

Date: 09/26/18

**ATTENTION - PROSPECTIVE BIDDERS**  
**OFFICIAL BID PACKAGE**  
**FOR**  
**SALE OF NDDOT-OWNED LAND**  
**NEAR EXIT 292 (KATHRYN DRIVE INTERCHANGE)**  
**(PART OF SE1/4 OF SEC. 28-140-58, BARNES COUNTY)**

**This file contains:**

1. The official advertisement of sale, Notice of Sale of State Land Owned by the North Dakota Department of Transportation.
2. A preliminary plat, depicting the parcels to be sold.
3. Cartway Agreement, dated May 6, 1975.
4. Report from NDDOT Valley City District Engineer, dated May 20, 2016.

**IMPORTANT NOTE TO PROSPECTIVE BIDDERS CONCERNING ITEM #4**

The enclosed report, referenced in Item #4 and dated May 20, 2016, was filed by then-District Engineer John Thompson in regards to a larger 27.1 acre site. However, NDDOT has since reduced the size of the site now offered for sale, to 19.1 acres. As a result of the change, the Western Area Power Authority (WAPA) overhead transmission line easement mentioned in Mr. Thompson's memo is not located on the 19.1-acre site now offered.

Mr. Thompson's memo of May 20, 2016 also refers to small piles of gravel and some topsoil piles that were being stored on site at that time; this status also has changed. Specifically, the North Dakota Department of Transportation (NDDOT) is currently storing a stockpile (approx.. 3,000 ton) of asphalt millings on the 19.1-acre site. This stockpile of asphalt millings is not included in the sale; it is the personal property of NDDOT and will be removed by NDDOT prior to the buyer taking possession of the site. All other existing materials piles located thereon will be included with the sale.

Any questions concerning the above should be directed to the Valley City District Engineer, Jay Praska, who can be contacted at (701) 845-8800 or by e-mail at [jpraska@nd.gov](mailto:jpraska@nd.gov).

5. A sample Quit Claim Deed (to be used in the conveyance of the sale property).
6. Official Bid Sheet, North Dakota Department of Transportation, Bid for Public Sale of Land.
7. Sample Bid Envelope
8. Geotechnical Report, dated June 8, 2012, prepared by Midwest Testing Laboratory, Inc.; report was commissioned independently by Valley City-Barnes Development Corporation.

NOTICE OF SALE OF STATE LAND OWNED BY  
THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

The North Dakota Department of Transportation (NDDOT) will sell to the highest bidder by sealed bids, with the three highest bidders having the opportunity to orally raise their bid at sale time, the following two parcels of land located near Valley City, ND, described as follows:

Parcel Number 1B-1

A portion of the SE  $\frac{1}{4}$  of Section 28, Township 140 N, Range 58 W, of the 5th Principal Meridian, County of Barnes, State of North Dakota, described as follows and as shown on plat 1B of 1:

Commencing at the SE corner of section 28, thence westerly along the south line of section 28, S 88 deg. 45 min. 56 sec. W a distance of 1338.11 feet; thence N 01 deg. 14 min. 04 sec. W a distance of 33.00 feet to the SW corner of Parcel 1A-1; thence N 01 deg. 56 min. 28 sec. W along the west line of Parcel 1A-1 a distance of 937.84 feet to the point of beginning; thence N 87 deg. 43 min. 09 sec. W along the north line of the US Department of the Interior Bureau of Reclamation Easement, Doc #135092, a distance of 1267.30 feet; thence N 02 deg. 02 min. 35 sec. W along the  $\frac{1}{4}$  line of section 28 a distance of 391.40 feet; thence N 11 deg. 34 min. 33 sec. E along a line that is 75 feet southeasterly of and parallel with the existing right of way line of I-94 a distance of 222.44 feet; thence N 88 deg. 40 min. 48 sec. E along the northerly line of the Cartway Easement, Doc #182645 a distance of 1212.64 feet; thence S 01 deg. 56 min. 28 sec. E along the west line of Parcel 1A-1 a distance of 687.84 feet to the point of beginning.

Said strip is shown on the plat as parcel 1B-1 and contains 18.68 Acres.

Parcel Number 1B-2

A portion of Parcel No. 2, less the northwesterly 75' of the E  $\frac{1}{2}$  of the SE  $\frac{1}{4}$  of Section 28, Township 140 N, Range 58 W, of the 5th Principal Meridian, County of Barnes, State of North Dakota, described as follows and as shown on plat 1B of 1:

Commencing at the S  $\frac{1}{4}$  corner of section 28, thence northerly along the  $\frac{1}{4}$  line of section 28, N 02 deg. 02 min. 35 sec. W a distance of 1048.58 feet to the point of beginning; thence N 87 deg. 43 min. 09 sec. W along the north line of the US Department of the Interior Bureau of Reclamation Easement, Doc #135092, a distance of 93.39 feet; thence N 11 deg. 34 min. 33 sec. E along a line that is 75 feet southeasterly of and parallel with the existing right of way line of I-94 a distance of 395.48 feet; thence S 02 deg. 02 min. 35 sec. E along the  $\frac{1}{4}$  line of section 28 a distance of 391.40 feet to the point of beginning.

Said strip is shown on the plat as parcel 1B-2 and contains 0.42 Acres more or less.

The above parcels of unimproved land will be sold as a single unit totaling approximately 19.1+/- acres, more or less. The site is located near the southeast quadrant of the Kathryn Drive interchange (Exit 292) in Valley City, ND. Access to the site is available only from Kathryn Drive via a 75-foot dedicated easement, as illustrated on the plat prepared for this sale. The site's market value, based on the average of two recent appraisals, was estimated at \$287,350.

The property is being sold “as is”, subject to the following conditions:

1. The sale does not include a stockpile (approximately 3,000 ton) of asphalt millings located on the site; this stockpile will remain the personal property of the North Dakota Department of Transportation and will be removed by NDDOT prior to the buyer taking possession of the site. All other existing materials piles located thereon will be included with the sale.
2. The sale is subject to all easements of record, including (but not limited to) a cartway easement that provides access to neighboring properties;
3. As a condition of sale, the purchaser agrees, at his or her personal expense, to erect and maintain a minimum three-strand barbed wire fence along the south boundary of the sale property. No access will be available to the site from across its south boundary.
4. The sale is subject to certain Non-discrimination covenants. Please visit NDDOT’s website at [www.dot.nd.gov/](http://www.dot.nd.gov/) for more information, including a draft of the quitclaim deed that will be used to convey the property.
5. The purchaser is responsible for payment of all real estate taxes and special assessments (current or delinquent), if any, heretofore or hereafter levied against said real estate;
6. The property is being sold without any warranty as to title.

All bidders should inspect the property and inform themselves of existing conditions, and be familiar with conditions of the sale prior to submitting a bid. Please visit NDDOT’s website at [www.dot.nd.gov/](http://www.dot.nd.gov/) for more information.

The sale will be held at 12:00 P.M. (CST) on Wednesday, October 24, 2018 in the ‘Ops’ Room of the Barnes County Courthouse, 230 4<sup>th</sup> Street NW, Valley City, ND. Sealed bids will be publically opened and announced at 12:00 P.M. (CST). All bidders are requested to be present.

The three highest bidders will have the opportunity to orally raise their bid at the time of bid opening. In the event that only two bids are received, both bidders will have the opportunity to raise their bids at the time of the bid opening.

All bids must be submitted in a sealed envelope, the outside plainly marked with the bidder’s printed name and address and the phrase, “BID FOR STATE LAND – DO NOT OPEN”. Bids are to be addressed to Greg F. Doll, Maintenance Division, North Dakota Department of Transportation, 608 East Boulevard Avenue, Bismarck, ND 58505-0700. Mailed bids must be postmarked on or before Friday, October 19, 2018. Hand-delivered, sealed bids will also be accepted until 5:00PM the following Monday, October 22, 2018, either at NDDOT’s Maintenance Division, 608 East Boulevard Avenue, Bismarck, ND, or at the Valley City District Office, 1524 8<sup>th</sup> Avenue SW, Valley City, ND.

Only sealed bids, submitted on an official bid form, will be accepted. A bid package, including official bid form and other information, is available on-line at [www.dot.nd.gov/](http://www.dot.nd.gov/)

Terms of the sale will be cash, to be paid no later than 30 days following opening of bids.

All bids shall be accompanied by a bank cashier's check in the amount of 10% of the total bid, made payable to the North Dakota Department of Transportation. Unsuccessful bidders' checks will be returned the day of sale. Bidders must bring a valid driver's license for identification purposes; checks will not be released without proof of identity.

The successful bidder's check will be held as a deposit and deducted from the total bid at the time of final settlement. The successful bidder must then remit a second cashier's check by Monday, December 3, 2018 for the balance owed. Said deposit to be forfeited in the event that the successful bidder fails to comply with the terms of the sale.

Conveyance will be via quitclaim deed, which the department will prepare and deliver to the purchaser after settlement. The property is being sold without warranty as to title, and the State of North Dakota will not furnish an abstract of title to the property. The buyer will be responsible for obtaining any desired title insurance at personal expense.

The sale is subject to final approval by the Director of the North Dakota Department of Transportation. Seller reserves the right to reject any or all bids, to waive technicalities, or to accept such bids as may be in the best interest of the state.

To request accommodations for disabilities and/or language assistance, contact Civil Rights Division, NDDOT, 701-328-2978 or [civilrights@nd.gov](mailto:civilrights@nd.gov) or TTY 711, as soon as possible.

Questions may be directed to Greg F. Doll, Maintenance Division, North Dakota Department of Transportation, 608 East Boulevard Avenue, Bismarck, North Dakota 58505-0700; e-mail: [gdoll@nd.gov](mailto:gdoll@nd.gov); phone: (701) 328-2613; or to Jay Praska, District Engineer for the Valley City District, 1524 8<sup>th</sup> Avenue SW, Valley City, ND 58072-4200; e-mail: [jpraska@nd.gov](mailto:jpraska@nd.gov); phone: (701) 845-8800.

TOM SOREL  
DIRECTOR





DOCUMENT NUMBER 182645

CARTWAY

This indenture, made this 6<sup>th</sup> day of MAY, 1975, by and between Barnes County, a Municipal Corporation, and Arnold H. Bjornson of Valley City, North Dakota, WITNESSETH:

WHEREAS, Arnold H. Bjornson has presented to this Board a Petition to establish a Cartway pursuant to Section 24-07-06 and,

WHEREAS, It appears to the Board of County Commissioners, that a tract of land owned by Arnold H. Bjornson does not touch upon a public road so as to allow the owner of such tract access to a public Highway and,

WHEREAS, the Board of County Commissioners in its judgment deems it necessary to establish such a cartway for the benefit of Arnold H. Bjornson and his heirs, successors and interest and assigns.

