SPECIFICATIONS AND DRAWINGS

HIGHLANDER 75 NORTH PUBLIC IMPROVEMENTS

OMAHA, NEBRASKA

EGA PROJECT NO. 141080A
September 2015

EHRHART GRIFFIN & ASSOCIATES
3552 FARNAM STREET
OMAHA, NEBRASKA 68131

HIGHLANDER 75 NORTH
PUBLIC IMPROVEMENTS
OMAHA, NEBRASKA

September 2015

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NOTICE TO CONTRACTORS

Project: **Highlander 75 North Public Improvements**

Owner: Seventy-Five North Revitalization Corporation

Project Location: West side of 31st Street to 29th Street between JC Wade Sr Dr and Parker Street

Engineer: Ehrhart Griffin & Associates
3552 Farnam Street
Omaha, Nebraska 68131

Construction Manager: Lund-Ross Constructors, Inc.
4601 F Street
Omaha, Nebraska 68117

Proposals will be received in the office of Lund Ross Constructors, 4601 F Street, Omaha, Nebraska 68117, until 3:00 p.m. on the 15th day of October 2015, for the furnishing all material, labor, tools, expendable equipment, and all utility and transportation services necessary to perform and complete, in a workmanlike manner, all of the Work required for the Highlander 75 North Public Improvements Project, Omaha, Nebraska.

At such hour, or as soon as practicable thereafter, the Construction Manager will proceed to open in private and consider the bids received for the furnishing of such labor, materials, and equipment necessary for the proper construction of such improvements.

WORK COVERED BY CONTRACT DOCUMENTS

The extent of the work consists of the construction or other effectuation of the items listed below and other related preparatory and subsidiary work from issuance of the Notice to Proceed:

The Project generally includes site demolition of existing pavements, inlets and miscellaneous topographic features, fine grading, placement of pavement, sidewalks, construction of sanitary and storm sewers, erosion control maintenance and replacement and site stabilization and silt fence.

Construction activities will begin on November 15, 2015 and must be substantially complete by July 1, 2016.

All work called for in the drawings and specifications shall be furnished in strict accordance with the drawings and specifications prepared by Ehrhart Griffin & Associates, of 3552 Farnam Street, Omaha, Nebraska 68131, and bids will be received only upon the proposal form furnished through the Engineer.

All City of Omaha Small and Emerging Small Business Program (SEB) certified Tier I and Tier II contractors are encouraged to provide bids on their appropriate scopes of work.

Proposals may be received by email, fax, mail or in person to:

Lund Ross Constructors
4601 F Street
Omaha, Nebraska 68117
c/o Regan Zeller
PH: 402-342-2810
Fax: 402-342-8775
Regan Zeller (Bids@lundross.com)

No bidder may withdraw his proposal for a period of ninety (90) days after the date set for the opening of bids.

Bid Security is not required.

Contractors may obtain drawings and specifications for the work at the following locations:

- Download from Lund-Ross Constructors plan room at no cost.
  http://bidroom.net/lundross/2015-10-PI.html

- A&D Tech Supply
  4320 South 89th Street
  Omaha, NE 68127
  (402) 592-4950 FAX: (402) 592-9302 www.adtechsupply.com

- A&D Tech Supply
  1822 N. Street
  Lincoln, NE 68508
  (402) 474-5454 FAX: (402) 474-5779 www.adtechsupply.com

A&D Tech Supply will only provide complete sets of contract documents (drawings and specifications) for a refundable deposit of $100/set. Alternatively, "Builders Cards" will be accepted as a form of deposit for this project. Make deposit checks payable to the Lund-Ross Constructors. Checks for the Shipping and Handling should be made out to A&D Tech Supply. Documents must be returned complete and in "like new" condition to obtain a refund. Plans must be returned no later than one month after bid date. One reminder phone call will be placed before deposit is forfeited.

Plans may also be purchased on a CD at a non-refundable cost of $25.00. The CD will contain the entire set of drawings and specifications in PDF format.

Copies of the Bid Documents may be viewed and/or obtained from:

- Lincoln Builders Bureau
  5910 So. 58th Street, Suite "C"
  Lincoln, Nebraska 68516
  (402) 421-8332 FAX: (402) 421-8334

- Omaha Builder's Exchange
  4255 So. 94th Street
  Omaha, Nebraska 68127
  (402) 593-6908 FAX: (402) 593-6912

- Contractor Development Services, Inc.
  1313 Cuming St., Suite 200
  Omaha, NE 68102
  402-399-9090 FAX: 402-399-2785

- North Omaha Contractors Alliance
  Houston McKell III
  2505 North 24th Street, Suite 409A
  Omaha, NE 68110
  402-590-9300 www.noc-alliance.org

- United Minority Contractors Assoc
  Preston Love Jr.
  6202 Villa de Sante #115
  Omaha, NE 68104
  402-812-3324 Prestonlovejr@gmail.com

- Construction Market Data www.cmdgroup.com
- BidClerk
- iSqFt

Subcontractors will be required to meet the minimums insurance requirements as shown on the following sample insurance certificate, including naming the following as additional insureds:

- Seventy-Five North Revitalization Corporation
- Brinshore Development, LLC
- Lund-Ross Constructors, Inc.
- Ehrhart Griffin & Associates

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Agency Name Street Address City, State, Zip	PHONE (A/C, No, Ext): Agency Phone Number	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Insurance Carrier	
INSURED	INSURER B :	
Insured Street Address City, State, Zip	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY						EACH OCCURRENCE	$ 1,000,000
	[X] COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 100,000
	[ ] CLAIMS-MADE [X] OCCUR						MED EXP (Any one person)	$ 5,000
				Policy Number	Eff Date	Exp Date	PERSONAL & ADV INJURY	$ 1,000,000
							GENERAL AGGREGATE	$ 2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$ 2,000,000
	[ ] POLICY [X] PRO-JECT [ ] LOC							$
A	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	[X] ANY AUTO						BODILY INJURY (Per person)	$
	[ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS			Policy Number	Eff Date	Exp Date	BODILY INJURY (Per accident)	$
	[X] HIRED AUTOS [X] NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
A	[ ] UMBRELLA LIAB [X] OCCUR						EACH OCCURRENCE	$ 1,000,000
	[ ] EXCESS LIAB [ ] CLAIMS-MADE			Policy Number	Eff Date	Exp Date	AGGREGATE	$ 1,000,000
	[ ] DED [ ] RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						[X] WC STATU-TORY LIMITS [ ] OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? [ ] N / A						E.L. EACH ACCIDENT	$ 100,000
	(Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 100,000
							E.L. DISEASE - POLICY LIMIT	$ 500,000
A	Professional Liability *			Policy Number	Eff Date	Exp Date	$1,000,000 Per Claim & Annual Aggregate	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Lund-Ross Constructors, Inc. and owner/general contractor shall be named as Additional Insured for General Liability on a primary & non-contributory basis including completed operations. Waiver of Subrogation applies in favor of Lund-Ross Constructors, Inc. for General Liability, Workers' Compensation and Umbrella/Excess.

* Professional Liability coverage required only if providing professional services including but not limited to consulting, architect, engineer and design-build.

CERTIFICATE HOLDER	CANCELLATION
Lund-Ross Constructors, Inc. 4601 F St PO Box 3688 Omaha NE 68103	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE Authorized Representative Signature

Lund Ross Constructors and Brinshore Development, LLC reserves the right to waive informalities and to reject all or any bids.

DATED: September 30, 2015

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

1.1 Terms used in these Instructions to Bidders, which are defined in the Standard General Conditions of the Construction Contract, EJCDC Document C-700, (2002 Edition), have the meanings assigned to them in the General Conditions. The term "Successful Bidder" means the lowest, qualified, responsible Bidder to whom Owner (on the basis of the Owner's evaluation as hereinafter provided) makes an award.

1.2 For purposes of this contract, the Owner's General Contractor, LUND ROSS CONSTRUCTORS, shall be referred herein as "OWNER".

2. COPIES OF BIDDING DOCUMENTS

2.1 Contractors may obtain drawings and specifications for the work at the following locations:

- Download from Lund-Ross Constructors plan room at no cost.
  http://bidroom.net/lundross/2015-10-PI.html

- A&D Tech Supply
  4320 South 89th Street
  Omaha, NE 68127
  (402) 592-4950 FAX: (402) 592-9302 www.adtechsupply.com

- A&D Tech Supply
  1822 N. Street
  Lincoln, NE 68508
  (402) 474-5454 FAX: (402) 474-5779 www.adtechsupply.com

A&D Tech Supply will only provide complete sets of contract documents (drawings and specifications) for a refundable deposit of $100/set. Alternatively, "Builders Cards" will be accepted as a form of deposit for this project. Make deposit checks payable to the Lund-Ross Constructors. Checks for the Shipping and Handling should be made out to A&D Tech Supply. Documents must be returned complete and in "like new" condition to obtain a refund. Plans must be returned no later than one month after bid date. One reminder phone call will be placed before deposit is forfeited.

Plans may also be purchased on a CD at a non-refundable cost of $25.00. The CD will contain the entire set of drawings and specifications in PDF format.

Copies of the Bid Documents may be viewed and/or obtained from:

- Lincoln Builders Bureau
  5910 So. 58th Street, Suite "C"
  Lincoln, Nebraska 68516
  (402) 421-8332 FAX: (402) 421-8334

- Omaha Builder's Exchange
  4255 So. 94th Street
  Omaha, Nebraska 68127
  (402) 593-6908 FAX: (402) 593-6912

- Contractor Development Services, Inc.
  1313 Cuming St., Suite 200
  Omaha, NE 68102
  402-399-9090 FAX: 402-399-2785

- North Omaha Contractors Alliance
  Houston McKell III
  2505 North 24th Street, Suite 409A
  Omaha, NE 68110
  402-590-9300 www.noc-alliance.org

- United Minority Contractors Assoc
  Preston Love Jr.
  6202 Villa de Sante #115
  Omaha, NE 68104
  402-812-3324 Prestonlovejr@gmail.com

- Construction Market Data www.cmdgroup.com
- BidClerk
- iSqFt

2.2 Copies of the Geotechnical Exploration Reports and soils boring logs are available upon request from the Lund-Ross Constructors.

2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit, within five (5) days of Owner's request, written evidence of the types set forth in the Supplementary Conditions, such as financial data, previous experience and evidence of authority to conduct business in the jurisdiction where the Project is located. Each Bid must contain evidence of Bidder's qualification to do business in the state of where the Project is located or covenant to obtain such qualification prior to award of the contract.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

4.1.1 Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the Work, (c) familiarize himself with federal, state, and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work; and (d) study and carefully correlate Bidder's observations with the Contract Documents.

4.2 Reference is made to the Supplementary Conditions and specifications for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work, which have been relied upon by Engineer in preparing the Drawings and Specifications. Owner will make copies of such reports available to any Bidder requesting them. These reports are not guaranteed as to accuracy or completeness, nor are they part of the Contract Documents. Before submitting his Bid, each Bidder will, at his own expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.3 On request, Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid.

4.4 The lands upon which the Work is to be performed, right-of-way for access thereto and other land designated for use by Contractor in performing the Work are identified in the Supplementary Conditions, General Requirements or Drawings.

4.5 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Article 4 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

5. INTERPRETATIONS

All questions about the meaning or intent of the Contract Documents shall be submitted to the Engineer in writing. Replies will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than five (5) days prior to the date for opening of Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6. BID SECURITY is not required.

7. CONTRACT TIME

The number of days within which, or the date by which, the Work is to be completed (the Contract Time) will be included in the Agreement.

8. LIQUIDATED DAMAGES is not used

9. SUBSTITUTE MATERIAL AND EQUIPMENT

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Wherever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the "effective date of the Agreement". The procedure for submittal of any such application by Contractor and consideration by Engineer is set forth in Paragraphs 6.5 of the General Conditions, which may be supplemented in the General Requirements.

