. Severe hydrostatic pressure.
B-38	35.0	None (11.0')	Glacial till @ 14.5' deep. Sandstone bedrock @ 29.0' deep.

*Test locations B-1 through B-4 and B-6 were deleted while B-24 and B-25 were renumbered B-37 and B-38, respectively.

APPENDIX C

(Subsurface Exploration Logs)



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Boring No. B-5
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: 8.5' Depth to collapse: 10.0' Depth to water: 6.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			10.0" ASPHALT / 2.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			Medium dense mottled brown/gray SILTY SAND, trace clay and gravel, moist						
1.88	13			15					
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Medium dense gray SANDY SILT, little clay, trace gravel, saturated						
6.88	12			10					
7.5									
8.13									
8.75			Loose gray fine to medium grain SILTY SAND, trace clay, wet to saturated						
9.38	7			9					
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	16			16					
15			Boring terminated at 15ft						



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Boring No. B-7
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: NONE Depth to collapse: 9.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			24.0" BLACK SAND & GRAVEL BERM						E.G. = Existing grade.
0.63									
1.25									
1.88	13		FILL: Medium dense brown fine to medium grain SILTY SAND, trace clay, gravel, and brick, moist	16					
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25									
6.88	11			11					
7.5									
8.13									
8.75			Medium dense brown fine to medium grain SILTY SAND, little gravel, moist	*9					*Drove rock.
9.38	15								
10									
10.63									
11.25									
11.88									
12.5									
13.13			Medium dense brown SANDY SILT, moist						
13.75									
14.38	15		Medium dense gray SANDY SILT, trace clay, moist	14					
15			Boring terminated at 15ft						



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Boring No. B-8
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 9.0' Depth to collapse: 10.0' Depth to water: 7.5'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			12.0" TOPSOIL						E.G. = Existing grade.
0.63									
1.25			Stiff brown SILTY CLAY, little sand, moist						
1.88	8			16				1.5	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Medium dense brown fine to medium grain SILTY SAND, trace clay and gravel, saturated						
6.88	15			12					
7.5									
8.13									
8.75									*Drove rock.
9.38	25			*10					
10									
10.63									
11.25									
11.88									
12.5									
13.13			Auger refusal @ 13.0 feet (possible bedrock or boulder).						+50 Blows for 0.5" of penetration.
13.75	50+			*0					
14.38			Boring terminated at 14.5ft						



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Boring No. B-9
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 9.0' Depth to collapse: 8.0' Depth to water: 5.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			12.0" BLACK SAND & GRAVEL BERM						E.G. = Existing grade.
0.63									
1.25			FILL: Very loose brown fine to medium grain SILTY SAND, little gravel, moist	*4					*Drove rock.
1.88	*9								
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			FILL: Medium stiff gray SILTY CLAY, little sand, gravel and cinders, trace organics, moist	16				1.0	
6.88	6								
7.5									
8.13									
8.75			Loose brown fine grain SILTY SAND, little gravel, saturated	15					
9.38	8								
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Medium dense gray SILTY SAND, trace clay and gravel, saturated	*4					*Drove rock.
14.38	*25								
15			Boring terminated at 15ft						



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Boring No. B-10
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 14.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			8.0" ASPHALT / 5.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			Medium stiff gray SILTY CLAY, little sand, moist						
1.88	8			16				0.5	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Stiff to medium stiff brown SILTY CLAY, little sand, moist						
6.88	11			10				2.25	
7.5									
8.13									
8.75									
9.38	8			17				2.5	
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Very stiff gray SILTY CLAY, trace sand, moist						
14.38	20			10				4.5+	
15			Boring terminated at 15ft						



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Boring No. B-11
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 8.5' Depth to collapse: 11.0' Depth to water: 9.5
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.0" ASPHALT / 4.0" BLACK SAND & GRAVEL						E.P. = Existing pavement.
0.63									
1.25			FILL: Loose gray fine grain SILTY SAND, trace clay and gravel, moist						
1.88	9			16					
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Medium dense gray SANDY SILT, little clay, moist						
6.88	11			17					
7.5									
8.13									
8.75			Loose gray fine to medium grain SILTY SAND, little clay, saturated						
9.38	9			8					
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Medium dense gray medium to coarse grain SILTY SAND & GRAVEL, saturated						*Drove rock.
14.38	*64			*3					
15			Boring terminated at 15ft						