NOW, THEREFORE, IT IS RESOLVED, by the Board of County Commissioners to establish a Cartway as follows:

A strip of land extending <sup>32 feet wide</sup> along and adjoining the southerly right-of-way line of Interstate Highway No. 10 in the S½ of Sec. 28, Twp. 140 N., Rge. 58 W., said strip beginning at the centerline of the Kathryn Road and running N 13 degrees 25' 30" E. a distance of 700 ft., more or less.

ALSO, a strip of land 32 feet wide lying South of and Parallel with the north right of way of the following described state Highway Dept. right of way line.

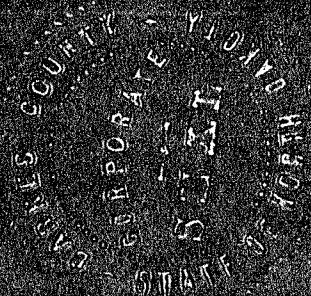
Beginning at a point 336.31 feet North of the SW ¼ Corner of the N½ SE ¼ Section 28, Township 140 N Range 58 W 5th PM, thence at a right angle to the east a distance of 2637.6 ft. to a point on the E section line of said Section 28, thence S along said Section line a distance of 32 ft., thence at a right angle to the W a distance of 2637.6 ft. more or less to the W property line of the North Dakota State Highway Department, thence N along said line a distance of 32 ft. to the point of beginning.

Given to Arnold H. Bjornson to have and to hold said Cartway unto the said Arnold H. Bjornson, his heirs, successors in interest, and assigns forever as appurtenant to all or any part of the premises of the said Arnold H. Bjornson and his heirs, successors in interest or assigns as above described done by order of the Barnes County Commissioners, at Valley City, North Dakota this 6<sup>th</sup> day of MAY, 1975.

BARNES County

BY Edwin L. Heinze  
Chairman Board of County Commissioners

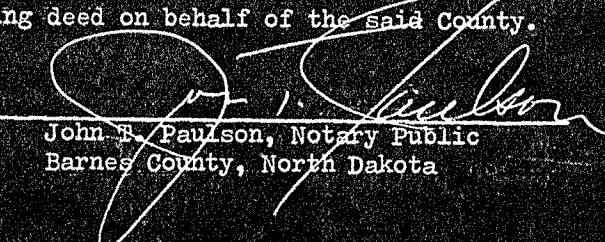
Margaret A. Carlson  
County Auditor





STATE OF NORTH DAKOTA)  
 SS)  
 COUNTY OF BARNES )

On this 6<sup>th</sup> day of May, 1975, personally appeared before me a Notary Public within the aforesaid County and State, EDWIN J. HEINZE and MARGARET A. CONLON to me personally known to be the Chairman of the Board of County Commissioners and the Auditor, respectively of the said County, and each acknowledged to me that he executed the foregoing deed on behalf of the said County.

  
 John F. Paulson, Notary Public  
 Barnes County, North Dakota

My Commission expires:

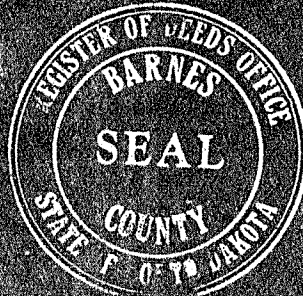
August 30, 1979.



DOCUMENT NUMBER 182645

OFFICE OF REGISTER OF DEEDS, ss.  
 County of Barnes, North Dakota.  
 I hereby certify that the within instrument was  
 filed in this office for record on the 7th day of  
May 1975 at 9:00 o'clock  
A.M., and was duly recorded in Book W-5  
 of Misc. Page 69-70  
JESSIE J. LANG  
 REGISTER OF DEEDS

Lucille H. Leitch Deputy  
 Rec. fee, No. chx.



Compared	_____
Grantor	_____
Grantee	_____
Indexed	<u>M</u>
Checked	<u>C</u>



20

1/4 Line

N 1/2 SE 1/4 SEC 28, TWP 140, RGE 58.

32' Cartway

1700'

Iron Pin

NORTH DAKOTA STATE HIGHWAY DEPT

1700'

336.31'

89° 57'

1/4 1/4 Line

937.6'

Iron Pin

East Section Line Sec 28  
Book W-5 of Minn page 69

**TO:** Gregory Doll-NDDOT Maintenance

**FROM:** John Thompson-Valley City District Engineer  
Kevin Hanson-Valley City Dist. Material Coordinator

**DATE:** May 20, 2016

**SUBJECT:** NDDOT Pit at 28-140-58 Valley City

In 1971, the Department of Transportation purchased the property from Wick Construction. Since then, it has been used for a variety of reasons ranging from storage of snow plow wings and guardrail items to serving as an aggregate and asphalt stockpile. Other items that have been stored at the pit are jersey barriers and old tires.

Material from this pit has been used for Department of Transportation construction projects from 1977 to 2007, and have also been utilized by the National Guard for training on rock crushing equipment as well.

The pit was frequently used until 2001 when a contractor was mining the pit. The workers at the site that day uncovered some barrels. A few days later, a couple of those people claimed to have felt sick. MSHA was then brought in, and all activity in the pit was shut down for a few weeks. The pit was cleared, using an underground detection system. MSHA determined that the barrels were old paint barrels. Since then, the pit has been used for two other projects.

The pit currently has numerous small piles of gravel and some topsoil piles.

There is a ramp which was used by the Army Nation Guard to practice setting up an aggregate production system.

The following utilities are known to exist in/on this property:

Western Area Power Authority has an overhead transmission line. The line has an easement on this property.

Intercommunity Telephone Coop is located on the west edge of the pit. This is there by permit with 21473.

NDDOT Contract No. \${FIELD:CONTRACT\_NUMBER}

**North Dakota Department of Transportation  
QUITCLAIM DEED (State to Others)**

**PCN:** \${FIELD:PROJECT\_CONTROL\_NUMBER}

**PROJECT:** \${FIELD:PROJECT\_NUMBER}

**PARCEL(S):**

This deed, made this       day of       20       , between the state of North Dakota, acting by and through its Director of Transportation, hereinafter referred to as Grantor, whose address is 608 East Boulevard Avenue, Bismarck, North Dakota 58505-0700, and       hereinafter referred to as the Grantee(s), whose address is       .

WITNESSETH, that the Grantor, for and in consideration of the sum of       Dollars, the receipt of which is hereby acknowledged, do BARGAIN, SELL, REMISE, RELEASE, QUITCLAIM, and CONVEY to the Grantee(s)       heirs and assigns, FOREVER, all its right, title, interest, claim, or demand in and to that tract or parcel of land lying and being in       County, State of North Dakota and more specifically described as follows, to wit:

The Grantee, for him or herself, his or her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree as a covenant running with the land that in the event facilities are constructed, maintained, or otherwise operated on the property described in this deed for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the Grantee will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

That in the event of breach of any of the above Non-discrimination covenants, the State of North Dakota will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the State of North Dakota and its assigns.

TO HAVE AND TO HOLD, the above quitclaimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining to the Grantee(s) \_\_\_\_\_ heirs and assigns, forever.

IN TESTIMONY WHEREOF, the state of North Dakota has caused this instrument to be executed in the name of the state of North Dakota by the Governor of the state of North Dakota, on recommendation of the Director of the North Dakota Department of Transportation, and who has affixed his signature hereto and the seal of the state of North Dakota.

The above-described property was acquired by the state of North Dakota for the use and benefit of the North Dakota Department of Transportation by purchase. As required by Section 24-01-28 of the North Dakota Century Code, I hereby recommend to the Governor that this transaction be completed.

NORTH DAKOTA  
DEPARTMENT OF TRANSPORTATION

\_\_\_\_\_  
DIRECTOR (TYPE OR PRINT)

\_\_\_\_\_  
SIGNATURE

Attest:  
STATE OF NORTH DAKOTA )  
COUNTY OF BURLEIGH )

\_\_\_\_\_  
GOVERNOR (TYPE OR PRINT)

\_\_\_\_\_  
SIGNATURE

The foregoing instrument was executed before me, this \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_, Governor of the State of North Dakota (See N.D.C.C. Sec. 47-19-14.5 et seq.)

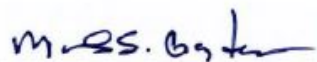
\_\_\_\_\_  
SECRETARY OF STATE (TYPE OR PRINT)

\_\_\_\_\_  
SIGNATURE

**NDDOT USE ONLY**

I certify that the full consideration paid for the property described in this deed is \$ \_\_\_\_\_

North Dakota Department of Transportation



As Agent

MARK S. GAYDOS, Director of Environmental & Transportation Services

Date \_\_\_\_\_

**For Recording Purposes Only**

**NORTH DAKOTA DEPARTMENT OF TRANSPORTATION**  
**BID FOR PUBLIC SALE OF LAND**

See official advertisement, as published in the Valley City Times-Record, and NDDOT's website for sale terms, conditions, and bid procedures.

Bids will be publicly opened and read at 12:00 P.M. (CST) on Wednesday, October 24, 2018 in the 'Ops' Room of the Barnes County Courthouse, 230 4<sup>th</sup> Street NW, Valley City, ND. Bidders must be present. The three highest bidders will be given the opportunity to orally raise their bids.

All bidders should inspect the property and inform themselves of existing conditions, and be familiar with the conditions of the sale prior to submitting a bid. Please visit NDDOT's website at [www.dot.nd.gov/](http://www.dot.nd.gov/) for more information.

The sale is subject to final approval by the Director of the North Dakota Department of Transportation. Seller reserves the right to reject any or all bids, to waive technicalities, or to accept such bid as may be in the best interest of the state.

In response to the terms of this sale, and if award is tendered, I, the undersigned, agree to purchase the property, described in the official advertisement for the notice of sale, for the bid amount quoted below:

**BID AMOUNT:** \$ \_\_\_\_\_

ENCLOSED HERewith IS BID SECURITY IN THE FORM OF A BANK CASHIER'S CHECK, MADE PAYABLE TO 'NORTH DAKOTA DEPARTMENT OF TRANSPORTATION', IN THE SUM OF \$ \_\_\_\_\_ WHICH IS 10% OF THE BID PRICE. **(NOTE: Personal checks or cash will not be accepted and will cause bid to be rejected.)**

SIGNATURE OF BIDDER: \_\_\_\_\_ DATE: \_\_\_\_\_

**IMPORTANT - PLEASE PRINT THE FOLLOWING INFORMATION**

BIDDER'S NAME: \_\_\_\_\_

MAILING ADDRESS: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

BUS. PHONE: \_\_\_\_\_ RES. PHONE \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

Only sealed bids, submitted using this official bid form, will be accepted. **Altered bid forms or conditional bids will be rejected.** Bid must be placed in a sealed envelope, the outside plainly marked with the bidder's printed name and address and the phrase, "**BID FOR STATE LAND – DO NOT OPEN**" prominently displayed in the lower left hand corner. Mail the bid to NDDOT – Maintenance Division, c/o Greg F. Doll, NDDOT 608 East Boulevard Avenue, Bismarck, ND 58505-0700. **MAILED BIDS MUST BE POSTMARKED ON OR BEFORE FRIDAY, OCTOBER 19, 2018.** Hand-delivered, sealed bids will also be accepted until 5:00PM the following MONDAY, OCTOBER 22, 2018, either at NDDOT's Maintenance Division, 608 East Boulevard Avenue, Bismarck, ND, or at the Valley City District Office, 1524 8<sup>th</sup> Avenue SW, Valley City, ND 58072.