10. SUBCONTRACTORS, ETC.

10.1 If the Supplemental Conditions require the identity of certain Subcontractors and other persons and organizations to be submitted to Owner in advance of the Notice of Award, the apparent Successful Bidder, and any other Bidder so requested will, within seven (7) days after the day of the Bid Opening, submit to Owner a list of all Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which such identification is so required. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, person and organization, if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, other person or organization, either may, before giving the Notice of Award, request the Apparent Successful Bidder to submit an acceptable substitute without any increase in Bid Price. If the apparent Successful Bidder declines to make any such substitution, the Contract shall not be awarded to such Bidder. Any Subcontractor, other person or organization so listed and to whom Owner and Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer.

10.2 No Contractor shall be required to employ any Subcontractor, other person or organization against whom he has reasonable objection.

11. BID FORM

11.1 The Bid Form is attached hereto. Additional copies may be obtained from the Engineer.

11.2 Bid Forms must be completed in ink or by typewriter. The Bid price of each item on the form must be stated in words and numerals. In case of a conflict, words will take precedence.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistance secretary. The corporate address and state of incorporation shall be shown below the signature.

11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

11.5 All names must be type or printed below the signature.

11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

11.7 The address to which communications regarding the Bid are to be directed must be shown.

12. SUBMISSION OF BIDS

Bids shall be submitted on or before **Thursday, October 15, 2015 at 3:00 PM** at the office of LUND ROSS CONTRUCTORS, 4601 F Street, Omaha, Nebraska 68117. Bids may be emailed, faxed, delivered or mailed. If delivered or mailed, bids shall be within a sealed envelope and the bid form shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.

13. MODIFICATION AND WITHDRAWAL OF BIDS

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

13.2 If, within twenty-four (24) hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw his Bid. Thereafter, that Bidder will be disqualified from further bidding on the Work.

14. OPENING OF BIDS

14.1 Bids will be opened privately.

14.2 After opening, Bids will be tabulated, and an abstract of the amounts of the Base Bids and major alternates (if any) will be made available.

15. BIDS TO REMAIN OPEN

All Bids shall remain open for ninety (90) days after the day of the Bid Opening, but owner may, in his sole discretion, release any Bid prior to that date.

16. AWARD OF CONTRACT

16.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities with the Successful Bidder, and the right to disregard all nonconforming, nonresponsive or conditional Bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

16.2 In evaluating Bids, Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid Forms. It is Owner's intent to accept alternates (if any are accepted) in the order in which they are listed in the Bid Form but Owner may accept them in any order or combination.

16.3 Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Supplementary Conditions. Operating costs, maintenance considerations,

performance data and guarantees of materials and equipment may be considered by Owner.

16.4 Owner may conduct such investigations as he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of the Bidders proposed Subcontractors and other persons and organizations to do the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

16.5 Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

16.6 If the Contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.

16.7 If the Contract is to be awarded, Construction Manager will give the Successful Bidder a Notice of Award within fourteen (14) days after the day of the Bid Opening.

17. PERFORMANCE AND OTHER BONDS

Paragraph 5.1 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and other Bonds. When the Successful Bidder delivers the executed Agreement to Owner it shall be accompanied by the required Contract Security.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement and all other Contract Documents. Within seven (7) days thereafter, Contractor shall sign and deliver at least three (3) counterparts of the Agreement to Owner with all other Contract Documents attached. Within seven (7) days thereafter Owner will deliver all fully signed counterparts to Contractor. Engineer will identify those portions of the Contract Documents not fully signed by Owner and Contractor and such identification shall be binding on all parties.

_____

(Name of Bidder)

BID FORM

PROJECT IDENTIFICATION: HIGHLANDER 75 NORTH
PUBLIC IMPROVEMENTS
OMAHA, NEBRASKA
EGA PROJECT NO. 141080A

THIS BID IS SUBMITTED TO: BRINSHORE DEVELOPMENT, LLC
C/O LUND ROSS CONSTRUCTORS
4601 F STREET
OMAHA, NEBRASKA 68117
ATTN: SCOTT THOMPSON

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Contract Documents, and to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and the Agreement and in accordance with the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain open for thirty (30) days after the day of Bid Opening. BIDDER will sign the Agreement and submit the Contract Security and other documents required by the Contract Documents within seven (7) days after the date of OWNER'S Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in this Agreement, the following:

(a) BIDDER has examined copies of all the Contract Documents and copies of the following Addenda:

Date	Number
_____	_____
_____	_____
_____	_____

(receipt of all which is hereby acknowledged) and also copies of the Notice of Hearing and Letting and the Instruction to Bidders;)

(b) BIDDER has examined the site and locality where the Work is to be

performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions affecting cost, progress or performance of the Work and has made such independent investigations as BIDDER deems necessary; and

(c) this Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham bid; BIDDER has not solicited or induced any person, firm or a corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for himself any advantage over any other Bidder or the OWNER.

4. BIDDER will complete the work for the following price(s):

BID SCHEDULE

HIGHLANDER 75 NORTH PUBLIC IMPROVEMENTS

The BIDDER agrees to perform all of the Work required to complete the Public Improvements for the Unit Prices listed below. The quantities listed are estimates. Unit Prices are for the complete installation of each item and Work related thereto. (Amounts shall be shown in both Unit Prices and Total Amounts. In case of discrepancy, Unit Prices shall govern.)

BID FORM

Item No.	Bid Item Description	Approximate Quantity	Unit	Unit Price	Amount	City Item
1	MOBILIZATION (2%)	1.00	LS			900.001
2	PAVEMENT OVER-EXCAVATION AND RECOMPACTION	6334.00	CY			900.002
3	REMOVAL OF PETROLEUM IMPACTED SOILS	6335.00	TON			900.003
4	REMOVAL OF UNSUITABLE MATERIALS	6336.00	CY			900.004
5	STABILIZED CONSTRUCTION ENTRANCE	5.00	EA			101.040
6	ABANDON STORM 12" AND SMALLER (FLOWABLE FILL)	3.75	CY			400.001
7	REMOVE 12" OR SMALLER SEWER PIPE	988.11	LF			120.012
8	REMOVE 15" TO 18" SEWER PIPE	1020.61	LF			120.018
9	REMOVE MANHOLE	5.00	EA			130.000
10	REMOVE INLET	7.00	EA			131.000
11	CONSTRUCT CONCRETE PIPE PLUG	20.00	EA			104.540
12	7" CONCRETE PAVEMENT - TYPE L65	9977.00	SY			201.207
13	CONSTRUCT CONCRETE CURB RAMP (7" THICK)	514.00	SF			202.006
14	5" CONCRETE SIDEWALK	2008.00	SF			204.000
15	6" IMPRINTED CONCRETE SIDEWALK	276.00	SF			204.104
16	SAW CUT - FULL DEPTH	506.00	LF			300.004
17	CONSTRUCT CONCRETE HEADER	150.00	LF			501.300
18	CONSTRUCT 54" ID SANITARY MANHOLE	95.00	VF			703.260
19	CONSTRUCT 8" SANITARY SEWER PIPE PVC	1927.00	LF			703.111
20	CONSTRUCT 6" SANITARY SEWER PIPE PVC	1378.00	LF			703.110
21	CONSTRUCT 8" CONCRETE COLLAR	4.00	EA			702.281
22	CONSTRUCT 15" RCP CLASS III	1148.00	LF			702.051
23	CONSTRUCT 18" RCP CLASS III	237.00	LF			702.052
24	CONSTRUCT 24" RCP CLASS III	610.00	LF			702.054
25	CONSTRUCT 27" RCP CLASS III	265.00	LF			702.055
26	CONSTRUCT 18" RC FLARED END SECTION W/ BAR GRATE	0.00	EA			702.372
27	CONSTRUCT 24" RC FLARED END SECTION W/ BAR GRATE	0.00	EA			702.374
28	CONSTRUCT CURB INLET - TYPE I 700-21	20.00	EA			702.780
29	CONSTRUCT GRATE INLET - TYPE "A" DOUBLE INLET 700-04	7.00	EA			702.791
30	CONSTRUCT 60" ID STORM MANHOLE	24.00	VF			702.441
31	CONSTRUCT 54" ID STORM MANHOLE	15.00	VF			702.440
32	CONSTRUCT 6" X 8" WYE	45.00	EA			703.190
33	TYPE III PERMANENT ROAD CLOSURES	2.00	EA			900.033
34	TYPE III BARRICADES	4.00	EA			900.034
35	SEEDING	1.27	AC			606.001
36	TUBULAR INLET PROTECTION	30.00	EA			550.200
37	SILT FENCE	1000.00	LF			101.000

TOTAL BID (ITEMS 1 TO 35) _____

The BIDDER proposes to utilize the following Subcontractors. The work of such Subcontractors is incorporated in the above Bid Amount.

NAME	DESCRIPTION OF WORK	DOLLAR AMOUNT
_____	_____	$ _____
_____	_____	$ _____
_____	_____	$ _____
_____	_____	$ _____
_____	_____	$ _____
_____	_____	$ _____

5. BIDDER agrees that the Work will be substantially completed and completed on or before the dates indicated in the Agreement for the Project Contract. BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

6. Communications concerning this Bid shall be addressed to the address of BIDDER indicated below.

7. The terms used in this bid, which are defined in the General Conditions of the Construction Contract included as a part of the Contract Documents, have the meanings assigned to them in the General Conditions.

8. In submitting this Bid, the BIDDER agrees that the right to reject any and all Bids and to waive irregularities in the Bidding has been reserved by the OWNER.

9. Bonding – Check appropriate box. Bond costs are not to be included in above bids. Bonds may not be required

☐ Contractor can bond up to $_____ at a rate of _____%.

☐ Contractor has never bonded before or cannot obtain a bond for this project

10. City of Omaha Small and Emerging Small Business Program (SEB) – Check appropriate box.

☐ Contractor is certified under the City of Omaha SEB as Tier I

☐ Contractor is certified under the City of Omaha SEB as Tier II

☐ Contractor is not certified under the City of Omaha SEB as Tier I or Tier II

SUBMITTED on _____, 2015.

IF BIDDER is:

A CORPORATION

_____(Seal)
(Name of Corporation)

_____
(State of Incorporation)

By: _____ _____
(Authorized Signature and Type Name) (Title)

Attest: _____

Business Address: _____

_____

Telephone Number: _____

A PARTNERSHIP

By: _____(Seal)
(Firm Name)

_____
(General Partner - Signature and Typed Name)

Business Address: _____

_____

Telephone Number: _____

AN INDIVIDUAL

_____
(Firm Name)

By: _____
(Name - Signature and Type Name)

Business Address: _____

_____

Telephone Number: _____

NPDES CERTIFICATION STATEMENT

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site as part of this certification. Further, by my signature, I understand that I am becoming a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the Nebraska Department of Environmental Quality NPDES General Permit for "Storm Water Discharge Associated with Construction Sites" at the identified site. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act and the Code of Nebraska, to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under this NPDES permit and the terms of this NPDES permit.

Project Name: Highlander 75 North Public Improvements

Project Address: North 28th Street to North 31st Street, Parker Street to Burdette

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Dated this _____ day of _____, 2015.

_____

(Authorized Signature and Title)

(Print or Type)

(Company Name)

(Address)

(Telephone Number)

DIVISION I – GENERAL REQUIREMENTS INDEX

SECTION 1000

ADMINISTRATIVE PROVISIONS

SUMMARY OF WORK

The Contract for Highlander 75 North Public Improvements North 28th Street to North 31st Street, Parker Street to Burdette, Omaha, Nebraska, includes all material, labor, tools, expendable equipment, construction equipment and machinery, utility and transportation services, and all incidental items necessary to perform and complete, in a workmanlike manner, the Work required.

SCOPE OF WORK

The Scope of Work for Highlander 75 North Public Improvements North 28th Street to North 31st Street, Parker Street to Burdette, Omaha, Nebraska, includes site demolition of existing pavements, inlets and miscellaneous topographic features, fine grading, placement of pavement, sidewalks, construction of sanitary and storm sewers, erosion control maintenance and replacement and site stabilization as shown on the Drawings and described in the Specifications and Contract Documents.

REFERENCE STANDARDS

For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes. Obtain copies of standards when required by Contract Documents. Maintain copy at job site during progress of the specific Work.