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Boring No. **B-12**
 Sheet 1 of 1
 Date 12-28-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 9.0' Depth to collapse: 10.0' Depth to water: 8.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			POSSIBLE FILL: Loose gray fine to medium grain SILTY SAND, trace clay and organics, moist						E.G. = Existing grade.
0.63									
1.25									
1.88	8			12					
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25	15		Stiff brown SILTY CLAY, little sand, moist	18				1.75	
6.88									
7.5									
8.13									
8.75	6		Loose brown fine to medium grain SILTY SAND, little clay, trace gravel, wet to saturated	14					
9.38									
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75	*37		Medium dense brown fine to coarse grain SILTY SAND & GRAVEL, moist	*10					*Drove rock.
14.38									
15			Boring terminated at 15ft						



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Boring No. B-13
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS

Location: NORTON, OHIO

Job No.: G11-9204

Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 13.0' Depth to water: NONE

Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB

Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.5" ASPHALT / 8.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
-0.63									
-1.25									
-1.88			Stiff brown SILTY CLAY, trace sand and gravel, moist						
-2.5	10			10				2.0	
-3.13									
-3.75									
-4.38									
-5									
-5.63									
-6.25									
-6.88	8			10				2.25	
-7.5									
-8.13									
-8.75									
-9.38	10			13				2.5	
-10									
-10.63									
-11.25									
-11.88									
-12.5									
-13.13									
-13.75			Medium stiff gray SILTY CLAY, little sand, trace gravel, moist						
-14.38	8			13				2.0	
-15			Boring terminated at 15ft						



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Boring No. B-14
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 13.5' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			6.0" ASPHALT / 8.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			Stiff gray SILTY CLAY, trace sand and gravel, moist						
1.88	12			14				1.5	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Stiff brown SILTY CLAY, trace sand and gravel, moist						
6.88	12			18				2.5	
7.5									
8.13									
8.75									*Drove rock.
9.38	*13			*0					
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Hard gray SILTY CLAY, trace sand and gravel, moist						
14.38	50+			16				4.5+	
15			Boring terminated at 15ft						



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Boring No. B-15
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 8.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			10.0" ASPHALT / 3.0" BROWN SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25									
1.88	6		Medium stiff to very stiff brown SILTY CLAY, trace sand and gravel, moist	16				1.5	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25									
6.88	18			12				2.5	
7.5									
8.13									
8.75									
9.38	17			14				3.0	
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	41		Dense brown fine to coarse grain SILTY SAND, little gravel, trace clay, moist	18					
15			Boring terminated at 15ft						



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Boring No. **B-16**
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 6.5' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			1.0" ASPHALT / 10.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			FILL: Medium dense black fine to medium grain SILTY SAND, trace clay and gravel, moist						
1.88	12			16					
2.5			Medium dense brown SANDY SILT, moist						
3.13									
3.75									
4.38									
5									
5.63									
6.25			Stiff brown SILTY CLAY, trace sand and gravel, moist					4.0	
6.88	23			17					
7.5									
8.13									
8.75									*20 - 50 Blows 6" and 3" of penetration, respectively.
9.38	50+			10				4.25	
10			Soft to hard gray WEATHERED SHALE, moist						
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									*18 - 50 Blows for 6" and 5" of penetration, respectively.
14.38	50+			7					
15			Boring terminated at 15ft						



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Boring No. B-17
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 6.5' Depth to collapse: 8.5' Depth to water: 5.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			2.0" TOPSOIL						
0.63			Soft brown SILTY CLAY, trace sand and gravel, moist						E.G. = Existing grade.
1.25									
1.88	4			15				2.0	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25									
6.88	21		Medium dense brown coarse grain SILTY SAND & GRAVEL, trace clay, saturated	10					
7.5									
8.13									
8.75			Stiff brown SILTY CLAY, moist						
9.38	9		Loose brown medium to coarse grain SILTY SAND & GRAVEL, saturated	16				2.5	
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	12		Stiff gray SILTY CLAY, trace sand and gravel, moist	15				3.25	
15			Boring terminated at 15ft						