# SAMPLE BID ENVELOPE

BIDDER'S NAME  
BIDDER'S ADDRESS  
CITY STATE ZIP

**BID FOR STATE LAND  
– DO NOT OPEN**

MAINTENANCE DIVISION – GREG DOLL  
NDDOT  
608 EAST BOULEVARD AVE  
BISMARCK ND 58505-0700

# Geotechnical Engineering Report

**NDANG Readiness Center  
Valley City, North Dakota**

June 8, 2012

Terracon Project No. M1125030

**Prepared for:**

Valley City-Barnes County Development Corporation  
Valley City, North Dakota

**Prepared by:**

Midwest Testing Laboratory/Terracon  
Fargo, North Dakota



Offices Nationwide  
Employee-Owned

Established in 1965  
[terracon.com](http://terracon.com)

# Terracon

Geotechnical   ■   Environmental   ■   Construction Materials   ■   Facilities

June 8, 2012

Valley City-Barnes County Development Corporation  
250 West Main Street  
Valley City, ND 58072-3321



Attn: Ms. Jennifer Feist  
P: 701.845.1891  
E: vdg@hellovalley.com

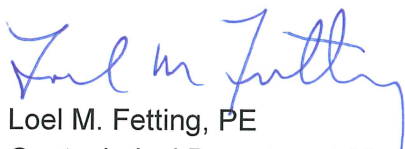
Re: Geotechnical Engineering Report  
Proposed NDANG Readiness Center  
Valley City, North Dakota  
MTL/Terracon Project Number: M1125030

Dear Ms. Feist:

Midwest Testing Laboratory (A Terracon Company) has completed the geotechnical engineering services for the above referenced project. This study was performed in general accordance with our Agreement for Services number M1125030 dated May 21, 2012. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning the design and construction of the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,  
**Midwest Testing Laboratory - A Terracon Company**

  
Loel M. Fetting, PE  
Geotechnical Department Manager

  
Theodore J. Engelstad, PE  
Office Manager

Enclosures

- cc: 2 - Client (mail)
- 1 - Client (PDF)
- 1 - RHR Architects,  
Attn: Brian Durgian, AIA (PDF)  
E: bdurgian@rhrarch.com
- 1 - File



Date 6-8-2012

## TABLE OF CONTENTS

	Page
<b>EXECUTIVE SUMMARY .....</b>	<b>i</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 PROJECT INFORMATION .....</b>	<b>1</b>
2.1 Project Description.....	1
2.2 Site Location and Description .....	2
<b>3.0 SUBSURFACE CONDITIONS .....</b>	<b>2</b>
3.1 Typical Profile .....	2
3.2 Groundwater .....	3
<b>4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION .....</b>	<b>4</b>
4.1 Geotechnical Considerations .....	4
4.2 Earthwork .....	4
4.2.1 Site Preparation.....	4
4.2.2 Material Requirements .....	5
4.2.3 Compaction Requirements .....	5
4.2.4 Utility Trench Backfill .....	6
4.2.5 Grading and Drainage .....	6
4.2.6 Earthwork Construction Considerations.....	6
4.3 Foundations .....	7
4.3.1 Foundation Design Recommendations.....	7
4.3.2 Foundation Construction Considerations.....	8
4.4 Floor Slabs.....	9
4.4.1 Floor Slab Design Recommendations .....	9
4.4.2 Floor Slab Construction Considerations .....	9
<b>5.0 GENERAL COMMENTS .....</b>	<b>10</b>

### APPENDIX A – FIELD EXPLORATION

Exhibit A-1	Site Location Map
Exhibit A-2	Boring Location Plan
Exhibit A-3	Boring Logs
Exhibit A-4	Field Exploration Description

### APPENDIX B – SUPPORTING INFORMATION

Exhibit B-1	Laboratory Testing
-------------	--------------------

### APPENDIX C – SUPPORTING DOCUMENTS

Exhibit C-1	General Notes
Exhibit C-2	Unified Soil Classification System

## Geotechnical Engineering Report

Proposed NDANG Readiness Center ■ Valley City, North Dakota

June 8, 2012 ■ MTL/Terracon Project No. M1125030



## EXECUTIVE SUMMARY

Geotechnical engineering services have been completed for the proposed North Dakota Army National Guard Readiness Center in Valley City, North Dakota. As requested, eleven (11) soil test borings were advanced to depths of 18 to 26 feet below the existing ground surface.

Based on the information obtained from our subsurface exploration, the site can be developed for the proposed project. The following geotechnical considerations were identified:

- The test borings encountered variable amounts of uncontrolled fill on this site which was previously used as a sand and gravel borrow site. It is sometimes difficult to distinguish between uncontrolled fill and the natural soils, due to the their similar nature. Fill depths of up to 12 feet below existing grade were estimated at our boring locations. We recommend all existing uncontrolled fill be excavated from below the proposed building footprint and replaced with a well compacted engineered fill.
- We recommend a number of test pits be excavated around each building perimeter prior to final design to provide a better indication regarding the amount of uncontrolled fill at the actual building sites.
- The proposed buildings may be supported on shallow spread foundations bearing on natural, undisturbed soils or upon a well compacted engineered fill after the removal of the existing fill and topsoil.
- Assuming proper site preparation and any needed repair, total and differential settlement should be within acceptable levels.
- We estimate the groundwater level at the site was located at least 15 to 20 feet below the existing ground surface at the time of our field activities. We do not expect the groundwater level to be a notable concern for the proposed construction.
- Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that the Terracon be retained to monitor this portion of the work.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

**GEOTECHNICAL ENGINEERING REPORT**  
**PROPOSED NDANG READINESS CENTER**  
**VALLEY CITY, NORTH DAKOTA**  
MTL/Terracon Project No. M1125030  
June 8, 2012

## **1.0 INTRODUCTION**

Geotechnical engineering services have been completed for the proposed North Dakota Army National Guard Readiness Center in Valley City, North Dakota. As requested, eleven (11) soil test borings (B-11 to B-21) were advanced to depths ranging from 18 to 26 feet below the existing ground surface. In 2011, ten (10) preliminary borings (B-1 to B-10) were performed at this site. Logs of the borings along with a site location map and a boring location plan are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- earthwork
- foundation design and construction
- slab design and construction

## **2.0 PROJECT INFORMATION**

### **2.1 Project Description**

Item	Description
Site layout	See Appendix A, Exhibit A-2: Boring Location Plan
Structures	Readiness Center Two story building with a floor slab on grade. Finished floor elevation 1335 feet. Overall dimensions 200'x290'.  Field Maintenance Shop (FMS) Two story building with a floor slab on grade. Finished floor elevation 1330 feet. Overall dimensions 122'x225'.

Item	Description
<b>Structures</b>	Unit Equipment Vehicle Storage (UEVS) Two stories with a floor slab on grade. Finished floor elevation 1335 feet. Overall dimensions 52'x196'.
<b>Maximum loads</b>	Columns: 100 kips (assumed) Walls: 6 kips per lineal foot (assumed) Slabs: 150 psf (assumed)
<b>Maximum allowable settlement</b>	Columns: 1 inch total Walls: ¾ inch differential over 40 feet
<b>Grading</b>	Cut and fill as needed to obtain the desired floor elevation. In some areas, existing stockpiles of granular material will need to be removed to allow for the new construction.
<b>Below grade areas</b>	None

## 2.2 Site Location and Description

Item	Description
<b>Location</b>	See Appendix A, Exhibit A-1: Site Location Plan 10 preliminary geotechnical borings were performed on this site by Midwest Testing Laboratory in 2011 (Project Number M1115040).
<b>Existing improvements</b>	The site is currently used as a gravel pit and includes large stockpiles of aggregate materials. Based upon recent and previous test borings, it appears some of the mined areas may have been backfilled with less desirable material such as clayey sand and sandy lean clay.
<b>Current ground cover</b>	Occasional grass and vegetation
<b>Existing topography</b>	The site elevation varies significantly down to approximate elevation 1290 along the west edge of the property with some stockpiles on the site above elevation 1365. Please refer to Exhibit A-2 regarding existing topography.

## 3.0 SUBSURFACE CONDITIONS

### 3.1 Typical Profile

In 2011, ten test borings were performed across this property to obtain preliminary information regarding soil conditions for future construction of a possible readiness center. These



## Geotechnical Engineering Report

Proposed NDANG Readiness Center ■ Valley City, North Dakota

June 8, 2012 ■ MTL/Terracon Project No. M1125030



preliminary test borings were identified as B-1 through B-10. Please refer to the 2011 report (M1115040) dated August 23, 2011 for information regarding the ten preliminary borings performed at this site.

Midwest Testing Laboratory has recently completed eleven (11) additional borings on this property at the locations indicated in Exhibit A-2. These 11 new boring locations were performed as directed by your project architect and are identified as borings B-11 through B-21. The soil conditions at the property are somewhat variable and consist mostly of various types of sand deposits. The soil deposits included: sand, sand with silt, silty sand, clayey sand, sandy silt, lean clay with sand, sandy lean clay and fat clay. Most of the soils in the upper 20 feet consisted of various types of sand deposits which are in a loose to very dense condition. These soils are mostly brown to grayish brown in color with the majority of the sand deposits having a fine texture. The soils were also noted to contain occasional cobbles which resulted in obstruction of the split spoon sampler at a number of boring locations and depths. We would expect these soils also include occasional boulders. A boulder at boring B-11 prevented advancement of the hollow stem auger below 18 feet. Shale consisting of a light gray fat clay was encountered below depths of 18 to 24 feet at borings B-12, B-19 and B-20.

Conditions at each boring location are indicated on the attached individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in situ, the transition between materials may be gradual. Details for each of the borings can be found on the boring logs in Appendix A of this report. A discussion of the field sampling is included in Appendix A.

### 3.2 Groundwater

The boreholes were observed while drilling and after completion for the presence and level of groundwater. In addition, attempts were made to measure the groundwater level after the borings were completed. The water levels observed in the boreholes are noted on the attached boring logs, and are summarized below:

Boring Number	Depth to groundwater while drilling, (ft.)	Depth to groundwater after drilling, (ft.)
B-13	24.1	Dry cave-in at 11.8' (22 hrs)
B-14	24.1	Dry cave-in at 13.1' (19 hrs)
B-21	23.8	Dry cave-in at 8.7' (14 hrs)

Groundwater was not measurable in the remaining borings while drilling, or for the short duration that the borings were allowed to remain open. However, this does not necessarily mean these borings terminated above groundwater, or that the water levels summarized above



are stable groundwater levels. Due to the fairly high permeability characteristics of the natural granular soils, fairly accurate water level measurements can be obtained with relatively short periods of observation time. Based upon the waterbearing condition of some of the deeper samples of sand collected from the site, we estimate the water level at our boring locations was typically located below depths of 15 to 20 feet at the time of our field activities. A longer period of time may be needed for the groundwater level to develop and stabilize in a borehole in these materials. Long-term observations and piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels and materials of this type.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

## **4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION**

### **4.1 Geotechnical Considerations**

Based on the results of the subsurface exploration, laboratory testing, and our analyses, it is our opinion that the three proposed buildings can be supported on shallow spread foundations bearing on natural, inorganic soils or on a well compacted engineered fill after removal of uncontrolled fill.