COORDINATION

Coordinate Work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodation items installed later.

The Contractor shall coordinate and schedule his work with the Engineer such that there will be minimum disruption of the normal operations of the Owner's existing facilities.

WORK ON WEEKENDS AND HOLIDAYS

No Work shall be performed on weekends or holidays except as may be required for strictly emergency work, or for protection of property and work required in these Specifications. This requirement is provided to avoid disturbance to the public or any individuals on these days. If Work must be performed on weekends or holidays, permission must be obtained from both the Owner and Engineer.

CONSTRUCTION RIGHT-OF-WAY

The Contractor shall confine all construction operations to the immediate vicinity of the Work shown on the Drawings and within public right-of-way or on property or easements owned by or obtained by the Owner. Contractor shall exercise care in placing construction equipment, tools, excavated materials, and materials and supplies on the right-of-way, property, or easement area to cause the least possible damage to property and interference with traffic. Contractor shall be responsible for damage to crops and other property outside the boundaries of the right-of-way, property and easement areas and shall make satisfactory settlement with the Owner if any damage occurs. In the event the Contractor desires to use and occupy land outside the right-of-way, property, or easement areas, he shall obtain written consent from the affected property owner.

NOTICE TO UTILITY COMPANIES AND PROPERTY OWNERS

The Contractor shall give at least 48 hours notice to all affected utility companies and property owners whose utility or service may be adjacent to, crossed by, or disrupted due to the operations of the Contractor performing the Work. The following is a list of some, but not all, utility companies and departments which may be affected:

Metropolitan Utilities District
Omaha Public Power District
Century Link
MCI AT&T
Cox Cable
Peoples Natural Gas
Northern Natural Gas
United Cable Television

APPLICATIONS FOR PAYMENTS

Application for payment shall be due to Lund Ross Constructors (Owner's General Contractor) by the 25th of each month for review and approval.

Monthly progress payments shall be made upon receipt, verification and approval of an Engineers Joint Contract Documents Committee Document EJCDC NO. C-700 (2002) "Application for Payment", provided that no payments shall be made from any acquisition, work, labor, material or expense incurred which deems to be:

a. unacceptable or substandard; or,

b. not in conformance with the working drawings and/or specifications as approved.

Upon review and recommendation by the Owner/Engineer, the Owner shall approve payment to the Contractor of ninety percent (95%) of the value of labor and materials incorporated in the Work and ninety percent (95%) of the materials suitably stored, such payment to be made within forty five (45) days after the recommendation of the Owner/Engineer.

Upon substantial completion, the Owner shall pay an amount sufficient to increase total payments to Contractor to ninety (95%) of the Contract Price, less such amounts as Engineer shall determine, in accordance with Paragraph 14.04 of the General Conditions.

Upon final completion, final inspection and acceptance of the Work, in accordance with Paragraph 14.06 of the General Conditions, the Owner shall pay to the Contractor the remainder of the Contract Price as recommended by the Engineer.

CONSTRUCTION STAKING

The Owner shall be responsible for the cost of construction staking for the following components of the work:

- Sanitary and storm sewers within the public right-of-way,
- Street pavement, driveway pavement, sidewalk and ADA ramp pavement as shown in the construction documents.

END OF SECTION

SECTION 1200

PROJECT MEETINGS

PRECONSTRUCTION CONFERENCE

A Preconstruction Conference will be held after the Agreement is executed, but before the Contractor begins the Work. The Conference will be to review the Project, discuss and clarify administration procedures and requirements under which the construction operations are to proceed, and to establish a working understanding among the parties involved in the Work. The Owner, Contractor(s) and Engineer shall attend the Preconstruction Conference. The Engineer will notify the Contractor of the date, time, and location of the Conference.

PROGRESS MEETINGS

Weekly Progress Meetings shall be scheduled and held throughout the Work. The day and time will be negotiated at the pre-construction conference.

END OF SECTION

SECTION 1300

SUBMITTALS

BONDS

Contractor shall submit Performance and Payment Bonds as required in the General Conditions, Paragraph 5.1, at the time of delivery of the executed Agreement to the Engineer.

INSURANCE CERTIFICATES

Contractor shall submit a Certificate of Insurance, as required in the General Conditions and Supplementary Conditions, at the time of delivery of the executed Agreement to the Engineer.

CONSTRUCTION SCHEDULE

Contractor shall submit a Construction Schedule to the Engineer within three (3) days after receiving the Notice of Award. The content of the Schedule shall include the following:

1. Work sequence.
2. Time of starting and completing each part of the Work.
3. Coordination requirements, including delivery of material, as well as necessary coordination between other Work schedules.
4. Name of job superintendent and/or job foreman.

LIST OF SUBCONTRACTORS AND MATERIAL SUPPLIES

Contractor shall submit a list of Subcontractors and Material Suppliers at the time of delivery of the executed Agreement to the Engineer.

SHOP DRAWINGS

The shop drawing form immediately following this specification section shall be used for the submission of all shop drawings. Transmittal numbers shall be sequential, with revision numbers identified on all resubmittals.

TESTING REPORTS

Testing Reports shall be made in triplicate with two copies sent directly to the Engineer and one copy to the Contractor. Testing reports shall include, but are not necessarily limited to, the following:

- Compaction testing and concrete testing (slump, air, temperature, compressive strength, coring).

APPLICATION FOR PAYMENT

Contractor shall submit all Applications of Payment in accordance with Section 1000, Administrative Provisions.

ADDITIONAL INSURED

The Contractor shall include Brinshore Development LLC, Lund Ross Constructors, the City of Omaha and Ehrhart Griffin & Associates as additional insured.

END OF SECTION

SECTION 1400

QUALITY CONTROL

TESTING LABORATORY SERVICES

The testing laboratory shall be Thiele Geotech, Inc. and shall perform the necessary quality control tests specified in these Contract Documents.

SAMPLING AND TESTING

All sampling and testing shall be performed by the Testing Laboratory's authorized representative. The location from which the samples were taken and tests performed shall be recorded and noted in the test report.

TESTING REPORTS

Testing Reports shall be made in triplicate with two copies sent directly to the Engineer and one copy to the Contractor. In addition, a copy of any concrete test report shall be sent to the concrete producer.

TESTS REQUIRED

Tests are specified and required as directed in accordance with the Technical Provisions and these detailed Specifications.

PAYMENT

Payment for all testing passing the requirements of these specifications shall be paid for by the Owner. The Contractor shall be fully responsible for the costs of all tests failing to meet these specifications.

END OF SECTION

SECTION 1500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

TEMPORARY FACILITIES

Contractor shall obtain and pay for all temporary facilities and services, which may be necessary for prosecution of the Work, including, but not limited to, water, power, fuel, light, heat, telephone, and sanitary facilities.

FENCES, GATES, AND BARRICADES

Contractor shall provide barriers, as required, to prevent public entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations

PROTECTION OF UTILITIES

Contractor shall exercise every precaution to avoid damage to existing utilities and appurtenances including, but not limited to, telephone lines, cable television lines, gas mains, power cables, water mains, sewer mains, service lines, sidewalks, driveways, drainage structures, fences, and trees. Contractor shall locate all underground utility lines with detection equipment well in advance of beginning Work.

STAKING OUT THE WORK

Refer to General Notes of the Construction Drawings for specifics of “Staking Out The Work”.

LAYING OUT THE WORK

Contractor shall be responsible for laying out all of the Work, including all measurements required to construct the proposed improvements. The contractor shall be required to utilize laser equipment for construction of all sanitary and storm sewer lines.

DRAINAGE

Contractor shall take steps to maintain all natural surface and subsurface drainage during construction so as to prevent ponding of surface water or saturation of the subsurface soil. Do not discharge water onto private property. All erosion control measures shall be maintained in accordance with the erosion control procedures and NPDES permit as set forth on the plans. Erosion control measures shall be removed in accordance with the erosion control procedures set forth on the plans.

STORAGE OF MATERIALS AND EQUIPMENT

Contractor shall store materials and equipment neatly in an area or areas approved by the Owner and Engineer.

TEMPORARY OFFICES

Contractor may maintain a temporary office at the Project site as necessary for the proper execution of the Work. The type and location of the temporary office shall be approved by the Owner and

Engineer.

TRAFFIC CONTROL

All traffic control devices shall be in accordance with the City of Omaha Manual of Barricading Standards, Specifications, Methods and Materials and/or the Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration.

Contractor shall make every effort to maintain the best possible flow of traffic during construction. Contractor shall closely coordinate his work schedule with the Owner and Engineer to avoid confusion and disruption of normal traffic patterns.

Should it become necessary to close any street, road, drive, or highway, notify the Engineer and the City of Omaha Public Works Department at least 48 hours in advance so that alternative traffic patterns and detours can be developed. Closing of any traffic lane, blocking traffic, or otherwise changing traffic routes shall be for as short a time period as possible.

All Work performed by the Contractor, which necessitates the closing or blocking of a street, road, drive, or highway, shall be completed quickly and efficiently and shall not be halted until completed. The Contractor shall not proceed to other areas of the Project until Work in the immediate area is completed and the street, road, drive, or highway is reopened.

When blocking traffic lanes or closing any street, road, drive, or highway, the Contractor shall furnish, erect, and maintain all traffic control devices, including barriers, cones, signs, markings, and flagmen (if required).

In the event that a private driveway must be closed or blocked to permit construction, provide a means of access to the private property owner. If necessary, provide advance notice to the owner so that vehicles may be moved into the street prior to the construction work. Complete all Work, repair the surfacing, and reopen the driveway as quickly as possible.

END OF SECTION

SECTION 1700

CONTRACT CLOSEOUT

CLOSEOUT PROCEDURES

Contractor shall comply with all procedures stated in the General Conditions for issuance of the Certificate of Substantial Completion.

When Contractor considers the Work to be complete, he shall submit written certification that the Contract Documents have been reviewed, the Work has been inspected, and that the Work is complete in accordance with the Contract Documents and ready for inspection by the Owner, the Engineer and the City of Omaha.

The Contractor shall provide all submittals required by governing authorities, and shall submit a final statement of accounting giving total adjusted Contract Price, previous payments, and amount remaining due.

The Owner and Engineer will issue a final Change Order reflecting approved adjustments to the Contract Price not previously made by Change Order.

FINAL CLEANING

Perform all cleaning prior to final inspection.

Clean site; sweep paved areas, rake clean other surfaces.

Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

PROJECT RECORD DOCUMENTS

Contractor shall store record documents separate from those used for construction.

Keep documents current; do not permanently conceal any Work until required information has been recorded.

At Contract Closeout, Contractor shall submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

WARRANTIES AND BONDS

Contractor shall provide duplicate, notarized copies of all warranties and bonds prior to final application for payment. Contractor shall also execute Contractor's submittals and assemble documents executed by Subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.

CONSENT OF SURETY COMPANY TO FINAL PAYMENT

Contractor shall submit a Consent of Surety Company to Final Payment to the Engineer at the time of submission of the Final Application for Payment.

PAYMENT ASSURANCES

Contractor shall submit signed lien waivers from all material suppliers and Subcontractors at the time of submission of the Final Application for Payment. In addition, the Contractor may be required to submit an affidavit of Payment of All Debts and Claims.

SALES AND USE TAX

The Contractor shall, at the time of submission of the Final Application for Payment, prepare and submit a Contractor's Statement of Sales and Use Tax, showing all taxes paid for materials, supplies, equipment, and services.

FINAL APPLICATION FOR PAYMENT

Contractor shall submit his Final Application for Payment in accordance with Paragraph 14.07 of the General Conditions, and Section 1000, Administrative Provisions.

END OF SECTION

DIVISION II – TECHNICAL PROVISIONS INDEX

SECTION 31 2100

SITE PREPARATION

GENERAL SITE PREPARATION

PART 1 - GENERAL

A. Keep project site free from drainage ponding due to construction operations during progress of Work. Make arrangements for disposal of all water and sewage received on the site from temporary connections or stoppages. Do not discharge any water or sewage onto private property outside the construction right-of-way.