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Boring No. B-18
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: 7.0' Depth to collapse: 8.0' Depth to water: 3.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.0" ASPHALT / 4.0" BROWN SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			Stiff brown SILTY CLAY, trace sand and gravel, moist						
1.88	17			16				0.5	
2.5			Medium dense brown fine to medium grain SILTY SAND, little gravel, moist						
3.13									
3.75									
4.38									
5									
5.63									
6.25			Medium dense to very dense brown medium to coarse grain SAND & GRAVEL, trace clay, moist to saturated						
6.88	20			10					
7.5									
8.13									
8.75									*50 Blows for 6" of penetration.
9.38	50+		BOULDER@ 9.0'.	9					Auger refusal @ 9.0'.
10	50+			10					*50 Blows for 3" of penetration.
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	19			0					
15			Boring terminated at 15ft						



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Boring No. B-19
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 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS

Job No.: G11-9204

Location: NORTON, OHIO

Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 10.5' Depth to water: NONE

Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB

Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			1.0" ASPHALT / 8.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
-0.63			Medium stiff mottled brown/gray SILTY CLAY, little sand, trace gravel, moist	14				3.0	
-1.25	6								
-1.88									
-2.5									
-3.13									
-3.75									
-4.38									
-5									
-5.63									
-6.25			Medium stiff to stiff brown SILTY CLAY, trace sand and gravel, moist	18				3.0	
-6.88	8								
-7.5									
-8.13									
-8.75									
-9.38	12			16				1.75	
-10									
-10.63									
-11.25									
-11.88									
-12.5									
-13.13									
-13.75			Very stiff black SILTY CLAY, moist	10				4.5+	
-14.38	22								
-15			Boring terminated at 15ft						



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Boring No. B-20
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 11.5' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler-Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			6.0" ASPHALT / 4.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63			FILL: Stiff gray SILTY CLAY, trace sand and cinders, moist						
1.25									
1.88	11		Stiff brown SILTY CLAY, trace sand and gravel, moist	16				3.5	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25	15		Medium dense brown SANDY SILT, trace clay and gravel, moist	13					
6.88									
7.5									
8.13									
8.75	13		Stiff to very stiff brown SILTY CLAY, trace sand and gravel, moist	18				2.75	
9.38									
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	32			16				3.25	
15			Boring terminated at 15ft						



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Boring No. B-21
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: NONE Depth to collapse: 10.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			6.0" TOPSOIL						E.G. = Existing grade.
0.63			Soft brown SILTY CLAY, little sand, trace gravel, moist						
1.25									
1.88	4			18				2.0	
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Very stiff brown SILTY CLAY, trace to little sand, moist						
6.88	18			8				3.0	
7.5									
8.13									
8.75									
9.38	16			10				4.25	
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	20			12				4.5+	
15			Boring terminated at 15ft						



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Boring No. B-22
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 11.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.0" ASPHALT / 4.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
-0.63									
-1.25			Stiff brown SILTY CLAY, little sand, trace gravel, moist						
-1.88	10			15				1.5	
-2.5									
-3.13									
-3.75									
-4.38									
-5									
-5.63									
-6.25									
-6.88	15			13				3.75	
-7.5									
-8.13									
-8.75									
-9.38	14			16				2.5	
-10									
-10.63									
-11.25									
-11.88									
-12.5									
-13.13									
-13.75									
-14.38	12			12				2.0	
-15			Boring terminated at 15ft						



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Boring No. B-23
 Sheet 1 of 1
 Date 12-27-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: 9.0' Depth to collapse: 11.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.5" ASPHALT / 3.0" BLACK SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			Medium stiff gray SILTY CLAY, little sand, trace gravel, moist	12				2.0	
1.88	6								
2.5									
3.13									
3.75									
4.38									
5									
5.63									
6.25			Medium dense brown fine to medium grain SILTY SAND, trace clay and gravel, moist to saturated	13					
6.88	13								
7.5									
8.13									
8.75			Stiff brown SILTY CLAY, trace sand and gravel, moist	16				4.0	
9.38	15								
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Hard gray SILTY CLAY, trace sand and gravel, moist	12				4.5+	
14.38	43								
15			Boring terminated at 15ft						