The depth of uncontrolled fill across the site is quite variable with anticipated depths of up to 12 feet estimated at borings B-16 and B-19. It is difficult to distinguish uncontrolled fill from the natural soils at this site due to their similarity. Based on the presence of PVC and other debris occasionally encountered during sampling, it appears that some of the less desirable soils encountered at the gravel pit may have been buried in areas where previous gravel was removed. Some concrete rubble was noted at boring B-16. Therefore, when the actual building locations have been finalized, we recommend performing test pits just outside each proposed building footprint to obtain improved information regarding the amounts of uncontrolled fill which would need to be removed from below the proposed buildings.

### **4.2 Earthwork**

#### **4.2.1 Site Preparation**

Prior to placing engineered fill, we recommend the uncontrolled fill be excavated from the proposed building footprints, along with an appropriate excavation oversize. Based on the soil

## Geotechnical Engineering Report

Proposed NDANG Readiness Center ■ Valley City, North Dakota

June 8, 2012 ■ MTL/Terracon Project No. M1125030



conditions encountered at our boring locations, excavation depths could be quite variable with uncontrolled fill noted as deep as 12 feet below grade at boring B-16 and B-19. Some concrete debris was noted at boring B-16 and could cause some excavating difficulties.

We recommend that MTL/Terracon be retained to evaluate the bearing material for the foundations, floor slab and pavement subgrade soils to evaluate whether additional subgrade excavation is required. Subsurface conditions, as identified by the field and laboratory testing programs, have been reviewed and evaluated with respect to the proposed building plans known to us at this time.

### 4.2.2 Material Requirements

Compacted structural fill should meet the following material property requirements:

Fill Type <sup>1</sup>	USCS Classification	Acceptable Location for Placement
Select Granular Fill	SP, SP-SM, SP-SC, SW, SW-SM, SW-SC (P <sub>200</sub> <12%)	Support of foundations and floor slabs
Inorganic on-site soils	CL, SM, SC, SP, SP-SM	Exterior Foundation backfill

1. Controlled, compacted fill should consist of approved materials that are free of organic matter, debris, or other deleterious substance. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.

### 4.2.3 Compaction Requirements

ITEM	DESCRIPTION
Fill lift thickness	9-inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack, plate compactor, etc.) is used
Compaction requirements <sup>1</sup>	95% beneath foundations and floor slabs 90% for exterior foundation backfill
Moisture content granular material <sup>2</sup>	Workable moisture levels
Moisture Content Clayey Material Below Grassed Areas	-3 to +3% of Standard Proctor optimum moisture

- 
1. We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved. Compaction levels are relative to the soil's standard Proctor maximum dry density (ASTM D698).
  2. Specifically, moisture levels should be maintained low enough to allow for satisfactory compaction to be achieved without the cohesionless fill material pumping when proofrolled.
- 

#### **4.2.4 Utility Trench Backfill**

Excavations should be performed in accordance with governing safety regulations. All vehicles and soil piles should be kept back from the crest of excavation slopes. The stability of excavation slopes should be reviewed continuously by qualified personnel. The responsibility for excavation safety and temporary construction slopes lies solely with the contractor. Trenches that remain open for an extended period of time should be protected by changes in moisture by covering with plastic sheeting or another suitable method.

#### **4.2.5 Grading and Drainage**

Final surrounding grades should be sloped away from the structure on all sides to prevent ponding of water. Gutters and downspouts that drain water a minimum of 10 feet beyond the footprint of the proposed structures are recommended. This can be accomplished through the use of splash-blocks, downspout extensions, and flexible pipes that are designed to attach to the end of the downspout. Flexible pipe should only be used if it is daylighted in such a manner that it gravity-drains collected water. Splash-blocks should also be considered below hose bibs and water spigots.

#### **4.2.6 Earthwork Construction Considerations**

We recommend performing a number of test pits around the perimeter of the proposed building locations to provide a better indication regarding the amount of uncontrolled fill and debris to be expected at the time of construction. During construction, a geotechnical engineer should be retained to observe the footing and floor areas to determine the proper amount of excavating was performed to remove uncontrolled fill.

We estimate a groundwater level on the order of 15 to 25 feet below existing grade at the time of our field activities. We do not expect the groundwater level will be a notable concern for the proposed construction.

The natural granular soils are susceptible to disturbance during construction. Any natural soils which become disturbed beneath footing and floor areas should be surface compacted prior to the placement of additional fill and concrete.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and pavements. The site should also be graded to

## Geotechnical Engineering Report

Proposed NDANG Readiness Center ■ Valley City, North Dakota

June 8, 2012 ■ MTL/Terracon Project No. M1125030



prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompact prior to floor slab and pavement construction. Fill should not be placed on frozen subgrades.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Safety and Health Administration (OSHA) regulations to provide stability and safe working conditions. Temporary excavations will probably be required during grading operations. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

MTL/Terracon should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; proofrolling; placement and compaction of structural fill; backfilling of excavations into the completed subgrade; and just prior to construction of building floor slabs.

### 4.3 Foundations

In our opinion, the proposed buildings can be supported on shallow spread foundations bearing on natural undisturbed soils or on a well compacted engineered fill after proper site preparation. Design recommendations for shallow foundations for the proposed structures are presented in the following sections.

#### 4.3.1 Foundation Design Recommendations

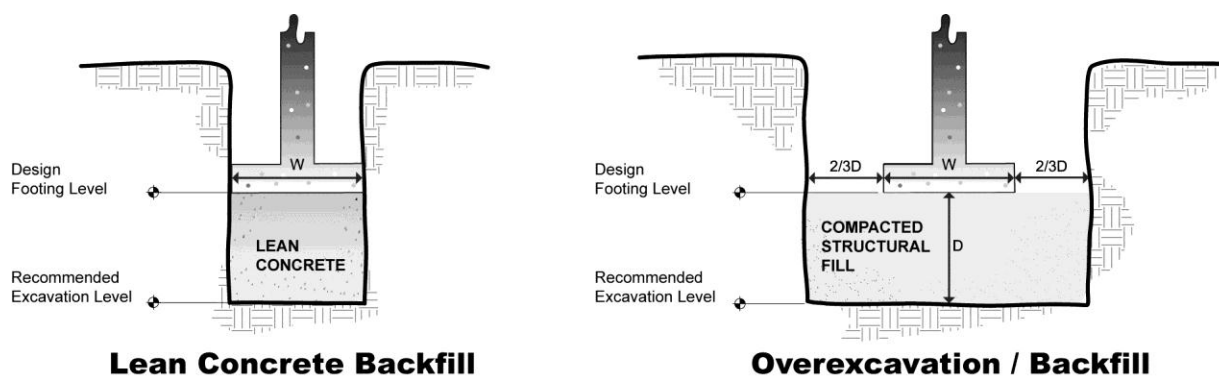
Description	Column	Wall
<b>Net allowable bearing pressure<sup>1</sup></b>		
■ <b>Compacted structural fill or native soil</b>	2000 psf	2000 psf
<b>Minimum dimensions</b>	30 inches	18 inches
<b>Minimum embedment below finished grade for frost protection<sup>2</sup></b>	60 inches	60 inches
<b>Approximate total settlement from foundation loads<sup>3</sup></b>	< 1 inch	<1 inch
<b>Estimated differential settlement from foundation loads<sup>3</sup></b>	< ½ inch between columns	< ¾ inches over 40 feet

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Assumes any unsuitable existing fill or soft soils, if encountered, will be undercut and replaced with compacted structural fill. Based upon a minimum Factor of Safety of 3.
2. For perimeter footings beneath continuously heated areas. Interior footings should have a minimum of 18 inches of embedment.
3. The above settlement estimates from foundation loads have assumed that the maximum footing size is 10 feet for column footings and 3 feet for continuous footings.

#### 4.3.2 Foundation Construction Considerations

The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed or saturated, or frozen, the affected soil should be evaluated by a geotechnical engineer prior to placing concrete. It is recommended that MTL/Terracon be retained to observe and test the soil foundation bearing materials.

If unsuitable bearing soils are encountered in footing excavations, the excavation could be extended deeper to suitable soils and the footing could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. As an alternative, the footings could also bear on properly compacted structural backfill extending down to the suitable soils. Over excavation for compacted structural fill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of over excavation depth below footing base elevation. The over excavation should then be backfilled up to the footing base elevation with well graded granular material placed in lifts of 9 inches or less in loose thickness (6 inches or less if using hand-guided compaction equipment) and compacted to at least 95 percent of the material's standard effort maximum dry density (ASTM D 698). The over excavation and backfill procedure is described in the following figure.



NOTE: Excavations in sketches shown vertical for convenience. Excavations should be sloped as necessary for safety.

## 4.4 Floor Slabs

In our opinion, the proposed floor slabs can be supported on engineered fill after removal of existing uncontrolled fill or upon the natural soils. Design recommendations for floor slabs for the proposed structures are presented in the following sections.

### 4.4.1 Floor Slab Design Recommendations

ITEM	DESCRIPTION
<b>Floor slab support<sup>1</sup></b>	Engineered fill after removal of the existing fill
<b>Modulus of subgrade reaction</b>	150 pounds per square inch per in (psi/in) for point loading conditions
<b>Aggregate base course/capillary break<sup>2</sup></b>	6 inches of free draining granular material

1. Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. The floor slab design should include a capillary break, comprised of free-draining, compacted, granular material, at least 6 inches thick and can be considered as part of the low volume change zone. Free-draining granular material should have less than 5 percent fines (material passing the #200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

### 4.4.2 Floor Slab Construction Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, freezing weather, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of concrete and corrective action will be required. Prepared interior subgrades should be protected from freezing temperatures.

Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill. All floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of concrete.