B. Strip topsoil and separately store to provide depth of topsoil replacement as specified.

C. Remove and store obstructions such as culvert pipe, signs, and fences for replacement upon completion of construction. Provide temporary fencing if necessary to prevent accidents until permanent fencing is restored.

1.2 EXISTING UTILITIES

A. Contractor is responsible for liaison with utility companies and for repairing utilities and services, which are not in direct conflict with the Work, and is responsible for damage during construction at no expense to the Owner, unless indicated otherwise on the Drawings.

B. Utilities shown on drawings, in direct line and grade, which conflict with (the new piping systems) the Work, shall be relocated by others at no expense to the Contractor, unless indicated otherwise on the Drawings.

C. For utilities not shown on the Drawings and which are in direct conflict with the Work, the Contractor shall notify the Engineer of the conflict. When directed, the Contractor shall perform the Work. The Contractor shall be entitled to payment for any extra work in accordance with the General Conditions.

D. Utility removal. Before the Contractor begins Work, he shall confer with the owners of any underground or overhead utilities, which may be on or in close proximity to the Work areas and shall arrange for the necessary disconnection of the utilities in accordance with the utility company regulations. The utility company or owner of the utility shall perform the work of removing, repairing, reconditioning, or revising the utility unless otherwise specified or indicated on the Drawings. The Contractor shall cooperate with the utility companies so that Work can be expedited to the best interests of all concerned.

1.3 TREE REMOVAL – NOT USED

1.4 PAVEMENT REMOVAL

A. Cut pavement, drives and sidewalks with a concrete saw full depth using a diamond edged saw blade.

B. Remove sidewalk pavement to the nearest joint.

1.5 ACCESS TO STREETS

A. Contractor shall maintain all traffic using streets on adjacent streets involved in construction, except as specifically permitted otherwise by the Owner. Should a street closure be allowed by the City, the Contractor shall notify the City/Owner twenty-four (24) hours in advance of any street closure.

B. The Contractor is expressly forbidden to use JC Wade Boulevard, the private driveway for Salem Baptist Church, for any reason. Any damage caused to JC Wade Boulevard by any construction activity of the Contractor shall be repaired to the full satisfaction of Salem Baptist Church by the Contractor without expense to the Owner.

1.6 DISRUPTION OF UTILITY SERVICE

A. Contractor shall maintain utility service to all property owners or customers of utilities throughout the construction period unless repairs or improvements are authorized. In the event of repairs, replacements or improvements to utility service lines, the Contractor shall give the property owner or customer 24-hour notice of the upcoming disruption. Disruption of service shall be for as brief a period as possible so as not to cause undue inconvenience to the affected property owner or customer.

1.7 REMOVAL OF EXISTING STRUCTURES

A. Remove structures regardless of materials of which they are constructed. Removal shall include, but not be limited to, sidewalks, steel, cast iron, concrete, rubbish, junk, wood, and miscellaneous items.

1.8 DISPOSAL OF DEBRIS AND REFUSE

A. Contractor shall dispose of surface materials, construction debris and trees in accordance with all Federal, State and Local laws and regulations. Burning of refuse will not be permitted.

END OF SECTION 31 2100

SECTION 31 2200

EARTHWORK

PART I – GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

Site Preparation	Section 31 2100
Removal of Petroleum Impacted Soils	Section 31 2220

1.02 DESCRIPTION OF WORK

A. Work covered under this section shall consist of the fine grading of the site to conform to the grades, lines and contours shown on the Drawings. The Work shall include all excavation, shaping and sloping of all cut areas; all placing, compacting, shaping and finishing of all embankments in fill areas necessary for the completion of all site and roadway re-grading; including sub-grades, shoulder slopes and sidewalk subgrades. Trench excavation and backfill for utility trenches is also included.

1.03 REFERENCES

A. ASTM D698 Standard Proctor - Test for Moisture-Density Relations of soils and soil-aggregate mixture.

B. ASTM D1557 Modified Proctor - Test for Moisture-Density Relations of soils and soil-aggregate mixture.

C. ASTM 4253 AND ASTM 4254 Test Methods.

D. Incorporated by reference as part of these specifications are the Geotechnical Engineering Reports prepared by Thiele Geotech, Inc., TG Project No. 15100.00 dated May 19, 2015 and TG Project No. 15100.01 June 15, 2015.

1.04 QUALITY ASSURANCE

A. Soil testing shall be arranged and paid for by the Owner. The soil testing company used shall be Thiele Geotech, Inc. The Contractor shall be responsible for the cost of all tests failing to meet specifications.

B. The Geotechnical Engineer referred to in these specifications shall be as identified in paragraph 1.04.A, unless otherwise directed or approved by the Engineer. In general, the services of the Geotechnical Engineer shall include, but are not limited to the following:

(1) Perform classification tests and determine moisture-density relations for materials used for fill and backfill.

(2) Test and approve subgrades under pavements.
(3) Perform soil density tests, including observation and testing during compaction of fill and preparation of subgrade to check suitability of soils, proper moisture content and degree of compaction.

The following minimum number of compaction and moisture tests, in accordance with appropriate ASTM procedures, shall be made, where determined by the Geotechnical Engineer, in the designated areas:

Designated Area	**Number of Tests**
All lifts of fill	1 test per 5000 square feet or per smaller separate area prepared.
Completed subgrade below slabs on grade	1 test per 5000 square feet or per smaller separate area prepared.
Completed subgrade for drives and parking areas	1 test per 5000 square feet or large areas or per 100 lineal feet of area less than 50 feet in width or per smaller area prepared.
Completed subgrade for walks	1 test per every 100 lineal feet.
Backfill for foundations	1 test horizontally every 100 feet and for every one-foot of vertical fill.

Backfill for utility trenches:

Depth Over Top of Pipe	**Location of Test**	**Frequency of Test**
0 - 5 Feet	Surface	Every 100 Lineal Feet
5 - 12 Feet	Surface and 1/2 Depth	Every 100 Lineal Feet
Over 12 Feet	Surface, 1/3 Depth, and 2/3 Depth	Every 100 Lineal Feet

1.05 PROTECTION

A. Site Information: Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn the reform by Contractor. Data are made available for convenience of Contractor.

Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

B. The Contractor shall carefully maintain all bench marks, monuments, stakes, and other reference points and replace same if disturbed or destroyed at no cost to the Owner.

C. Contractor shall exercise extreme care to protect all existing underground and overhead utilities. Contractor shall be responsible for repairing all utilities damaged or destroyed during construction.

D. Contractor shall protect trees, shrubs, lawns, and other features, which are to remain after construction is completed.

E. Properly dispose of all waste materials. On-site burial will not be allowed.

F. Protect all excavations from the action of the elements. Keep all excavations free of water or snow at all times during the entire progress of construction, regardless of the cause, source or nature of the water. Temporarily grade areas adjacent to excavations to prevent excessive moisture from entering excavations. If water enters excavations, or other construction areas, dewater promptly using means which will ensure dry excavations and the preservation of all lines and grades. Provide ample means and devices at all times during construction to ensure prompt and adequate removal of water. Where soil has been softened or eroded by actions of the elements remove all damaged areas, replace soil and re-compact as required by these specifications.

G. Provide for surface drainage during construction of the project so at all times there is positive drainage away from the pavement areas. Soils in under pavement and walks and within 20 feet of the building perimeters, shall be protected against moisture content increase throughout the construction period.

H. Provide erosion control as shown on the drawings and described in the general notes or as required by the Engineer to prevent damage to areas within the construction limits and to adjacent properties.

I. The contractor shall guard against any movement, settlement, or collapse of all excavations, buildings, structures, paved areas, drives, sidewalks, streets, utility items or any other item adjacent to or within the construction limits of this project.

J. The contractor shall adequately brace all walls and other construction during backfilling and compacting operations so movement does not occur.

K. Protect bottoms of all excavations for foundations and soil under slabs, as needed, from frost.

L. The contractor shall repair, at his expense, all damage occurring to the owner's property or any other property (on or off the premises) that resulted from lack of adequate protection. The Engineer shall approve all repair or replacement.

1.06 DEFINITIONS

A. Suitable materials include material that is low plasticity cohesive soil, free of debris, roots, organic matter, frozen matter, and which is free of stones or foreign material with any dimension greater than 3 inches. Per the soils investigation, on-site soils are generally suitable for reuse as structural fill (with significant moisture conditioning).

B. Unsuitable materials include all material that contains debris, roots, organic matter, frozen matter, stone (with any dimension greater than 3 inches, or other materials that are determined by the Engineer or Soil Engineer as too wet or otherwise unsuitable for providing a stable subgrade.

PART II - PRODUCTS

2.01 FILL (EMBANKMENT) AND BACKFILL MATERIAL

A. All fill and backfill materials unless otherwise noted shall be approved low plasticity silt or lean clay, free of rubble and organics, with a liquid limit less than 45 and a Plasticity Index of less than 20 percent as identified in the Geotechnical Engineering Report. When unsuitable materials are encountered, the Contractor shall notify the Engineer, in accordance with the General Conditions. If directed by the Engineer, the Contractor shall excavate and replace with suitable material. Generally, the onsite excavated soils appear to be suitable for use as structural backfill.

B. Fat clays present on the project site shall not be used as backfill material within 2 feet of pavements or building floor slabs.

C. Topsoil shall be rich, fine and well drained material, which has previously been stripped and stored on the site. A typical stripping depth of 4 to 6 inches is expected to be adequate in most areas of the site; however, areas of deeper stripping may be encountered.

PART III – EXECUTION

3.01 EQUIPMENT

All equipment shall be adequate for the purpose for which it is to be used and shall be kept in satisfactory working order. Equipment shall be adequate to perform all excavation, hauling, placing of embankment, compaction, trimming, and shaping.

3.02 OVER-EXCAVATION

Over-excavation for the pavement shall be 2' below the slab and shall be in areas identified on the plans. Areas where 2' of fill have already been placed during the overlot grading work shall not require over-excavation and re-compaction. Should soft or unsuitable areas be discovered during subgrade preparation, the Contractor shall perform over-excavation as directed by the Geotechnical Engineer.

3.03 SURCHARGE – not used

3.04 FILL AND COMPACTION

A. Topsoil has been stripped and stockpiled by the overlot grading contractor under separate contract. Re-topsoiling shall use stockpiled on-site topsoil.

Prior to placement of any fill, floor slabs or pavement construction, stripped subgrades shall be observed by the Geotechnical Engineer to verify all unsuitable materials have been removed. The area to receive the fill shall be proof rolled in the presence of the Geotechnical Engineer with a fully loaded tandem-axle dump truck with a minimum gross weight of 25 tons or other equipment approved by the Geotechnical Engineer.

B. All fill shall be placed as structural fill. Prior to the placement of any new fill, the subbase shall be scarified to a minimum depth of 12 inches; moisture conditioned and compacted according to the specifications. All new fill shall be placed in 8-inch maximum lifts and compacted as specified hereinafter using a sheepsfoot type roller as approved by the Geotechnical Engineer. Bench all slopes steeper than 5H:IV. All scarified soils that cannot meet the specified compaction requirements shall be removed and the area backfilled and compacted with suitable material, as defined by this specification.

C. Compaction of Fill - All fill and backfill shall be wetted or dried by aeration, and then compacted as structural fill to the following percentage of maximum density at a moisture content within the limits specified above or below optimum moisture content, as determined by Testing Procedure ASTM D-698 Standard Proctor unless otherwise noted:

Material Above	**% of Maximum (Cohesive Soil Only)**	**ASTM**	**Percent**
Upper 12" of Scarified base soils	95% minimum	D698	-3% to +4%
All lifts of fill	95% minimum	D698	-3% to +4%
Free draining Granular Fill	70% minimum	D4253 D4254	not critical
Narrow Trench Backfill (< 6 feet wide, below 5 feet deep)	92% minimum	D698	-3% to +6%
Narrow Trench Backfill (< 6 feet wide, upper 5 feet, or full depth for trenches wider than 6 feet or around manholes)	95% minimum	D698	-3% to +4%
Trench Backfill (5 feet or more outside of paved areas)	95% minimum	D698	allowable to permit construction
Interior backfill	95% minimum	D698	-3% to +4%
Upper 6" of Subgrade beneath Floor slabs	95% minimum	D698	-3% to +4%
Upper 6" of Subgrade beneath P.C.C. sidewalk	95% minimum	D698	-3% to +4%
Upper 12" of Subgrade beneath Exterior pavement	90% minimum	D1557	-3% to +4%
Backfill soils Around foundations And basement walls	95% minimum	D698	-3% to +4%

Backfill behind curbs	95% minimum	D698	-3% to +4%

D. Compact cohesive soils by the use of sheepsfoot or pneumatic type compactors under optimum moisture conditions. Compact granular soils with vibratory compaction equipment. Granular backfill shall not be used in exterior trenches or around foundation elements.