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Boring No. B-26
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204

Location: NORTON, OHIO

Ground Elevation: E.G. Depth to seepage: 9.0' Depth to collapse: 10.0' Depth to water: 4.6'

Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 ATV Driller: P. SIMPSON Logger: M. KING

Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet.	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.0" TOPSOIL						E.G. = Existing grade.
1.38	3		Very loose brown SANDY SILT, trace clay and organics, moist	6					
2.75									
4.13	24		Medium dense brown SANDY SILT, trace clay, moist	16					
5.5									
6.88	17		Medium dense grey fine to coarse grain SILTY SAND & GRAVEL, trace clay, moist	15					
8.25									
9.63	10		Loose brown SANDY SILT, saturated	17					
11									
12.38									
13.75	22		Medium dense grey fine to coarse grain SILTY SAND & GRAVEL, saturated	14					
15.13									
16.5									
17.88									
19.25	43		Dense grey fine grain SAND, some silt, trace gravel, saturated	12					
20.63									
22									
23.38	50+		Very dense grey fine to medium grain SAND & GRAVEL, saturated	*10					*19 - 40 - 50 blows for 6, 6, and 4 inches of penetration, respectively. *Drove Rock.
24.75									
26.13									
27.5									
28.88	50+			*3					*50 blows for 6 inches of penetration. *Drove rock.
30.25									
31.63									
33									
34.38	50+			*1.5					*50 blow for 3.5 inches of penetration. *Drove rock.
			Boring terminated at 35ft						



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Boring No. B-27
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 7.0' Depth to collapse: 7.0' Depth to water: 6.5'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 ATV Driller: P. SIMPSON Logger: M. KING
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks	
0			8.0" TOPSOIL						E.G. = Existing grade.	
-1.38	5		Loose to medium dense brown fine grain SILTY SAND, trace clay, moist	7						
-2.75										
-4.13	17			15						
-5.5										
-6.88	17		Medium dense grey fine grain SILTY SAND, some gravel, trace clay, saturated	17						
-8.25										
-9.63	13			12						
-11										
-12.38										
-13.75	16		Medium dense grey SANDY SILT, saturated	14						
-15.13										
-16.5										
-17.88										
-19.25	35		Medium dense grey fine to medium grain SILTY SAND & GRAVEL, saturated	15						
-20.63										
-22										
-23.38										
-24.75	50+		Very dense grey fine to coarse grain SAND & GRAVEL, trace silt, saturated	13					*37 - 42 - 50 blows for 6, 6, and 5 inches of penetration, respectively.	
-26.13										
-27.5										
-28.88	50+			*3					*50 blows for 5 inches of penetration. *Drove rock.	
-30.25										
-31.63										
-33										
-34.38	50+			*1					*50 blows for 3 inches of penetration. *Drove rock.	
			Boring terminated at 35ft							



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Boring No. B-28
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 3.5' Depth to collapse: 8.0' Depth to water: 3.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 ATV Driller: P. SIMPSON Logger: M. KING
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			18.0" TOPSOIL						E.G. = Existing grade.
0.88	5		Loose brown fine to coarse grain SILTY SAND, some gravel, saturated	12					
1.75									
2.63									
3.5									
4.38	*10			*3					*Drove rock.
5.25									
6.13									
7	*18			*0					*Drove rock.
7.88									
8.75	45		Dense brown fine to coarse grain SILTY SAND & GRAVEL, saturated	10					
9.63									
10.5									
11.38									
12.25									
13.13									
14	42		Dense brown fine to medium grain SAND & GRAVEL, trace silt, saturated	11					
14.88									
15.75									
16.63									
17.5									
18.38									
19.25	50+		Very dense grey fine to medium grain SAND & GRAVEL, trace silt, saturated	4					*29 - 50 blows each for 6 inches of penetration.
			Boring terminated at 20ft						