## **5.0 GENERAL COMMENTS**

MTL/Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. MTL/Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless MTL/Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

## **APPENDIX A**

### **FIELD EXPLORATION**

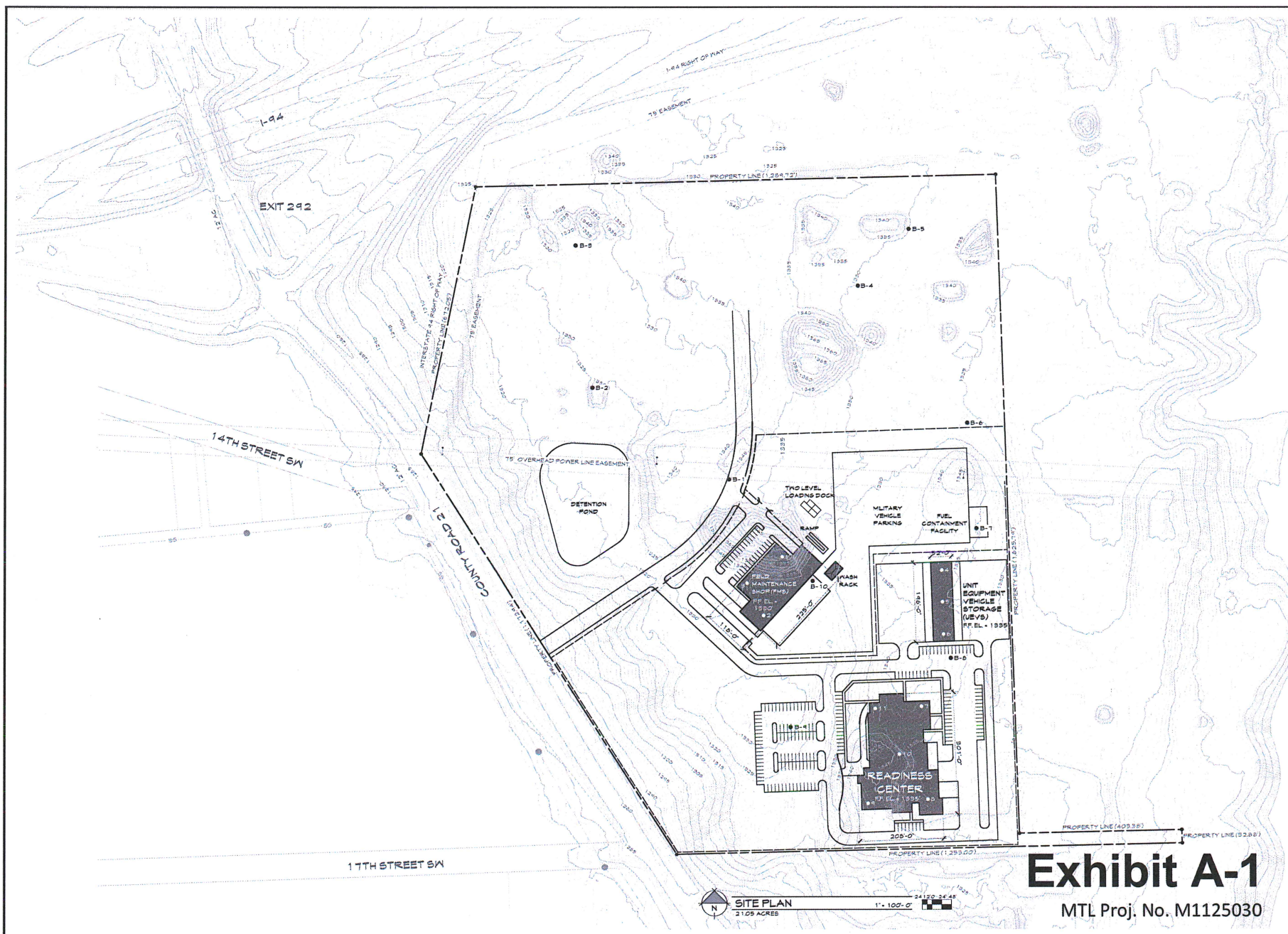


**PROPOSED NORTH DAKOTA ARMY NATIONAL GUARD  
READINESS CENTER  
VALLEY CITY, NORTH DAKOTA**

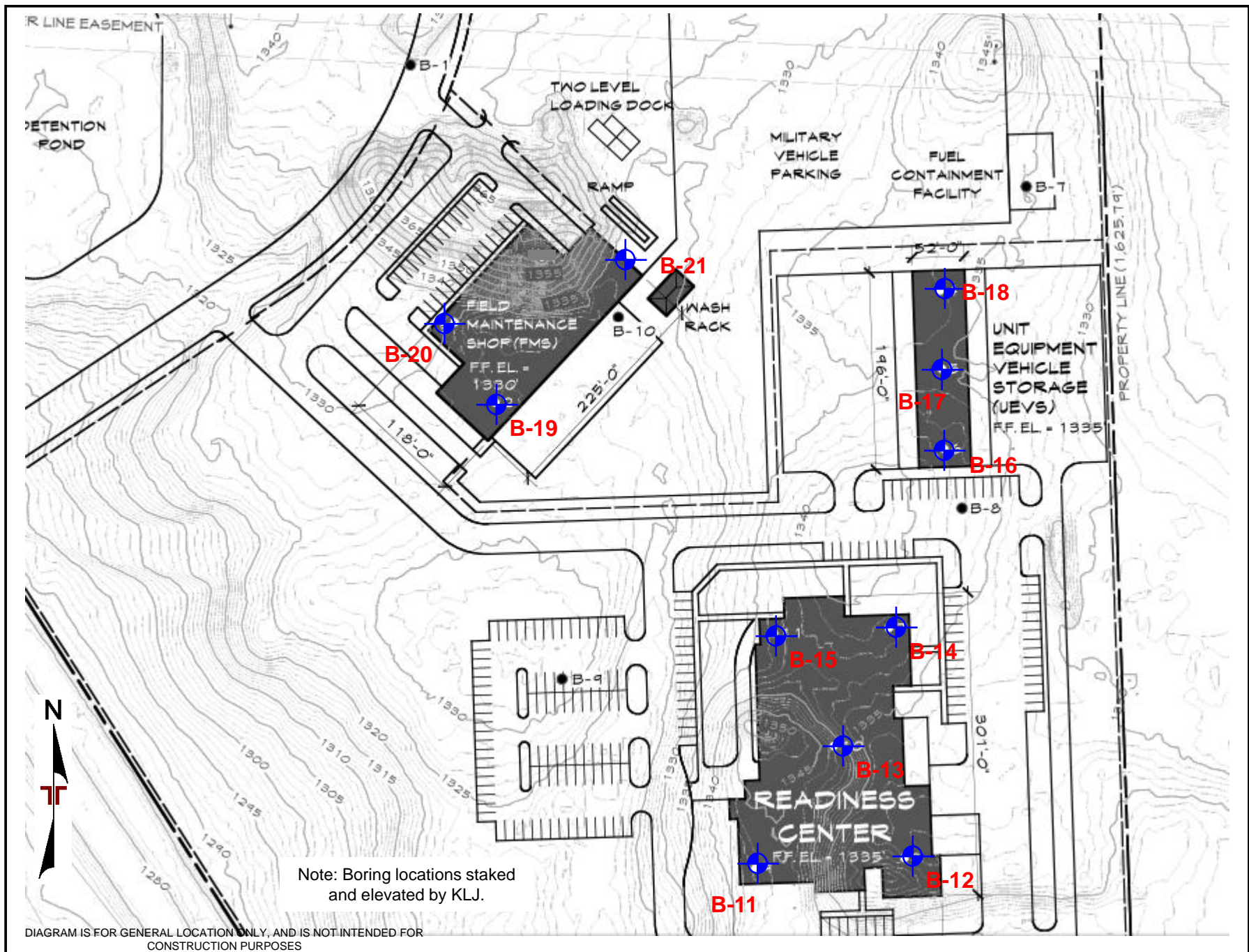
• SITE INVESTIGATION

Project No.	1214
Drawn By	FMH
Checked By	BDD
Date	5-16-12

Sheet No. **SCHEME**  
**5**







Project Manager:	LMF
Drawn by:	bkj
Checked by:	LMF
Approved by:	LMF
Project No.	M1125030
Scale:	See above
Date:	6-7-2012

**Midwest Testing**  
LABORATORY, INC.  
A Terracon COMPANY

4102 7th Avenue North Fargo, North Dakota 58102  
PH. (701) 282-9633 FAX. (701) 282-9635

**BORING LOCATION MAP**  
Proposed NDANG Readiness Center  
County Road 21 Site  
Valley City, North Dakota

EXHIBIT  
**A-2**

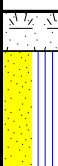


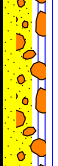

# BORING LOG NO. B-11

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION    See Exhibit A-2		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Approximate Surface Elev.: 1343.14 ELEVATION									LL-PL-PI
DEPTH										
	1.0	<b>TOPSOIL, SILTY SAND WITH ORGANIC FINES (SM)</b> , very dark brown, moist	1342			X 0.6	12-10-17 N=27			
		<b>SAND WITH SILT (SP-SM)</b> , trace gravel, brown, medium dense, fine, moist								
	4.0		1339			X 1.3	7-4-9 N=13			
		<b>SAND (SP)</b> , trace gravel, brown, medium dense, fine, moist								
	7.0		1336			X 1.3	4-3-7 N=10	3		
		<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , with cobbles, dark brown, fine to medium, moist				X 0.4				
	9.0		1334							
		<b>SAND WITH SILT (SP-SM)</b> , trace gravel, light brown, medium dense, fine, moist				X 1.5	8-8-14 N=22			
	12.0		1331			X 1.3	14-17-35 N=52			
		<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , trace gravel, brown and dark brown, very dense, fine to medium, moist				X 0.5				
	18.0		1325							
<b>Boring Terminated at 18 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-19 1/2'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

4.5 Ft.:See attached mechanical analysis.  
7 Ft.:No N-Value due to sampler refusal on cobble.  
14.5 Ft.:24 blow for 6" set then refusal on cobble at 15 ft.

## WATER LEVEL OBSERVATIONS

Not measurable before HSA removal.

Reversed auger upon completion.



Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12

## Page 1 of 1

**CLIENT: Valley City-Barnes County Development Corp.  
Valley City, North Dakota**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH	Approximate Surface Elev.: 1329.86 ELEVATION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
											LL-PL-PI
						X	1.1	4-5-10 N=15			
					X	1	7-5-6 N=11	10			
					X	1.3	5-3-3 N=6	19			
		7.0		1323							
					X	1.3	13-14-18 N=32	9			
		9.0		1321							
					X	1.5	18-14-14 N=28	2			
						X	1.5	12-13-17 N=30	4		
					X	1.5	11-13-17 N=30	9			
					X	1.3	13-20-26 N=46				
		24.0		1306							
					X	1.3	31-43-47 N=90				
26.0	1304										
<b>Boring Terminated at 26 Feet</b>											

Hammer Type: Mobile Downhole

Exhibit A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12





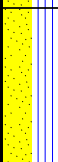
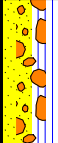
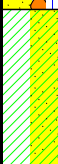
# BORING LOG NO. B-13

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION See Exhibit A-2		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
										LL-PL-PI
	Approximate Surface Elev.: 1335.22 ELEVATION									
	DEPTH									
	<b>FILL - SILTY SAND</b> , trace gravel, brown, fine, moist					1.3	3-3-4 N=7			
	2.0	1333								
	<b>TOPSOIL, SILTY SAND WITH ORGANIC FINES (SM)</b> , very dark brown, moist					1.3	7-6-5 N=11			
	3.0	1332								
	<b>SAND WITH GRAVEL (SP)</b> , brown, medium dense, fine to medium, moist									
	6.0	1329	5			1.1	6-7-13 N=20			
	<b>SAND WITH SILT (SP-SM)</b> , trace gravel, grayish-brown, medium dense to very dense, fine to medium, moist					1.3	6-5-5 N=10			
			10			1	6-12 N=			
						0	18-32-39 N=71			
	14.0	1321								
	<b>SAND WITH SILT (SP-SM)</b> , trace gravel, light brown, medium dense, fine, moist					1.3	9-14-12 N=26			
			15							
	18.0	1317								
	<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , dark brown, medium dense, fine to medium, moist									
			20			1	9-10-17 N=27			
	22.0	1313								
	<b>LEAN CLAY WITH SAND (CL)</b> , trace gravel, grayish-brown, stiff, with layers of waterbearing sand									
			25			1.5	4-5-6 N=11			
	26.0	1309								
<b>Boring Terminated at 26 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole


Advancement Method:  
3 1/4" HSA 0-24 1/2'

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
10 Ft.:Sampler refusal on cobble @ 10.5 ft  
12 Ft.:N-Value influenced by rock in sampler tip.

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

 24.1' initially observed before HSA removal.  
Dry cave-in at 12.7' (0 hrs).  
Dry cave-in at 11.8' (22 hrs).

  
4102 7th Ave., North  
Fargo, North Dakota

Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12













# BORING LOG NO. B-14

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION See Exhibit A-2		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Approximate Surface Elev.: 1336.04 ELEVATION									LL-PL-PI
DEPTH										
	<b><u>SAND WITH SILT (SP-SM)</u></b> , trace gravel, brown, medium dense, fine, moist				X	1.1	5-7-8 N=15			
	2.0		1334							
	<b><u>SAND WITH SILT AND GRAVEL (SP-SM)</u></b> , brown, loose, fine to medium, moist				X	1.3	6-3-4 N=7			
	<b><u>SAND WITH SILT (SP-SM)</u></b> , trace gravel, grayish-brown, medium dense, fine, moist		5		X	1.1	2-2-3 N=5			
	7.0		1329							
	<b><u>SAND WITH SILT (SP-SM)</u></b> , trace gravel, grayish-brown, medium dense, fine, moist				X	1.3	10-9-8 N=17	12		
	9.0		1327							
	<b><u>SILTY SAND WITH GRAVEL (SM)</u></b> , brown, loose to medium dense, fine to medium, moist				X	0.8	11-5-4 N=9			
	<b><u>SAND WITH SILT AND GRAVEL (SP-SM)</u></b> , brown, loose to medium dense, fine to medium, moist		10		X	1.3	8-10-11 N=21			
	<b><u>SAND (SP)</u></b> , trace gravel, brown, dense, fine, moist				X	1.3	17-21-26 N=47			
	14.0		1322							
	<b><u>SAND (SP)</u></b> , trace gravel, brown, dense, fine, moist		15							
	<b><u>SAND (SP)</u></b> , trace gravel, brown, dense, fine, moist									
	<b><u>SAND (SP)</u></b> , trace gravel, brown, dense, fine, moist		20		X	1.5	22-23-28 N=51			
	23.0		1313							
	<b><u>SAND WITH SILT AND GRAVEL (SP-SM)</u></b> , dark brown, dense, medium to fine, waterbearing				▽					
	<b><u>SAND WITH SILT AND GRAVEL (SP-SM)</u></b> , dark brown, dense, medium to fine, waterbearing		25		X	1.5	11-15-23 N=38			
	26.0		1310							
<b><i>Boring Terminated at 26 Feet</i></b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

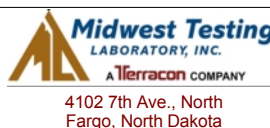
See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
4.5 Ft.:See attached mechanical analysis.

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

24.1' initially observed before HSA removal.  
Dry cave-in at 15.6' (0 hrs).  
Dry cave-in at 13.1' (19 hrs).



Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12








# BORING LOG NO. B-15

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION See Exhibit A-2		DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Approximate Surface Elev.: 1338.56 ELEVATION									LL-PL-PI
DEPTH										
	1.0	<b>SILTY SAND (SM)</b> , trace gravel, grayish-brown, fine, dry (may be fill)	1337.5		X	1.3	7-10-11 N=21			
		<b>CLAYEY SAND (SC)</b> , trace gravel, dark brown, dense, moist (may be fill)			X	0.8	9-16-21 N=37			
					X	0.3	20 N=			
	7.0	<b>SILTY SAND (SM)</b> , trace gravel, brown, medium dense, fine, moist	1331.5		X	1.3	6-8-5 N=13	14		
	10.0	<b>SAND WITH SILT (SP-SM)</b> , trace gravel, light brown, medium dense, fine, moist	1328.5		X	1.5	8-7-7 N=14			
	12.0	<b>SILTY SAND (SM)</b> , trace gravel, grayish-brown, medium dense to very dense, fine, moist	1326.5		X	0.8	5-6-7 N=13			
					X	0.7	14-24-30 N=54			
	18.0	<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , brown, very dense, fine to medium, moist	1320.5		X	0.8	20-24-29 N=53			
	22.0	<b>CLAYEY SAND WITH GRAVEL (SC)</b> , dark reddish brown, very dense, moist	1316.5		X	1.3	24-30-41 N=71			
	26.0	<b>Boring Terminated at 26 Feet</b>								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

See Exhibit A-14 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data, (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

4.5 Ft.:No N-Value due to sampler refusal on cobble.  
7 Ft.:See attached mechanical analysis.

Abandonment Method:

Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

Not measurable before HSA removal.

Reversed auger upon completion.



4102 7th Ave., North  
Fargo, North Dakota

Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12

# BORING LOG NO. B-16

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	See Exhibit A-2								LL-PL-PI
	Approximate Surface Elev.: 1337.57 ELEVATION								
	DEPTH								
	<b>FILL - SILTY SAND</b> , trace gravel, dark brown, fine, moist			X	0	7-9-10 N=19			
	4.0 1333.5								
	<b>FILL - SANDY LEAN CLAY</b> , dark brownish-gray, with pieces of asphalt								
		5		X	1.1	17-7-10 N=17			
	7.0 1330.5								
	<b>FILL</b> , MOSTLY CONCRETE DEBRIS			X	0.1	10-17-20 N=37			
	10.0 1327.5	10		X	0.5	17-26-47 N=73			
	<b>FILL - MIXTURE OF SANDLY LEAN CLAY AND SAND</b> , trace gravel, brown and dark brown								
	12.0 1325.5								
	<b>CLAYEY SAND WITH GRAVEL (SC)</b> , gray and reddish brown, very dense, moist			X	1.3	18-25-33 N=58	16		
	14.0 1323.5								
	<b>SAND WITH GRAVEL (SP)</b> , brown, dense, medium to fine, moist			X	1.3	12-18-17 N=35	4		
		15							
	19.0 1318.5								
	<b>CLAYEY SAND (SC)</b> , trace gravel, brownish-gray, dense, moist, with lenses of sand			X	1.3	20-24-23 N=47	20		
	24.0 1313.5	20							
	<b>SAND WITH SILT (SP-SM)</b> , trace gravel, brown, dense, fine, waterbearing			X	1.3	15-20-16 N=36			
	26.0 1311.5	25							
	<b>Boring Terminated at 26 Feet</b>								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

*Not measurable before HSA removal.*  
*Reversed auger upon completion.*



Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12



# BORING LOG NO. B-17


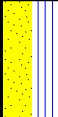
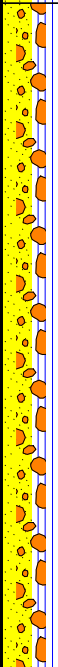


Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12

GRAPHIC LOG	LOCATION    See Exhibit A-2	DEPTH	Approximate Surface Elev.: 1535.11 ELEVATION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
											LL-PL-PI
	<b>FILL - SANDY LEAN CLAY</b> , trace gravel, dark brown, (may be natural)	4.0	1531			X	1.3	7-10-13 N=23			
							1.3	6-7-11 N=18			
	<b>SAND WITH SILT (SP-SM)</b> , brown, medium dense, fine, moist, occasional cobbles	7.0	1528	5		X	1	7-9 N=	10		
	<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , brown, very dense to dense to very dense, medium to fine, moist, a few lenses and layers of brown SANDY LEAN CLAY and CLAYEY SAND, some occasional cobbles			10		X	1.3	16-27-34 N=61	10		
							1.3	17-22-27 N=49	11		
	<b>SANDY LEAN CLAY WITH GRAVEL (CL)</b> , dark brown, hard	24.0	1511			X	1.3	20-27-36 N=63			
		26.0	1509	25		X	1	25-30-41 N=71			
<b>Boring Terminated at 26 Feet</b>											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

4.5 Ft.:No N-Value due to sampler refusal on cobble.  
9.5 Ft.:See attached mechanical analysis.  
12 Ft.:No N-Value due to sampler refusal on cobble.

## WATER LEVEL OBSERVATIONS

Not measurable before HSA removal.

Dry cave-in at 14.1' (0 hrs).

Dry cave-in at 9.2' (16 hrs).



Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-9


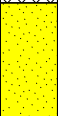
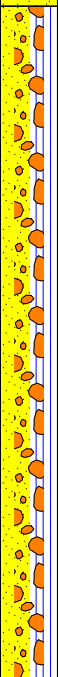
# BORING LOG NO. B-18

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH	Approximate Surface Elev.: 1336.09 ELEVATION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	<b>FILL - SANDY LEAN CLAY</b> , trace gravel, dark brown, occasional cobbles (may be natural)	6.0	1330	5		X	1.3	9-12-16 N=28			
							0.6	20 N=			
	<b>SAND (SP)</b> , trace gravel, light brown, medium dense, fine, moist	9.0	1327	10		X	1.3	9-10-9 N=19			
							1.5	9-10-15 N=25			
	<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , grayish-brown, medium dense to dense, fine to medium, moist, occasional cobbles and/or boulders	26.0	1310	25		X	1.5	20-15-11 N=26			
							1.5	8-16-18 N=34			
	<b>Boring Terminated at 26 Feet</b>			15		X	1.5	16-21-28 N=49			
							1.3	15-18-26 N=44			
						X	0	5 N=			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:

2 Ft.:No N-Value due to sampler refusal on cobble.  
24.5 Ft.:No N-Value due to sampler refusal on cobble.

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

*Not measurable before HSA removal.*  
*Reversed auger upon completion.*



Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12

# BORING LOG NO. B-19

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH	Approximate Surface Elev.: 1327.92 ELEVATION	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	<b>FILL - SILTY SAND, SILT AND CLAYEY SAND</b> , trace gravel, mostly brown, moist (may be natural)	12.0	1316	5		X	1.3	3-4-4 N=8			
	<b>SAND (SP)</b> , trace gravel, brown, very dense, fine to medium, moist	14.0	1314	15		X	1	20-26-31 N=57	9		
	<b>SAND WITH GRAVEL (SP)</b> , brown, dense, medium to fine, waterbearing, occasional cobbles										
		18.0	1310	20		X	0.8				
	<b>SHALE, TEXTURAL CLASSIFICATION, FAT CLAY (CH)</b> , light gray, hard										
		26.0	1302	25		X	0.6				
	<b>Boring Terminated at 26 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

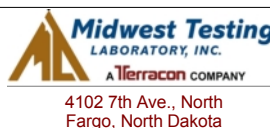
See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
14.5 Ft.:No N-Value due to obstruction.  
19.5 Ft.:N= 100/10 inches  
24.5 Ft.:N= 100/8 inches

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

*Not measurable before HSA removal.*  
*Reversed auger upon completion.*



Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12


# BORING LOG NO. B-20

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION	See Exhibit A-2	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Approximate Surface Elev.: 1329.92 ELEVATION									LL-PL-PI
DEPTH										
	<b><u>FILL - LEAN CLAY AND SANDY LEAN CLAY</u></b> , trace gravel, dark brown					0.8	4-6-7 N=13			
						0.2	3-2-2 N=4			
						0.2	3-2-2 N=4			
6.5			5							
	<b><u>SILTY SAND WITH GRAVEL (SM)</u></b> , brown, dense, fine to medium, moist					1.1	12-16-19 N=35			
9.0										
	<b><u>SANDY LEAN CLAY WITH GRAVEL (CL)</u></b> , brown, hard, some lenses of sand, occasional cobbles		10			1	14-15-19 N=34			
						1.3	15-23-29 N=52			
14.0										
	<b><u>SILTY SAND (SM)</u></b> , trace gravel, brown, dense, fine to medium, moist		15			1.1	15-20-24 N=44			
18.0										
	<b><u>SHALE, TEXTURAL CLASSIFICATION, FAT CLAY (CH)</u></b> , light gray, hard		20			1.3	22-28-50 N=78			
			25			0.8				
26.0										
<b>Boring Terminated at 26 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
25 Ft.:N-Value = 100/11 inches

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

*Not measurable before HSA removal.*  
*Reversed auger upon completion.*



Boring Started: 5/23/2012

Boring Completed: 5/23/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12

# BORING LOG NO. B-21

Page 1 of 1

**PROJECT:** Proposed NDANG Readiness Center

**CLIENT:** Valley City-Barnes County Development Corp.  
Valley City, North Dakota

**SITE:** C.R. 21 Site  
Valley City, North Dakota

GRAPHIC LOG	LOCATION	See Exhibit A-2	DEPTH (ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (ft)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Approximate Surface Elev.: 1330.87 ELEVATION									LL-PL-PI
DEPTH										
	<b>FILL - CLAYEY SAND AND SANDY LEAN CLAY WITH GRAVEL</b> , brown and dark brown, occasional cobbles (may be natural)		5		X	1.3	13-10-12 N=22			
						1.3	12-16-19 N=35			
	5.0	1326			X	1.3	9-10-16 N=26	7		
	<b>SILTY SAND (SM)</b> , trace gravel, grayish-brown, medium dense, fine to medium, moist									
	7.0	1324			X	1.5	9-13-12 N=25	9		
	<b>SAND WITH SILT (SP-SM)</b> , trace gravel, grayish-brown, medium dense, fine, moist									
	9.0	1322	10		X	1.3	12-15-14 N=29	17		
	<b>SILTY SAND WITH GRAVEL (SM)</b> , brown to grayish brown, medium dense to dense, fine to medium, moist, occasional cobbles									
	14.0	1317	15		X	1.3	13-20-27 N=47	15		
	<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , brown, very dense, fine to medium, moist, occasional cobbles									
	19.0	1312	20		X	1.3	14-25-31 N=56	5		
	<b>SILTY SAND WITH GRAVEL (SM)</b> , brown, dense, fine to medium, waterbearing									
	24.0	1307	25		▽					
	<b>SAND WITH SILT AND GRAVEL (SP-SM)</b> , gray, dense, fine, waterbearing					1.5	12-17-24 N=41			
<b>Boring Terminated at 26 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Mobile Downhole

Advancement Method:  
3 1/4" HSA 0-24 1/2'

See Exhibit A-14 for description of field procedures.  
See Appendix B for description of laboratory procedures and additional data, (if any).  
See Appendix C for explanation of symbols and abbreviations.

Notes:  
4.5 Ft.: See attached mechanical analysis.

Abandonment Method:  
Borings backfilled with soil cuttings upon completion.

## WATER LEVEL OBSERVATIONS

23.8' initially observed before HSA removal.  
Dry cave-in at 14.1' (0 hrs).  
Dry cave-in at 8.7' (14 hrs).

**Midwest Testing**  
LABORATORY, INC.  
A Terracon COMPANY  
4102 7th Ave., North  
Fargo, North Dakota

Boring Started: 5/22/2012

Boring Completed: 5/22/2012

Drill Rig: Mobile B-53

Driller: DW

Project No.: M1125030

Exhibit A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TERRACON SMART LOG-NO WELL BORING LOGS.GPJ TERRACON2012.GDT 6/7/12

## Geotechnical Engineering Report

Proposed NDANG Readiness Center ■ Valley City, North Dakota

June 8, 2012 ■ MTL/Terracon Project No. M1125030



### Field Exploration Description

Eleven (11) soil test borings were completed from May 22 to 23, 2012. The borings were advanced at the approximate locations staked by KLJ and as indicated on Exhibit A-2. The surface elevations indicated on the soil boring logs were also provided by KLJ.

The borings were drilled with a truck-mounted rotary drill rig using 3 ¼ hollow stem to advance the boreholes. Soil samples were obtained using both spilt-barrel and Shelby tube sampling procedures in accordance with ASTM Specifications D1586 and D1587, respectively.

In the split-barrel sampling procedure the number of blows required to advance a standard 2-inch O.D., 1-3/8-inch I.D spilt-barrel sampler from 6 to 18 inches of penetration by means of a 140-pound hammer with a free fall of 30 inches is used to obtain the Standard Penetration Test (SPT) or N-value. The SPT is used to estimate the in-situ relative density of cohesionless soils and the consistency of cohesive soils. A Mobile Drill downhole hammer was used to drive the split-barrel sampler. In the Shelby tube sampling procedure, a thin wall seamless steel tube with a sharp cutting edge is pushed into the soil by hydraulic pressure to obtain a relatively undisturbed sample of cohesive soil.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

A field log of each boring was prepared by the drill crew. These logs included visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

**APPENDIX B**  
**SUPPORTING INFORMATION**

## **Geotechnical Engineering Report**

Proposed NDANG Readiness Center ■ Valley City, North Dakota

June 8, 2012 ■ MTL/Terracon Project No. M1125030



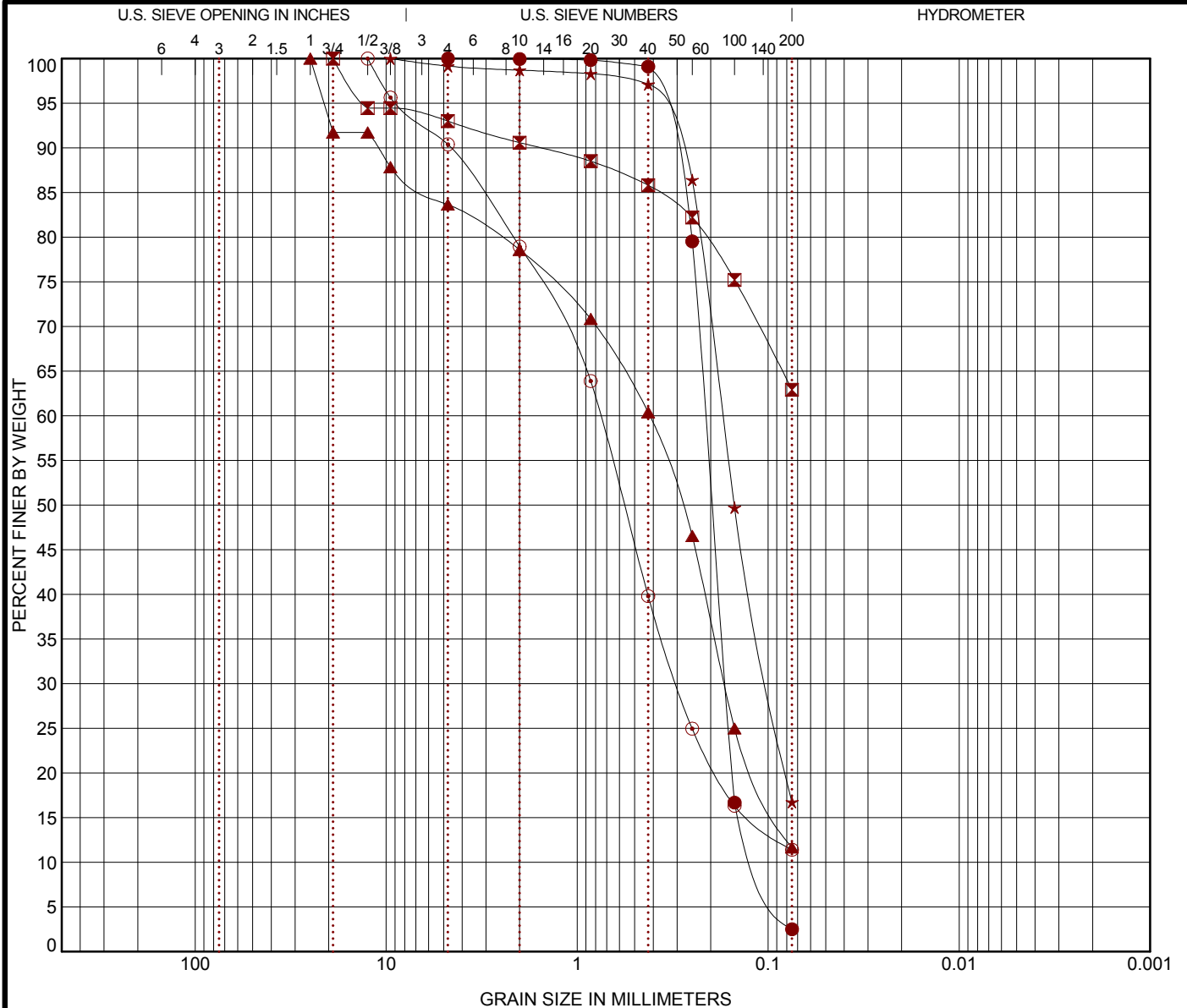
### **Laboratory Testing**

Representative samples were selected for laboratory analysis. The testing program consisted of determining moisture content and grain size distribution. The moisture content test results are found on the boring logs, opposite the samples they represent. The results of the grain size distribution testing are provided on the following pages.