E. Pavement subgrade preparation shall extend laterally 6 inches beyond the edge of all sidewalks and 2 feet behind edge of all pavement.

F. The Contractor shall not commence construction activity without the approval of the Geotechnical Engineer.

3.05 EXCAVATION

A. Perform excavation to dimensions and elevations indicated on. Care shall be taken during excavation and site work to avoid unnecessarily disturbing soils at the greater depth excavations.

B. Trench excavations within the limits of the building and under paving or walks shall be carefully excavated, maintaining a minimum width and in no way impairing the bearing value of any footing or foundation. Excavations should not extend below an imaginary plane-projecting out and down from the bottom edge of the existing footing of a 2H:IV.

C. Existing fills and native soils determined suitable for reuse as structural fill or backfill may require moisture conditioning upon excavation.

D. All excavated material not suitable for filling or backfilling as approved by the Geotechnical Engineer and all excess earth or other material shall be removed from the site.

E. The bottoms of all excavations for foundations shall be hand trimmed and free of all loose material.

F. Unexpected Subsurface Condition. Where suitable bearings are encountered at different elevations from those indicated on the drawings, the Engineer shall direct, in writing, that the excavation be carried to elevations above or below those indicated on the Drawings. Adjustment in payment shall be made in accord with the terms of the General Conditions.

G. During construction of roadways and parking areas, the roadbed shall be maintained in such condition that it will be adequately drained at all times. Side ditches emptying from cuts to embankments shall be constructed so as to avoid damage to embankments by erosion. The finished roadway shall be free from waves and true to the lines, grades and cross sections shown on the Drawings.

K. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

3. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.

L. All excavations should comply with the requirements of OSHA's "Construction Standards for Excavations".

M. The Contractor is referred paragraph 3.07N for dewatering.

3.06 EXCAVATION FOR UTILITY STRUCTURES AND APPURTENANCES

A. Excavate as required for manholes and other appurtenances until firm, undisturbed soil is reached. If excavation is carried below bottom of foundations as shown on the Drawings, fill with 3,000 psi concrete or stabilizing material, as directed by the Engineer, at no expense to Owner.

B. When unstable material is encountered which will not provide suitable bearing (as determined by the Geotechnical Engineer), fill with 3,000 psi concrete or stabilizing material specified herein, or as directed by Engineer. Contractor shall be entitled to payment for this extra work in accordance with the General Conditions.

3.07 TRENCHING

A. Perform trenching operations to the depth indicated on the Drawings or as specified.

B. Pile excavated material suitable for backfill in an orderly manner sufficient distance back from edge of excavation to avoid rollbacks, slides, or cave-ins.

C. Remove soil not suitable for backfill and waste at a disposal area designated by the Geotechnical Engineer.

D. Where new construction crosses or closely parallels existing utilities or utility services, excavate in advance of pipe laying to determine location and crossing arrangement, including exact construction line and grade.

E. Excavate by open cut under existing streets, utilities, and structures, except as noted on the Drawings or as directed by the Geotechnical Engineer.

F. Keep width of trench as narrow as possible, but provide adequate room for backfilling and jointing. Keep sides of the trench as nearly vertical as practical within the limits of excavation codes and maintain vertical walls of excavation below top of pipe. Trench widths shall be as follows:

Pipe Size	Trench Width
3/4" to 3"	12"
4" to 8"	24"
10" to 16"	36"
18" to 24"	48"
30" and Greater	Pipe size plus 18" each side

G. Excavate to full depth by machine and level trench bottom to provide uniform bearing and support for full length of pipe. Trench bottom shall be continuous, relatively smooth, and free of rocks.

H. Bedding shall consist of a minimum of 4 inches or 1/8 the pipe diameter (for pipes over 42” in diameter). Bedding material shall consist of a nominal size of 1 ½ inches.

Perched groundwater may exhibit soft conditions during trench or manhole excavation. Bedding thicknesses should be field adjusted to accommodate field conditions as they are encountered. As a minimum for small pipes with diameters between 24 and 42 inches, provide an additional 6 to 12 inches of bedding material where directed by the Geotechnical Engineer. Additional bedding material shall consist of a nominal size of 3 inches.

I. Provide bell holes at each pipe joint and allow access around entire circumference of pipe for proper jointing operations.

J. Install pipe and provide a minimum pipe envelope, consisting of compacted backfill completely around the pipe, and a distance of 12 inches above the top of the pipe.

K. When unstable material is encountered which may not provide a suitable foundation for pipe, notify the Engineer immediately. If determined by the Engineer upon his/her investigation that the material is unsuitable for foundations, the Engineer may specify and authorize remedial measures. If removal of unsuitable material is authorized, replace it with a stabilizing material consisting of three inch size, coarse, sharp, clean, well-graded crushed stone or other approved material.

L. Excavate by hand under and around utilities, where overhead clearance prevents use of machine, and under trees and shrubs where shown on the Drawings.

M. Construct sheeting, shoring, and bracing required to hold walls of excavation, to provide safety for workmen, to protect existing utilities or structures, and to permit dry construction. If wood sheeting is driven below the level of pipe, it shall be left in place to a level 5 feet below finished grade. Steel sheeting shall be pulled upon completion unless indicated otherwise on the Drawings. When a movable trench shield is used below the spring line of the pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

N. All dewatering activity is the responsibility of the Contractor and shall be considered incidental to all other work. If dewatering is necessary, obtain the Engineer's approval of proposed methods of dewatering. When dewatering is necessary, provide for handling of water encountered during construction. Lay no pipe in and pour no concrete on excessively wet soil. Prevent surface water from flowing into the excavations and remove water as it accumulates. Divert stream flow away from areas of construction.

Do not pump water onto adjacent property without approval of Architect and adjacent property owner. Do not use sanitary sewers for disposal of trench water. The cost of dewatering shall be included in the original Bid Price for construction. No additional remuneration for dewatering shall be permitted.

3.08 BACKFILLING

A. Place the backfill for structures in horizontal uniform layers not to exceed 8 inches loose thickness. Bring each layer up uniformly on all sides of the structure and thoroughly compact using pneumatic compaction or other methods as approved by the Geotechnical Engineer. Granular backfill shall not be used in exterior areas or around foundation elements.

B. Employ a placement method that will not disturb or damage foundation waterproofing.

C. When embankments are constructed on side hill slopes steeper than 5H:1V, the area of the original slope on which embankment is to be placed shall be stepped to a vertical depth of at least twelve inches (12") in order in integrate the embankment and the slope.

D. Place all embankments to the grades, lines, and contours shown on the Drawings. Place embankment systematically, as early as possible, to allow maximum time for natural settlement. The hauling of embankment material shall be distributed over the entire embankment areas to assist in compacting the material.

E. Do not place embankments over porous, wet, or spongy subgrade surfaces. If necessary, remove such unsuitable material and replace with satisfactory stabilizing materials, as directed by the Geotechnical Engineer.

F. The Contractor shall be responsible for the stability of all embankment and excavation areas and shall replace, at Contractor's own expense, any portions, which become displaced or unstable prior to the expiration of the warranty period.

G. Remove excess backfill material from site.

3.09 BACKFILL FOR TRENCHES

A. Back fill trenches immediately after the location of all lines, connections, and appurtenances are recorded, or at the Engineer's direction.

B. Construct manholes and appurtenances and perform backfilling as work progresses.

C. Backfill with material removed from excavation except where sand backfill may be specified. Backfill material shall be as specified herein and shall not contain any debris, frozen earth, large clods, stones, or other unsuitable material.

D. Place backfill simultaneously on both sides of the pipe to prevent displacement. Place backfill into the trench at an angle so that the impact on the installed pipe is minimized. Install a cushion of four feet (4') of backfill above the pipe envelope before using heavy compaction equipment.

E. Hand place backfill in the pipe envelope and compact finely divided material to twelve inches (12") over the top of the pipe.

F. Backfill remainder of trench with excavated material up to the bottom of the specified surface restoration.

G. Backfill top twelve inches (12") of the trench with soil equivalent to adjacent topsoil.

H. Do not use granular backfill in exterior trenches.

3.10 BACKFILL FOR STRUCTURES AND APPURTENANCES

A. Backfill after concrete or masonry has cured for seven (7) days and has been inspected and approved by Engineer. Backfill with material removed from excavation except where sand backfill is specified. Backfill material shall be as specified herein and shall not contain any debris, frozen earth, large clods, stones, or other unsuitable material. Backfill simultaneously

on all sides of the structure to prevent damage at all times. Brace walls of structures as required.

B. Compact backfill at structures to a density not less than specified for the adjacent trench.

C. Terminate backfill at finish grade as shown on the Drawings and dispose of excess excavation material as directed by the Engineer. Prepare backfill for surface restoration as specified for adjacent trench.

D. Do not use granular backfill material around foundation elements except for specified wall drainage material.

3.11 TOPSOIL AND FINISH GRADING

A. Upon completion of rough grading, the Contractor shall spread 6” inches of top soil. Before spreading topsoil, graded areas shall be scarified for a depth of 3 inches, and all settlements and washes shall be repaired. Finish grade shall be held 1 inch below adjacent sidewalks, curbs and pavement. Topsoil shall be free of rocks, rubble, wood and other undesirable material.

B. Perform finish grading of topsoil adequately for sod, seed or whatever material is placed in each area. Finished surface shall be reasonably smooth, compacted and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade grader operations, except as otherwise needed. Finished surface shall be not more than 0.10 feet above or below established grade or approved cross section. All swales shall be finished so as to drain readily.

C. Manually place topsoil around trees, plants, and buildings to prevent damage. Assure positive drainage away from buildings and structures.

D. Lightly compact placed topsoil. Settle topsoil with a fine spray of water to avoid separation of ingredients. Do not jet or flood topsoil.

E. Hand rake as necessary around trees, plants, buildings, and structures. Maintain sufficient topsoil reserve to re-grade as necessary after initial settlement. Upon re-grading, remove surplus topsoil and subsoil from the site

3.12 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather,

scarify surface, re-shape, and compact to required density prior to further construction.

C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION 31 2200

SECTION 31 2220

REMOVAL OF PETROLEUM IMPACTED SOIL

1.0 DESCRIPTION OF WORK

The work area includes the Highlander redevelopment area generally located at North 30th & Parker Streets, Omaha, Nebraska. Several historical gas station locations were identified within the project area during environmental assessment activities. As a result, petroleum impacted soils may be encountered and require removal and disposal during construction activities.

2.0 CONTRACTOR QUALIFICATIONS

Engineer will provide oversight services during the removal of the contaminated soil directing removal quantities and locations. The contractor shall be familiar with overexcavation procedures of contaminated soil and utilize personnel that have successfully completed the 40-Hour Hazardous Waste Site Operations Course (HAZWOPER) as required by the Occupational Safety and Health Administration (OSHA) under 40 CFR 1910.120 (e). In addition to the required personnel safety training, the contractor shall possess all applicable permits and/or licenses that may be required to transport the contaminated soil to the disposal facility.

3.0 TESTING REQUIREMENTS

Engineer will provide the necessary analytical testing for documentation of discovery and removal of impacted soils, as well as quality control/quality assurance testing during the placement and compaction of the required backfill material. Contractor shall be responsible for all analytical testing as required by the disposal facility utilized for disposal.

4.0 DISPOSAL REQUIREMENTS

All contaminated soil removed from the project site must be properly disposed of at the Butler County landfill facility located at 3588 R Rd, David City, NE 68632.