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Boring No. B-29
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: 8.0' Depth to collapse: 9.0' Depth to water: 7.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type	Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0				5.0" ASPHALT / 8.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63										
1.25				FILL: 6.0" Stiff olive brown SILTY CLAY, moist						
1.88	9			Stiff brown SILTY CLAY, little gravel, moist	13				4.0	
2.5									4.0	
3.13										
3.75				Medium dense brown SANDY SILT, little clay and gravel, moist						
4.38	12				14					
5										
5.63										
6.25										
6.88	10				16					
7.5										
8.13										
8.75				Very stiff brown CLAYEY SILT with random saturated sand seams to layers, moist						
9.38	19				14				2.75	
10										
10.63										
11.25										
11.88										
12.5										
13.13				Medium dense brown medium to coarse grain SAND & GRAVEL, trace cobbles, saturated						
13.75										
14.38	32*				*2					*Drove rock.
15				Boring terminated at 15ft						



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Boring No. B-30
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 9.0' Depth to collapse: 6.5' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			4.0" ASPHALT / 7.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63									
1.25			Medium stiff to very stiff brown SILTY CLAY, little gravel, trace sand, moist						
1.88	8			15				3.0	
2.5									
3.13									
3.75									
4.38	17			14				3.25	
5									
5.63									
6.25			Stiff brown SILTY CLAY, trace sand and gravel, moist						
6.88	9			14				2.0	
7.5									
8.13									
8.75			Loose brown SANDY SILT, trace clay, gravel, cobbles, moist to saturated,						
9.38	8			12					
10									
10.63									
11.25									
11.88									
12.5									
13.13			Dense brown fine to coarse grain SILTY SAND & GRAVEL, moist						
13.75									
14.38	32			14					
15			Boring terminated at 15ft						



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Boring No. B-31
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 6.0' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			2.0" ASPHALT / 8.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63			Loose grey SANDY SILT, trace clay, moist						
1.25									
1.88	9			14					
2.5									
3.13									
3.75			Stiff brown SILTY CLAY, little sand, moist					2.0	
4.38	12			15					
5									
5.63									
6.25			Medium dense brown SANDY SILT, trace to little clay, moist						
6.88	21			16					
7.5									
8.13									
8.75									
9.38	11			14					
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Stiff brown SILTY CLAY, trace sand and gravel, moist					2.0	
14.38	10			14					
15			Boring terminated at 15ft						



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Boring No. B-32
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS

Job No.: G11-9204

Location: NORTON, OHIO

Ground Elevation: E.P. Depth to seepage: 5.0' Depth to collapse: 6.0' Depth to water: 5.5'

Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB

Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			1.5" ASPHALT / 6.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63			FILL: Medium stiff olive grey SILTY CLAY, trace sand and gravel, moist						
1.25	5			14				3.0	
1.88									
2.5									
3.13									
3.75									
4.38	6		Medium stiff brown SILTY CLAY, little gravel with random saturated sand seams, moist	15				2.25	
5									
5.63									
6.25									
6.88	7			14				3.0	
7.5									
8.13									
8.75									
8.75	6		Medium stiff brown CLAYEY SILT, little sand with random saturated sand seams, moist	16				1.5	
9.38									
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
13.75	14		Stiff grey SILTY CLAY, little gravel, moist	15				4.0	
14.38									
15			Boring terminated at 15ft						



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Boring No. B-33
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: 9.0' Depth to collapse: 9.0' Depth to water: 8.5'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			2.5" ASPHALT / 8.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
-0.63									
1.25	7		Medium stiff brown CLAYEY SILT, little gravel, moist	12				4.0	
1.88									
2.5									
3.13									
3.75			Medium stiff to very stiff brown SILTY CLAY, little sand and gravel, moist						
4.38	*7			*6				2.5	*Drove rock.
5									
5.63									
6.25									
6.88	17			14				4.5+	
7.5									
8.13									
8.75									
9.38	30		Medium dense brown medium to coarse grain SILTY SAND & GRAVEL with random moist clay seams, moist to saturated	15					
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75			Soft brown WEATHERED SHALE, moist						
14.38	51			15					
15			Boring terminated at 15ft						