Descriptive classifications of the soils indicated on the boring logs are in accordance with the enclosed General Notes and the Unified Soil Classification System. Also shown are estimated Unified Soil Classification Symbols. A brief description of this classification system is attached to this report. All classification was by visual manual procedures.



# GRAIN SIZE DISTRIBUTION ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			USCS Classification			LL	PL	PI	Cc	Cu
●	B-11	4.5	SAND (SP) - brown, fine						1.21	1.97
☒	B-12	4.5	SANDY SILT (ML)							
▲	B-14	4.5	SAND WITH SILT (SP-SM)						0.99	6.08
★	B-15	7.0	SILTY SAND (SM)							
⊙	B-17	9.5	SAND WITH SILT (SP-SM)						1.91	12.34
Specimen Identification			D <sub>100</sub>	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	%Gravel	%Sand	%Silt	%Clay
●	B-11	4.5	4.75	0.213	0.167	0.108	0.0	97.5	2.5	
☒	B-12	4.5	19				7.0	30.1	62.9	
▲	B-14	4.5	25	0.419	0.169		16.4	72.0	11.6	
★	B-15	7.0	9.5	0.173	0.099		0.8	82.4	16.7	
⊙	B-17	9.5	12.5	0.76	0.299		9.6	79.0	11.4	

PROJECT: Proposed NDANG Readiness  
Center  
SITE: C.R. 21 Site  
Valley City, North Dakota

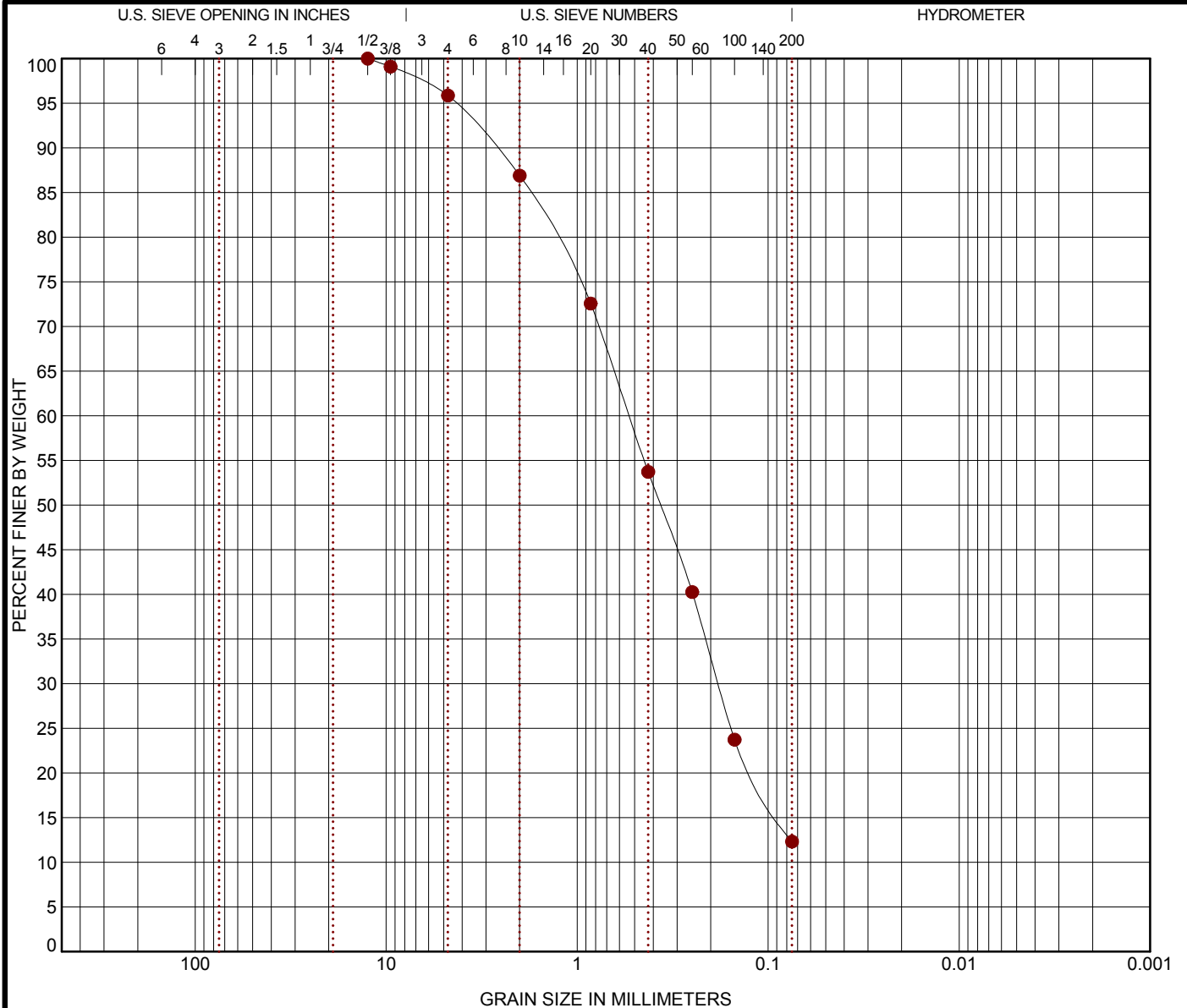


4102 7th Ave., North  
Fargo, North Dakota

PROJECT NUMBER: M1125030  
CLIENT: Valley City-Barnes County  
Development Corp.  
Valley City, North Dakota  
EXHIBIT: B-2

# GRAIN SIZE DISTRIBUTION

## ASTM D422



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			USCS Classification					LL	PL	PI	Cc	Cu
●	B-21	4.5	SILTY SAND (SM)								0.95	8.22
Specimen Identification			D <sub>100</sub>	D <sub>60</sub>	D <sub>30</sub>	D <sub>10</sub>	%Gravel	%Sand	%Silt	%Clay		
●	B-21	4.5	12.5	0.535	0.182		4.1	83.5	12.3			

PROJECT: Proposed NDANG Readiness  
Center  
SITE: C.R. 21 Site  
Valley City, North Dakota














4102 7th Ave., North  
Fargo, North Dakota

PROJECT NUMBER: M1125030  
CLIENT: Valley City-Barnes County  
Development Corp.  
Valley City, North Dakota  
EXHIBIT: B-3

**APPENDIX C**  
**SUPPORTING DOCUMENTS**

# EXPLANATION OF BORING LOG INFORMATION

## DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING			WATER LEVEL		Water Initially Encountered	FIELD TESTS	(HP)	Hand Penetrometer	
	Auger	Split Spoon			Water Level After a Specified Period of Time		(T)	Torvane	
					Water Level After a Specified Period of Time		(b/f)	Standard Penetration Test (blows per foot)	
	Shelby Tube	Macro Core		Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.			(PID)	Photo-Ionization Detector	
							(OVA)	Organic Vapor Analyzer	
	Ring Sampler	Rock Core							
									
	Grab Sample	No Recovery							

## DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

## LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

<b>STRENGTH TERMS</b>	<b>RELATIVE DENSITY OF COARSE-GRAINED SOILS</b> (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			<b>CONSISTENCY OF FINE-GRAINED SOILS</b> (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
	Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.
	Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1
	Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4
	Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	5 - 7
	Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 14
	Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30
				Hard	> 8,000	> 30

## RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 15
With	15 - 29
Modifier	> 30

## GRAIN SIZE TERMINOLOGY

<u>Major Component of Sample</u>	<u>Particle Size</u>
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

## RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term(s) of other constituents</u>	<u>Percent of Dry Weight</u>
Trace	< 5
With	5 - 12
Modifier	> 12

## PLASTICITY DESCRIPTION

<u>Term</u>	<u>Plasticity Index</u>
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

# UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>A</sup>					Soil Classification	
					Group Symbol	Group Name <sup>B</sup>
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines <sup>C</sup>	Cu ≥ 4 and 1 ≤ Cc ≤ 3 <sup>E</sup>		GW	Well-graded gravel <sup>F</sup>
			Cu < 4 and/or 1 > Cc > 3 <sup>E</sup>		GP	Poorly graded gravel <sup>F</sup>
		Gravels with Fines: More than 12% fines <sup>C</sup>	Fines classify as ML or MH		GM	Silty gravel <sup>F,G,H</sup>
			Fines classify as CL or CH		GC	Clayey gravel <sup>F,G,H</sup>
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines <sup>D</sup>	Cu ≥ 6 and 1 ≤ Cc ≤ 3 <sup>E</sup>		SW	Well-graded sand <sup>I</sup>
			Cu < 6 and/or 1 > Cc > 3 <sup>E</sup>		SP	Poorly graded sand <sup>I</sup>
		Sands with Fines: More than 12% fines <sup>D</sup>	Fines classify as ML or MH		SM	Silty sand <sup>G,H,I</sup>
			Fines classify as CL or CH		SC	Clayey sand <sup>G,H,I</sup>
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	PI > 7 and plots on or above “A” line <sup>J</sup>		CL	Lean clay <sup>K,L,M</sup>
			PI < 4 or plots below “A” line <sup>J</sup>		ML	Silt <sup>K,L,M</sup>
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay <sup>K,L,M,N</sup>
			Liquid limit - not dried			Organic silt <sup>K,L,M,O</sup>
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above “A” line		CH	Fat clay <sup>K,L,M</sup>
			PI plots below “A” line		MH	Elastic Silt <sup>K,L,M</sup>
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay <sup>K,L,M,P</sup>
			Liquid limit - not dried			Organic silt <sup>K,L,M,Q</sup>
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

<sup>A</sup> Based on the material passing the 3-inch (75-mm) sieve

<sup>B</sup> If field sample contained cobbles or boulders, or both, add "with cobbles" or "with boulders, or both" to group name.

<sup>C</sup> Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

<sup>D</sup> Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

$$^E Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

<sup>F</sup> If soil contains  $\geq 15\%$  sand, add "with sand" to group name.

<sup>G</sup> If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

<sup>H</sup> If fines are organic, add "with organic fines" to group name.

<sup>I</sup> If soil contains  $\geq 15\%$  gravel, add "with gravel" to group name.

<sup>J</sup> If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

<sup>K</sup> If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

<sup>L</sup> If soil contains  $\geq 30\%$  plus No. 200 predominantly sand, add "sandy" to group name.

<sup>M</sup> If soil contains  $\geq 30\%$  plus No. 200, predominantly gravel, add "gravelly" to group name.

<sup>N</sup>  $PI \geq 4$  and plots on or above "A" line.

<sup>O</sup>  $PI < 4$  or plots below "A" line.

<sup>P</sup>  $PI$  plots on or above "A" line.

<sup>Q</sup>  $PI$  plots below "A" line.