5.0 BACKFILL REQUIREMENTS

Backfill the void created by the excavation of petroleum impacted soil using suitable structural fill, as determined by the Geotechnical Engineer, from on-site soils. Compact per the structural fill requirements of Section 31 2200, Earthwork.

6.0 METHOD OF PAYMENT

See the project drawings for measurement and payment description.

END OF SECTION

SECTION 32 9100

TURF GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sodding.
   2. Seeding

1.2 DEFINITIONS

A. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

B. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Certification of grass seed.

   1. Certification of each seed mixture for turfgrass sod.

B. Product certificates.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

   2. Pesticide Applicator: State licensed, commercial.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

PART 2 - PRODUCTS

2.1 TURFGRASS SOD

A. Turfgrass Sod: Certified, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

B. Turfgrass Species: Sod of grass species shall be a turf type fescue blend suitable for use in Papillion environmental conditions. Super Turf II by United Seeds or equivalent to be provided.

2.2 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2.3 PESTICIDES

A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 TURF AREA PREPARATION

A. Reduce elevation of planting soil to allow for soil thickness of sod.

B. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

C. Before planting, obtain Owner Representative's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.2 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.3 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

B. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings.

C. Contractor shall maintain sod for a minimum of 30 calendar days and include a minimum of two mowings.

3.4 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:
   1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

END OF SECTION 329100

SECTION 32 9200

PLANTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section includes provisions for trees, shrub, and perennial plant material.

1.02 SUBMITTALS

A. Submit list of sources for all tree and perennial plant materials for approval. Plant material sources shall include the names and locations of nurseries proposed as sources of acceptable plant materials and a list of the plants each nursery shall provide. The plant list shall include the botanical and common name and the size at the time of selection. Inspect all nursery materials to determine that the materials meet the requirements of this section. Trees and shrubs shall be purchased from a growing nursery, and shall be obtained from the project site eco-region as defined for the State of Nebraska. Wholesale and resale plant suppliers shall not be used as sources unless the contractor can certify that the required plant materials are not available from a growing nursery. When utilized, the contractor shall submit the name and location of the growing nursery from where the trees were obtained.

B. Plant and material certifications include:

1. Name, location, contact and website information of the nursery providing plant materials for review and approval by Owner's Representative;

2. Certificates of inspection as required by governmental authorities;

3. Label data substantiating that trees and shrubs comply with specified requirements;

C. During course of installation, carefully record in red line on a print of the planting drawings all changes made to the planting layout during installations; approved by the Owner's Representative. Final payment for planting will not be authorized until an accurate and complete as-built is submitted.

D. Proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of Substantial Completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

E. Typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one calendar year. Provide a month by month list of recommended tasks to be completed.

F. Submit product data, supplier sources and small sample of the following:

1. Double-ground Hardwood Mulch;
2. Compost;

3. Fertilizer and Bio-stimulants;
4. Herbicide and Pre-emergent
5. Tree stakes and guys

1.03 QUALITY ASSURANCE

A. Engage a single firm specializing in landscape work with a minimum of 5 years experience who has completed landscaping work similar in material, design, and extent to that indicated for this project and with a record of successful landscape establishment. Require installers to maintain an experienced full-time supervisor on the project site during times that landscaping is in progress.

B. Source Quality Control:

1. Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to Owner's Representative, together with proposal for use of equivalent material.

2. The latest revisions of the following standards shall apply to work hereunder: ANSI Z60.1.

3. Deliver packaged materials to the site in their original containers with all labels showing weight, analysis, and name of manufacturer intact and legible. Use all means necessary to protect all materials from deterioration before and during delivery, and while stored on site. Also protect the installed work and materials of all other trades.

4. Do not prune prior to delivery unless otherwise approved by Owner's Representative. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches, or destroy natural shape. Provide protective covering during delivery. Plants with damaged or broken containers shall be rejected.

1.04 OBSERVATIONS

A. In addition to normal progress observations, schedule, and conduct the following formal observations to verify compliance with the specifications, giving the Owner's Representative at least 72 hours prior notice of readiness for observation.

B. Owner shall deliver trees and shrubs after preparations for planting have been completed and plant immediately. Contractor shall be responsible to coordinate with Owner when tree and shrub planting preparations are complete. Owner's Representative shall be notified 72 hours in advance when trees shall be delivered for final approval of product. Owner's Representative retains the right to further observe trees and shrubs for size and conditions of balls and root systems, insects, injuries, and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected plants immediately from project site and replace at the Contractor's expense with approved materials. Owner's Representative further retains the right for:

1. Observation of labels and the condition of all items delivered to the site;

2. Observation of any repairs or replacements that are necessary;

3. Observe the staking for all trees and shrubs prior to planting;

4. Observation of bed preparation prior to planting;

5. Observation of plant material at end of plant warranty period.

C. The Contractor shall field demonstrate the means and methods of installing plant materials to the approval of the Owner's Representative.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials to the site in their original containers with all labels showing weight, analysis, and name of manufacturer intact and legible. Use all means necessary to protect all materials from deterioration before and during delivery, and while stored on site. Also protect the installed work and materials of all other trades.

B. Do not prune prior to delivery unless otherwise approved by Owner's Representative. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches, or destroy natural shape. Provide protective covering during delivery. Plants with damaged or broken containers shall be rejected.

C. Owner shall deliver trees, shrubs, and perennial plant material after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set plant material in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means to retain moisture. All plant material shall be installed within same day after arrival on site. It shall be the Contractors responsibility to coordinate delivery of plant material with other site construction to ensure plant material does not remain unplanted and to deliver quantities that can be properly planted on the same day as delivery to project site.

D. The Contractor shall use all means necessary to protect all materials of this section before, during and immediately after installation and to protect all materials designated to remain. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

E. In the event of damage or rejection, immediately make all repairs and replacements necessary to the approval of the Owners Representative. Owner shall be reimbursed for plant material cost.

F. The Contractor shall be responsible for the maintenance of all plant materials throughout the duration of the construction project. All trees and shrubs shall be alive and growing (or dormant) at the time of final inspection.

1.06 PROJECT CONDITIONS

A. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

B. When conditions detrimental to plant growth are encountered, such as pebble fill, adverse drainage conditions, or obstructions, notify Owner's Representative before planting.

1.07 SEQUENCING AND SCHEDULING

A. Proceed with, and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required. All planting shall be performed during favorable weather conditions. The planting operations shall not be performed during times of extreme drought, when ground is frozen, or during times of other unfavorable climatic conditions unless otherwise approved by the Owner's Representative. The Contractor assumes full and complete responsibility for all such plantings and operations.

B. Recommended dates for tree planting shall be April 15 – May 31 and October 15 – November 30. Correlate planting with specified maintenance periods to provide maintenance from date of Substantial Completion.

C. The Owner's Representative shall maintain the sole authority to establish seasonal limitations regarding the installation of biological plant materials. The initiation of a delay or the designation of a suitable planting period shall be considered incidental to the project and shall be provided by the Contractor at no additional cost to the Owner.

D. All planting work shall be coordinated with all other work included in this contract and with work being done by others.

E. Plant trees and shrubs after final grades are established, and following planting of native grasses, unless otherwise acceptable to Owner's representative. Protect seeded areas and promptly repair damage resulting from planting operations.

1.08 WARRANTY

A. Warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Warrant trees and shrubs for a period of one (1) year after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond the Contractor's control.

C. Immediately prior to plant warranty observation, the Contractor will be responsible for the removal of all staking material on site.

D. The Contractor shall replace once, all dead plants and all plants not in a vigorous, thriving condition as determined by the Owner's Representative during and at the end of the warranty period. Contractor shall plant replacements as soon as weather conditions permit, and within a specified planting period. The replacement plants shall be free of dead or dying branches and branch tips, and shall bear foliage of a normal density, size, and color. Trees, shrubs, and perennial plant material to be replaced shall be installed at no cost to the Owner. If contractor does not install plant material per specifications and details that results in plant mortality, contractor shall add one (1) additional plant replacement after warranty period.

E. Replacements, beyond those available, shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in the Specifications.

F. The Contractor shall make all necessary repairs to other site and project features due to plant replacements. Such repairs shall be done at no cost to the Owner.

G. All replacements shall be plants of the same kind and size specified in the plant schedule. They shall be furnished by the Owner and planted by the Contractor as specified. The cost shall be borne by the Contractor. After Substantial Completion replacements resulting from the removal, loss, or damage due to occupancy of the project site by others, vandalism, or acts or neglect on the part of others, or physical damage by animals, may be approved and paid for by the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Plant Materials

1. All plants designated balled and burlapped ("B&B") in the Plant Schedule shall be adequately balled with firm natural balls of earth of a diameter and depth no less than that specified in ANSI 60.1-1986. Balls shall be firmly wrapped with burlap. All plants which are 2" in caliper or over shall be drum laced. No balled plants shall be planted if the ball is cracked or broken either before or during the process of planting. Container grown plants will be acceptable in lieu of balled and burlapped deciduous plants subject to specified limitations of ANSI Z60.1 for container stock.

2. All materials shall be inoculated with a suitable mycorrhizal inoculant by the plant provider.

3. Scientific and common names used for plants are generally in conformity with "Standardized Plant Names." The names of varieties are generally in conformity with the names accepted in nursery trade. Plant material size and measurements shall conform to the “American Standard for Nursery Stock”, ANSI Z60.1-1986.

4. Plants shall be nursery grown, freshly dug, vigorous stock, normally shaped, heavy and well branched foliage when in leaf and shall have healthy, well-developed root systems. Trees must be self-supporting with straight trunks and with leaders intact. All plants furnished shall be free of any insect infestation, dead wood, bruises, or other root or branch injuries and shall have been grown under climatic conditions with temperature extremes similar to those of the project area for a minimum of two years prior to use on this project.

5. Plants shall not be pruned before delivery. Trees, which have a damaged or crooked leader or multiple leaders, unless otherwise specified, will be rejected. Trees with abrasion of bark, sunscalds, disfiguring knots, or fresh cuts of limbs over 1 inch in diameter which have not completely calloused will be rejected. Plants shall be measured when branches are in a normal position. If a range of size is given, no plants shall be less than the minimum size and not less than 50% of the plants shall be as large as the upper half of the range specified. The measurements specified are the minimum size acceptable and are the measurements after pruning where pruning is required. Plants that meet the measurements specified, but do not possess a normal balance between height and spread will be rejected. Plants shall be true to species and variety and shall conform to measurements specified in the Plant Schedule, except that plants larger than specified may be used if approved by the Owner’s Representative. Use of such plants shall not increase the contract price. If larger plants are approved, the ball of earth shall be increased in proportion to the size of the plant according to ANSI Z60.1-1986. Plants planted in rows shall be matched in size and form.

6. Root balls shall be adequately protected at all times from sun and from drying winds. All balled and burlapped plants which cannot be planted immediately upon delivery shall be set on the ground and

well protected with soil or other acceptable material. Plants shall not remain unplanted for longer than day of delivery.

7. All plant materials shall bear a tag providing full and legible identification of plant genus, species and variety.

C. Mulch

1. Double-ground hardwood mulch that is free from deleterious materials shall be used for top dressing of trees. Size of particles may vary from minimum of ¼ inch to maximum of 2 inches.

D. Tree Protection

1. Open mesh, low-density polyethylene, 42 inches in length minimum up to first branching, shall be placed on each tree stem to reduce harm from rabbits, rodents, deer, and light mechanical damage. Cost for this item is subsidiary to the unit cost for the trees.

E. Tree Stakes and Guys

1. With written approval from Owner's Representative, trees shall be staked with 3 hardwood posts. Stakes shall be approximately 2" wide and 6-6.5 feet long. Posts are to be driven a minimum of 2 feet into undisturbed stable earth. Any trees staked shall be as detailed on plans. An acceptable tree tie is one that is easily adjustable, strong in all weather, and is easily attached and removed. Hose and wire are not acceptable for staked trees. Provide the following:

2. Tree tie webbing;

a. 1" wide Arbor Tie nylon straps specifically provided for use in tree stabilizing activities.