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Boring No. B-34
 Sheet 1 of 1
 Date 4-13-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.P. Depth to seepage: NONE Depth to collapse: 5.5' Depth to water: NONE
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 TRUCK Driller: D. SIMPSON Logger: W. HOLUB
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0 - 0.63			2.0" ASPHALT/ 7.0" SAND & GRAVEL BASE						E.P. = Existing pavement.
0.63 - 1.25			FILL: Medium stiff olive grey CLAYEY SILT, trace sand, gravel, and brick fragments, moist						
1.25 - 1.88	6			13				1.75	
1.88 - 2.5									
2.5 - 3.13									
3.13 - 3.75									
3.75 - 4.38	21		Very stiff brown SILTY CLAY, trace sand and gravel, moist	15				2.0	
4.38 - 5									
5 - 5.63									
5.63 - 6.25									*13 - 17 - 50 blows for 6, 6, and 5 inches of penetration, respectively.
6.25 - 6.88	50+		Hard brown SILTY CLAY, trace sand and gravel, moist	14				4.5+	
6.88 - 7.5									
7.5 - 8.13									
8.13 - 8.75									
8.75 - 9.38	44		GLACIAL TILL: Hard mottled brown/grey SILTY CLAY, trace to little gravel to cobbles, moist	15				4.5+	
9.38 - 10									
10 - 10.63									
10.63 - 11.25			Soft grey WEATHERED SHALE, moist						
11.25 - 11.88									
11.88 - 12.5									
12.5 - 13.13	50+			5.5					Auger refusal at 12.0 feet deep. *50 blows for 5.5 inches of penetration.
			Boring terminated at 13.5ft						



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Boring No. B-35
 Sheet 1 of 1
 Date 4-18-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 12.0' Depth to collapse: 11.0' Depth to water: 2.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: CME 750 ATV Driller: P. SIMPSON Logger: M. KING
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			11.0" TOPSOIL						E.G. = Existing grade. East bank of creek.
0-0.63	5		Loose brown fine grain SILTY SAND, moist	4					
1.25									
1.88									
2.5									
3.13									
3.75	8								
4.38				12					
5									
5.63									
6.25	8		Loose grey fine grain SAND, trace silt, moist	9					
6.88									
7.5									
8.13									
8.75	3		Very loose grey fine grain SAND, trace silt and clay, moist to saturated	13					
9.38									
10									
10.63									
11.25									
11.88			Soft brown HIGHLY WEATHERED SANDSTONE, saturated						
12.5									
13.13									
13.75									
14.38	50+			2					*50 blows for 5.5 inches of penetration.
15			Boring terminated at 15ft						



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Boring No. B-36
 Sheet 1 of 1
 Date 4-18-12

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 14.5' Depth to collapse: 11.0' Depth to water: 8.5'
 Drilling Contractor: RIDGEWAY DRILLING Drill: CME 750 ATV Driller: P. SIMPSON Logger: M. KING
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			9.0" TOPSOIL						E.G. = Existing grade.
0.63									
1.25	3		Soft brown SILTY CLAY, trace to little sand, trace wood fragments, moist	10				0.75	
1.88									
2.5									
3.13									
3.75									
4.38	23		Medium dense brown SANDY SILT, trace clay and gravel, moist	13				4.5+	
5									
5.63									
6.25									
6.88	17		Medium dense brown fine grain SILTY SAND, trace clay and gravel, moist	11					
7.5									
8.13									
8.75									
9.38	16		Medium dense brown fine grain SAND, trace silt and gravel, moist	15					
10									
10.63									
11.25									
11.88									
12.5									
13.13									
13.75									
14.38	37		Dense brown fine grain SAND, trace silt and clay, moist to saturated	16					
15			Boring terminated at 15ft						