3. Other tree tying materials may be accepted. Submit sample, product information, and plant tying methods to the Owner's Representative for approval.

F. Water

1. The Contractor may employ the use of water from existing hydrants for this work. The Contractor shall provide all needed hose, sprinkler heads and other appurtenances. If the Contractor provides his own water, it shall not contain material injurious to plant.

G. Anti-Desiccant

1. Emulsion type, film-forming agent designed to permit transpiration, but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.

H. Miscellaneous materials

1. All other materials, not specifically described but required for a complete and proper installation or construction, shall be as selected by the Contractor subject to the approval of the Owner's Representative.

PART 3 CONSTRUCTION REQUIREMENTS

3.01 SURFACE CONDITIONS

A. Prior to all landscape installation, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Weeds that have emerged or persisted shall be removed or eradicated. Verify that planting may be completed in accordance with the original design and the referenced standards.

B. In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 PREPARATION FOR PLANTING OF TREES

A. Unless directed by the Owner's Representative, the indication of a plant on the planting plan is to be interpreted as including the digging of a hole, furnishing of a plant of the specified size, the work of planting, wrapping and other activities where called for.

B. Consult the plans for type and size of and types of trees and shrubs. The Contractor shall be responsible for selection and tagging at nurseries stocking the specified materials. Contractor shall inform the Owner's Representative three (3) days in advance of when planting will commence, of anticipated delivery date of material, and will furnish an itemized listing of actual quantities of plant materials to be delivered. Failure to notify the Owner's Representative in advance, in order to arrange proper scheduling, may result in loss of time or removal of any plant or plants not installed as specified or directed.

C. Contractor will be provided with a surveyed and staked boundary for the area. The Owner's Representative will observe all plant locations. The Contractor shall not begin excavating plant pits until plant locations have been approved. In case underground obstruction or utilities are encountered, locations shall be changed under the direction of the Owner's Representative without extra charge to the Owner.

3.03 EXCAVATION FOR TREES

A. Holes for balled and burlapped trees shall be a minimum of 3 times greater in diameter than the spread of the root ball and at a depth such that root flare is even with or 1" above grade.

3.04 PLANTING TREES

A. Remove plant from container, set container stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top crown of plant at 2 inches above elevation adjacent to finished landscape grades. When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. Plants shall be backfilled with soil excavated from the plant pit that is spaced and broken up as it is placed. Soil clods over 2 inches will not be permitted. When excavation is approximately 2/3 full, apply specified fertilizer and water thoroughly before placing remainder of backfill.

B. Repeat watering until no more is absorbed. After watering, backfill with soil mixture until the surface of the backfill is level with the surrounding grade.

C. For balled and burlapped trees: cut and remove all ropes, wire or strings from top of ball after plant has been set. Leave burlap wrapping intact around balls. Turn under and bury portions of burlap exposed at top of ball. Containers for container-grown or supplied plant materials shall be completely removed.

3.05 DOUBLE-GROUND HARDWOOD MULCH

A. Apply double-ground hardwood mulch for each planting as shown in the plans and details. The Contractor shall determine his own quantities based on the area, the work and site investigations. Provide a minimum depth per plans for all trees and shrubs.

PART 4 MAINTENANCE

4.01 MAINTENANCE

A. Maintain trees and perennial grasses by watering, cultivating, and weeding as required for healthy growth. Plants shall be inspected at least once per month by the Contractor and needed maintenance performed promptly. Maintain for the remainder of the 2015 growing season ending approximately October 31, 2015.

4.02 CLEANUP AND PROTECTION

A. During landscape work, keep pavements clean and work area in an orderly condition. Properly dispose of all resultant dirt, debris, and other waste material.

B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed by the Owner's Representative at no additional cost, unless damage is the result of vandalism.

C. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

4.03 OBSERVATION AND ACCEPTANCE

A. When landscape work is completed, Owner's Representative will, upon request, make an observation to determine acceptability. Landscape work may be observed for acceptance in portions as agreeable to Owner's Representative or Owners representative, provided each portion of work offered for observation is complete.

B. When observed landscape work does not comply with requirements, replace rejected work and continue specified maintenance until approved by Owner's Representative and found to be acceptable. Remove rejected plants and materials promptly from project site.

C. Trees and perennial plant material are to be inspected to certify that all plants have been installed according to plans and are acceptable. Upon satisfactory completion of all replacements and repairs requested, Owner's Representative shall certify granting of Substantial Completion. The warranty will begin on the date of Substantial Completion. Contractor to continue maintenance of all plants for 1 year following Substantial Completion. At end of the warranty period, Owner's Representative or Owners representative will inspect plants upon written request by Contractor. Any plant that is dead, or not in satisfactory health as determined by the Owner's Representative or Owners representative will be replaced by the Contractor at no cost to the Owner. The Contractor will not be responsible for vandalism or theft.

END OF SECTION

Thiele Geotech Inc

Geotechnical Exploration Report

Highlander

North 30th Street and Parker Street
Omaha, Nebraska

Prepared for:
Brinshore Development, LLC
666 Dundee Road
Suite 1102
Northbrook, IL 60062

May 19, 2015
TG Project No. 15100.00

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Geotechnical Exploration Report

Highlander

Table of Contents

INTRODUCTION

Thiele Geotech, Inc. has completed a supplemental preliminary geotechnical exploration study for the proposed Highlander project to be located near the intersection of North 30th Street and Parker Street in Omaha, Nebraska. The purpose of this study was to identify the general soil and ground water conditions underlying the site; to evaluate engineering properties of the existing soils; and to provide overlot earthwork and site preparation recommendations. An additional exploration will be required to provide design criteria and parameters for the proposed structures.

This study included soil borings, laboratory testing, and engineering analysis. A series of 12 test borings was spaced across the project site at strategic locations. A preliminary geotechnical exploration consisting of 5 test borings was also conducted at the project site by Schemmer (No. 06344.002) on May 9, 2012. The field and laboratory data are presented in the Appendix, along with a description of investigative methods. Also located in the Appendix are the boring logs and soil test summary for the preliminary exploration conducted by Schemmer.

The drilling and testing performed for this study were conducted solely for geotechnical analysis. No analytical testing or environmental assessment has been conducted. Any statements or observations in this report regarding odors, discoloration, or suspicious conditions are strictly for the information of our client. An environmental assessment of the project site was previously conducted by others.

It should also be noted that this report was prepared for design purposes only, and may not be sufficient for a contractor in bid preparation. Prospective contractors should evaluate potential construction problems on the basis of their own knowledge and experience in the local area and on similar projects, taking into account their own intended construction methods and procedures.

This report is an instrument of service prepared for use by our client on this specific project. The report may be duplicated as necessary and distributed to those directly associated with this project, including members of the design team and prospective contractors. However, the technical approach and report format shall be considered proprietary and confidential, and this report may not be distributed in whole or in part to any third party not directly associated with this project. By using and relying on this report, all other parties agree to the same terms, conditions, and limitations to which the client has agreed.

PROJECT DESCRIPTION

Our understanding of the project is based upon information provided by Ehrhart, Griffin & Associates, Inc.

The Highlander project site is generally bound on the north by Grant Street, on the east by North 29th Street, on the south by Parker Street, and on the west by Pleasant Hill Cemetery and Prospect Hill Cemetery. A majority of the site was previously developed with low income residential structures. The structures on the east side of North 30th Street were completely demolished prior to August of 2009 and the structures on the west side were completely demolished prior to June of 2010. All basements within the site have been backfilled. Based on the partial preliminary geotechnical exploration conducted by Schemmer in May of 2012, moderate compactive effort was used on the basement backfill, but the soil appears to not have been completely free of demolition rubble and debris.

Preliminary structure layouts and locations have been provided but not yet finalized at the time of this report. Anticipated structures for the project include: multi-story apartment complexes, residential town homes, single-story commercial buildings, senior living complexes, etc. Accompanying infrastructure and parking lot pavement will also be constructed. First level parking garages are also anticipated in a few of the multi-story apartment complexes.

Preliminary phasing plans have been provided by Ehrhart, Griffin & Associates. All phases included on this plan, with the exception of the Future Phases, will need to be graded to establish final elevations of the future building pads and surrounding improvements.

SURFACE AND SUBSURFACE CONDITIONS

SITE CONDITIONS

The project site is generally bound on the north by Grant Street, on the east by North 29th Street, on the south by Parker Street, and on the west by Prospect Hill Cemetery and Pleasant Hill Cemetery. For the most part, the site is primarily surfaced with grass. Sparsely planted woody vegetation from previous site development is located throughout the site. The entire western boundary, which slopes upward towards the cemeteries, is heavily wooded. Surface water generally drains from west to east towards North 30th Street. A recreation area and playground are located near the northern limit.

LOCAL GEOLOGY

The surface geology of eastern Nebraska is Pleistocene in age and consists of eolian (wind-blown) deposits of Peoria and Loveland loess. The loess formed in dune-shaped hills along the Missouri River and various tributaries. The Peoria loess typically consists of silty lean clays that are stiff when dry but become softer with increasing moisture content. The Peoria sometimes exhibits low unit weight and is collapse susceptible. The Loveland loess is an older deposit, and typically consists of lean clays. The Loveland generally exhibits higher unit weights and shear strengths than the Peoria. Perched moisture conditions sometimes occur above the Peoria/Loveland interface.

The loess overlies Pleistocene glacial deposits of Kansan and Nebraskan till. The till consists of lean to fat clays mixed with sand, gravel, and occasional cobbles. The glacial deposits are generally fairly deep, but are sometimes near the surface at lower elevations on steep slopes. Cretaceous sandstone or Pennsylvanian limestone and shale form the bedrock unit below the glacial deposits. The depth to bedrock is normally great, and rock is rarely encountered in construction.

Along drainageways, alluvial and colluvial deposits are typically present. These soils were formed by erosion of the adjoining loess-mantled hills. Alluvial deposits are generally present along creeks and in major drainageways. The upper several feet of alluvium are usually stiffer due to the effects of desiccation. Colluvial soils are usually located at the base of steep slopes and in upland draws, and are formed by local creep and sloughing.

SOIL CONDITIONS

The soils encountered in the test borings conducted by both Thiele Geotech and Schemmer consisted of man-placed fill, altered Peoria loess, Peoria loess (transition loess), Loveland loess, and Kansan till.

With the exception of borings B-2, B-4, T-4 and T-7, man-placed fill was encountered in every boring. The man-placed fill layer thickness ranged from 1.0 foot in boring T-6 to 13.5 feet in borings T-1 and T-11. It was generally described as a brown to dark brown, slightly moist to very moist, soft to hard, lean to fat clay. Minor to moderate amounts of brick and concrete rubble were noted in borings B-1, B-

3, B-5, T-1 thru T-3, T-5, and T-10 thru T-12. Based on an assumed Standard Proctor (ASTM D698), the fill had a compaction range of 83 to over 100 percent of the maximum dry density.

A 1-foot thick layer of altered Peoria loess was encountered at the surface of boring T-4. This is a weathered layer of Peoria loess that has been altered physically and chemically due to the effects of freeze-thaw, exposure, and has become organic rich from years of vegetative growth. It was described as a dark brown, very moist, firm, fat clay.

With the exception of borings B-1, B-2 and B-5, Peoria loess was encountered in every boring. It was generally described as a light brown to light gray, slightly moist to wet, soft to firm, lean clay.

Loveland loess was encountered below the Peoria loess in borings B-1 thru B-5 and T-4 thru T-12. It was generally described as a reddish brown to light brown, moist to wet, firm to hard, lean to fat clay.

Kansan till was encountered below the Loveland loess in borings B-2, B-5, T-5, T-6, T-9, and T-12. It was generally described as a light grayish brown to yellowish brown, slightly moist to wet, firm to hard, fat clay.

Ranges of engineering properties from laboratory tests on selected samples are presented in Table 1.