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Boring No. B-37
 Sheet 1 of 1
 Date 5-31-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS Job No.: G11-9204
 Location: NORTON, OHIO
 Ground Elevation: E.G. Depth to seepage: 11.0' Depth to collapse: 10.0' Depth to water: 6.0'
 Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 ATV Driller: P. SIMPSON Logger: M. KING
 Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (Inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			8.0" TOPSOIL						
1.38			Loose brown fine to medium grain SAND, trace clay and roots, moist						E.G. = Existing grade. Sandstone under hydrostatic pressure as water rose 22 feet in auger upon penetrating sandstone formation.
2.75									
4.13	10		Stiff mottled brown/grey CLAYEY SILT, trace sand, moist	15				3.5	
5.5									
6.88									
8.25									
9.63	10		Loose brown SANDY SILT; trace clay, moist to saturated	16					
11									
12.38									
13.75	17		Very stiff grey SILTY CLAY, little gravel, trace sand, moist	15				4.0	
15.13									
16.5									
17.88									
19.25	19		Very stiff grey SILTY CLAY, little gravel, moist	16				4.0	
20.63									
22									
23.38									
24.75	36		GLACIAL TILL: Hard grey SILTY CLAY, little gravel and sand, moist	15				4.5+	
26.13									
27.5									
28.88	50+		Medium hard to hard grey SANDSTONE, saturated	3					*50 blows for 3 inches of penetration. Hard drilling @ 32.0 feet.
30.25									
31.63									
33									
34.38	50+			0					*50 blows for 1.5 inches of penetration.
			Boring terminated at 35ft						



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Boring No. B-38
 Sheet 1 of 1
 Date 5-31-11

SUBSURFACE EXPLORATION LOG

Job Title: NASH HEIGHTS SANITARY SEWER IMPROVEMENTS

Job No.: G11-9204

Location: NORTON, OHIO

Ground Elevation: E.G. Depth to seepage: 11.0' Depth to collapse: 23.0' Depth to water: NONE

Drilling Contractor: RIDGEWAY DRILLING Drill: D-50 ATV Driller: P. SIMPSON Logger: M. KING

Hammer weight: 140 LB. Hammer drop: 30.0" Sampler Size: 2.0" Auger Size: 2.25"

Depth in feet	"N" value	Sample type Graphic log	Description of Material	Sample Recovery (inches)	Water Content (%)	Liquid Limit (%)	Plasticity Index (%)	Unconfined Compressive Strength (TSF)	Remarks
0			8.0" TOPSOIL						E.G. = Existing grade.
1.38			Loose brown SANDY SILT, moist						
2.75			Loose mottled brown/grey SILT, little clay, trace fine sand, moist						
4.13	10			20					
5.5									
6.88									
8.25	14		Stiff mottled brown/grey CLAYEY SILT (fissured) with random moist sand/silt seams, moist	24				2.0	
9.63									
11			Loose brown fine grain SAND, saturated						
12.38									
13.75	10		12.0" Loose brown medium to coarse grain SILTY SAND & GRAVEL, saturated	18				4.5+	
15.13			GLACIAL TILL: Stiff to very stiff grey SILTY CLAY, trace sand and gravel, moist						
16.5									
17.88									
19.25	14			18				4.5+	
20.63									
22									
23.38	22			18				4.5+	
24.75									
26.13									
27.5									
28.88	50+		Medium hard grey WEATHERED SANDSTONE, moist	11					26 - 50 blows for 6 and 4 inches of penetration, respectively.
30.25									
31.63									
33									
34.38	50+			1					50 blows for 3.25 inches of penetration.
			Boring terminated at 35ft						



Summit Testing & Inspection Company

SAMPLING AND TESTING PROCEDURES

All test borings were advanced using a medium capacity rotary drilling rig and hollow stem, continuous augers. The boring method and hole diameter are indicated on the respective "Subsurface Exploration Logs"

SPLIT SPOON SAMPLING [ASTM D-1586]

A split spoon sampler with a 2.0 inch O.D. (1.375 inch I.D.) is driven into the subsoil with a 140-pound hammer free falling a vertical distance of 30.0 inches. The summation of hammer blows required to drive the sample 2nd and 3rd 6.0 inch sampling intervals is defined as the "Standard Penetration Resistance" or "N-Value". The first 6.0 inch "seating penetration" is normally disregarded for engineering purposes. The N-value is representative of the soils' resistance to penetration. The N-value is, therefore, an index of the relative density of granular soils and the comparative consistency of cohesive soils. A soil sample is collected from each SPT interval.

SHELBY TUBE SAMPLING [ASTM D-1587]

A relatively undisturbed soil sample is collected by hydraulically advancing a 3.0 inch O.D., thin wall Shelby Tube sampler into a soil mass.

DUTCH CONE PENETRATION TEST [ASTM D-3441]

This test measures the soil's resistance to penetration of a 10.0 square centimeter projected area cone, pushed hydraulically at a rate of 2 centimeters per second. Soil resistance is recorded in kilograms per square centimeter at 20 centimeter depth intervals. Soil friction values are measured by a friction sleeve at each test interval. Field data is then reduced by computer. The resulting cone pressure corresponds to the consistency or density of the soil, and the friction ratio is an indication of the soil type.

ROCK CORING [ASTM D-2113]

1.75 inch rock core samples are obtained from a 2.125 inch O.D. double tube core barrel. The "Rock Quality Designation" (RQD) is the sum of core pieces \geq 4.0 inches in length, divided by the recovered core lengths.

* All soil samples are discarded 6 months after the report's publication date unless notified otherwise.



BORING LOG TERMINOLOGY

CLASSIFICATION TERMINOLOGY AND CORRELATIONS

NON COHESIVE SOILS			COHESIVE SOILS		
N value (blow/ft.)	Descriptive Term	Relative Density	N value (blow/ft.)	Consistency Term	Qu (tsf)
0-4	Very loose	<0.15	0-2	Very soft	<0.25
5-10	Loose	0.15-0.35	3-4	Soft	0.25-0.5
11-30	Medium dense	0.35-0.65	5-8	Medium stiff	0.5-1.0
31-50	Dense	0.65-0.85	9-16	Stiff	1.0-2.0
>50	Very dense	>0.85	17-32	Very stiff	2.0-4.0
			>32	Hard	>4.0

SOIL PARTICLE SIZES AND GRAPHIC SYMBOLS

	GRAVEL: COARSE = 3/4"-3" : FINE = 4.76mm-3/4"		SILTY CLAY		FILL
	SAND: COARSE = 2.0-4.76mm : MEDIUM = 0.42-2.0mm : FINE = 0.075-0.42mm		CLAYEY SILT		SHALE
	SILT: 0.005-0.075mm		ORGANIC CLAY		SANDSTONE
	CLAY: <0.005mm		ORGANIC SILT		SILTSTONE
	SAND & GRAVEL		TOPSOIL		LIMESTONE
	SILTY SAND		PEAT		COAL
	SANDY SILT				

MOISTURE DESCRIPTION

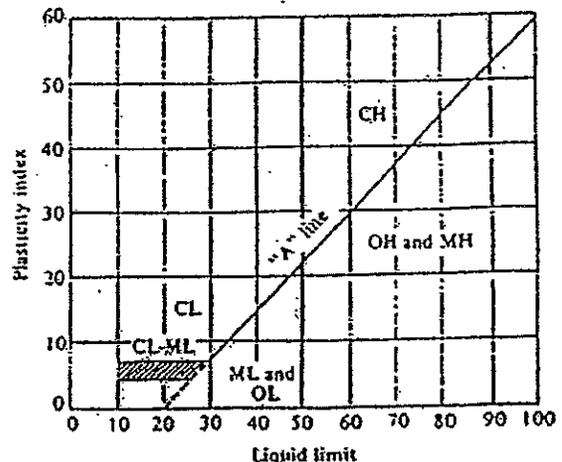
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER
SATURATED	EXCESS FREE WATER

ADJECTIVE	% BY WEIGHT
TRACE	1-10
LITTLE	10-20
SOME	20-35

ROCK HARDNESS

Term	N value blows/penetration
SOFT	50/6-8"
MEDIUM	50/3-5"
HARD	50/1-2"
VERY HARD	50/0"

Pasticity Chart



1. Each soil sample is visually-manually classified based on texture and plasticity in general accordance with the Unified Soil Classification System (ASTM D 2487-93).

2. The main soil component is the noun and the minor component is the adjective, i.e. silty clay has at least 35% silt and the majority is clay.