Table 1 - Laboratory Results

Soil Layer	Moisture Content (%)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (tsf)	Standard Penetration Values (N)*	Classification *(LL/PI)*
Man-placed fill	14 to 29	84 to 117	0.2 to 3.9	- -	CL (38/26) (41/18) CH (visual)
Peoria loess	12 to 37	84 to 104	0.3 to 2.4	- -	CL (35/14)
Loveland loess	14 to 31	89 to 107	1.1 to 4.5	- -	CL (visual) CH (visual)
Kansan till	15 to 26	98 to 114	2.1 to 2.5	22 to 25	CH (visual)
* Standard Penetration Values are actual field recorded values and have not been corrected for hammer energy					

GROUND WATER OBSERVATIONS

Ground water levels were observed in the borings as presented in Table 2. Note that ground water levels may fluctuate due to seasonal variations and other factors. The materials encountered in the test borings

have relatively low permeabilities and observations over an extended period of time through use of piezometers or cased borings would be required to better define current ground water conditions.

Table 2 - Water Level Observations

Boring Number	Boring Elevation (ft.)	Water Level (ft. below grade)			Ground Water Elevation (ft.)
		During Drilling	After Drilling	24± Hours After Drilling	
T-1	1119.0	18.5	18.5	- -	1100.5
T-3	1125.0	8.5	17.2	7.0	1118.0
T-5	1135.0	17.0	17.6	15.4	1119.6
T-11	1172.0	38.5	39.0	37.2	1134.8
T-12	1165.0	38.5	38.5	- -	1126.5

Perched ground water is commonly observed near the loess/glacial interface. A perched ground water condition occurs when surface water percolates downward through the relatively permeable loess deposits to the less permeable glacial clays. This commonly creates a zone of saturated loess soils above the glacial clays that have relatively low strength and high compressibility, which appears to be the condition at this site.

ANALYSIS AND RECOMMENDATIONS

GENERAL

The Highlander project is significant in scope and will ultimately include several multi-story apartment complexes, multi-story senior living complex, retail strip mall, multi-story rental housing units, infrastructure, interior access roads, parking lots, and sidewalks. The existing recreational areas and woody vegetation will all be removed as part of the project. This project will contain numerous phases over a period of time.

Thiele Geotech performed 12 preliminary borings across the project site to supplement the 5 preliminary borings drilled by Schemmer previously. This geotechnical report focuses on structure specific overlot grading and building pad preparation recommendations. An additional geotechnical exploration will be required to develop specific bearing capacity recommendations for the structures.

The soils encountered within the borings varied moderately across the project site. Due to this, area-specific building pad preparation recommendations have been provided. The Zone Plan, located in the Appendix, highlights the locations of the zones referred to in the site preparation recommendations below.

As displayed by the Sanborn images from 1973, 1982, and 2010, the site has been heavily developed previously. The man-placed fill in the boring logs reflect a typical urban development site. Brick, concrete, glass, and other building materials were encountered in a majority of the samples collected from the fill layer. Borings B-2, B-4, T-4 and T-7 did not encountered any fill, but this is likely not an adequate reflection of the surficial soil conditions surrounding these borings. It is likely that these borings were drilled in between previous structures. The recommendations provided in this report are predicated on soil conditions encountered in the preliminary borings. However, it should be noted that the soil conditions are likely to vary. The geotechnical engineer should be provided the opportunity to examine the subgrade conditions of the proposed building pad locations during stripping and grading processes to determine if any additional pad preparation procedures will be necessary.

According to the preliminary grading plan supplied by Ehrhart Griffin, moderate cuts and only minor fills are anticipated across the project site. A sample of Peoria loess collected from boring T-8 was tested for compressibility per ASTM D2435. The sample displayed overconsolidated conditions. Based on these results, an estimated settlement of 0.25” per foot of fill is expected. A footing construction delay of 2 to 3 weeks after completion of fill placement should be provided in the areas of site which receive at least four feet of fill. A settlement plate may be installed and surveyed weekly to monitor settlement in schedule-sensitive areas of the project site.

SITE PREPARATION – ZONES A, B, C, E, G, J

Borings B-2, B-5, T-1 thru T-3, T-5, T-8, T-10 and T-11 were all drilled in the general locations of these various single-story and multi-story commercial and residential structures. Approximately 2 to 14 feet of fill was encountered at the surface of these borings. The fill was noted to contain trace brick and concrete fragments throughout. In the existing condition, these rubble fill soils are unsuitable for support of the proposed buildings on a shallow foundation. Therefore, we recommend conducting an undercut of each building pad. The undercut should extend down 3 feet below the lowest footing subgrade elevation and should also extend laterally 10 feet outside of the structure perimeter. If significant rubble is encountered at the base of the undercut, the undercut should be extended deeper to remove the unsuitable material. The undercut will allow for replacement of controlled structural fill to the desired finished elevations. With the exception of rubble fill and fat clay Loveland loess/Kansan till, the on-site soils will be suitable for use as structural fill. This process will provide a clean, stable and uniform bearing surface for the shallow foundation of these structures.

SITE PREPARATION – ZONE H

Borings B-4, T-9 and T-12 were drilled in the location of the multi-story complex. Approximately 3 to 9 feet of fill was underlain by Peoria loess. The fill in this area was noted to contain minor brick and concrete fragments throughout. The Peoria loess exhibited typical densities and moisture conditions. Due to the anticipated heavy structural loads stemming from the first level cast-in-place parking area, the existing soil condition will be unsuitable for a shallow foundation system. Therefore, we recommend use of an intermediate foundation system such as the *Geopier* Rammed Aggregate Pier®(RAP) system to support the building foundations.

A *Geopier* RAP system is a patented design/build intermediate foundation soil improvement process which consists of constructing shallow aggregate columns of highly compacted crushed aggregate materials to improve the bearing conditions under isolated or continuous spread footings, mat foundation systems, and/or grade supported slabs. Based on a preliminary design conducted by a *Geopier* design engineer, an allowable bearing capacity around 4,000 to 5,000 psf could be expected and result in less than 1 inch of total settlement for these conditions and less than 3/4 inch of differential movement.

Geopier RAP elements are constructed by drilling a 30 inch diameter hole in the ground to depths ranging from about 7 to 20 feet below the foundation support elements. Once the desired penetration is achieved, a lift of open-graded crushed aggregate is placed in the bottom of the hole and, using the patented ramming system, is densified to form a stabilizing layer. RAP installation proceeds with subsequent lifts of well-graded crushed aggregate placed in about 12 inches in thickness. Each lift is rammed with a high-energy beveled tamper that both densifies the aggregate and forces the aggregate laterally into the sidewalls of the hole. This action increases the lateral stress in surrounding soil; thereby further stiffening the stabilized composite soil mass. The result of *Geopier* RAP installation is a

significant strengthening and stiffening of subsurface soils that then support on-grade slabs and high-capacity footings.

The *Geopier* RAP soil reinforcement system is proprietary and would be designed and installed under the direction of Ground Improvement Engineering, the (licensed) regional specialty designer (licensed by Geopier Foundation Company). Due to the specialty nature of this soil improvement procedure, we recommend that a performance specification be used for this system.

We recommend that a static field modulus test be performed to verify the design parameters. The test RAP element should be loaded to 150 percent or more of the design capacity. Installation of the modulus test RAP element should be monitored by a representative of our firm.

SITE PREPARATION – ZONES D, F

Borings T-4 and T-7 were drilled in zones D and F, respectively. These borings encountered natural loess deposits in their entirety. However, as displayed by the Sanborn images located in the Appendix, several existing structures were located within these zones. The soil conditions described in these borings may not be an adequate representation of the overall soil conditions in these zones. In the event of natural conditions throughout, a reduced bearing pressure would be provided for these structures after an additional exploration. However, in the event that rubble fill is also encountered in these zones during the overlot grading processes, the recommendations highlighted above for Zones A, B, C, E, G, and J would also apply for zones D and F.

SITE PREPARATION – ZONE K

Based on the grading plan, significant cuts nearing 15 feet are expected in this portion of project site. The proposed cuts will place existing grade at, or very near, the location of the underling Kansan till layer. Upon visual inspection, the Kansan till was described as a moist, hard, fat clay. Fat clay soils have a tendency to shrink and swell with varying moisture conditions. Therefore, we recommend conducting a minimum 2 feet undercut of the floor slabs where Kansan till is encountered at finished grade. The undercut should extend laterally one foot for every foot of overexcavation. The undercut will allow for replacement of lean clay structural fill up to the desired finished elevation.

SITE PREPARATION – PAVEMENTS

Pavement performance is directly affected by the degree of compaction, uniformity, and stability of the subgrade. This is particularly important where traffic from heavy trucks is anticipated. The widespread rubble fill soils varied significantly in both compaction and uniformity. To establish a more stable subgrade for the proposed parking lots and interior roadways, we recommend a minimum 2 feet undercut of the pavement subgrades. The undercut may end laterally at the pavement edge. The undercut will allow for replacement of controlled structural fill to the finished grade.

For concrete pavements, it is recommended that the upper 12 inches of the subgrade be compacted to a minimum of 90 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D1557, Modified Proctor). Subgrade preparation should extend a minimum of 2 feet laterally beyond the edge of the pavement.

For asphalt pavements, greater stability is required due to the extreme loading conditions placed on the subgrade during laydown. Subgrades for asphalt pavements should be prepared by compacting the upper 12 inches to a minimum of 92 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D1557, Modified Proctor). Subgrade preparation should extend a minimum of 2 feet laterally beyond the edge of the pavement, including the concrete curb and gutter section.

Under sidewalks, the upper 6 inches of the subgrade should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor). Subgrade preparation should extend laterally 6 inches beyond the edge of the sidewalk.

DEWATERING

As displayed in Table 2, ground water was encountered in only a few borings and at varying elevations throughout the site. This ground water is most likely perched atop a less permeable fat clay Loveland loess or Kansan till layer. Minor to significant cuts are anticipated in select areas on site to establish the proposed grades, especially near the east end of the project site. This perched ground water may have a tendency to pump up to the surface in areas due to heavy machinery traffic. In addition, ground water may also be encountered in building pad overexcavations. In the event that a perched water table is encountered, dewatering will likely need to be accomplished through use of sump pits and pumps to control water within the clay material. A dewatering contractor may need to be consulted for an opinion on how best to control ground water on the project site.

EARTHWORK AND EXCAVATIONS

Rubble and waste materials from site clearing and demolition should be removed from the site and lawfully disposed or recycled. Waste materials should not be buried on-site. Demolition of structures should include excavation and removal of foundations and floor slabs. Areas disturbed during demolition of the existing structures should be thoroughly evaluated by the geotechnical engineer prior to placement of structural fill. Where trees are cleared, the stumps should be excavated and removed.

Relocation of any existing utility lines within the zone of influence of proposed construction areas should also be completed as part of the site preparation. The lines should be relocated to areas outside of the proposed construction. Excavations created by removal of the existing lines should be cut wide enough to allow for use of heavy construction equipment to recompact the fill. In addition, the base of

the excavations should be evaluated by a geotechnical engineering representative prior to placement of fill.

Topsoil and vegetation should be stripped to a depth of 4 to 6 inches in areas to be disturbed during grading, including borrow and fill areas. Stripping depths will likely vary and should be adjusted to remove all vegetation and root systems. A representative of the geotechnical engineer should monitor the stripping operations to observe that all unsuitable materials have been removed. Care should be exercised to separate these materials to avoid incorporation of the organic matter in structural fill sections.

Surfaces to receive fill should be broken up and recompacted to allow new fill to bond to the existing soil. Slopes steeper than 5H:1V should be benched before placing fill.

With the exception of rubble fill soils, the excavated site soils will generally be suitable for reuse as structural fill, although some moisture conditioning may be required. Any off-site borrow should be a clean, inorganic silt or lean clay with a liquid limit less than 45 and a plasticity index less than 20. Borrow material should not contain an appreciable amount of roots, rock, or debris, and should not contain any foreign material with a dimension greater than 3 inches.

All fills should be placed and compacted as structural fill. Fill should be placed in thin lifts not to exceed 8 inches loose thickness. Structural fill should be compacted with a sheepsfoot type roller to a minimum of 95 percent of the maximum dry density (ASTM D698, Standard Proctor). Moisture content should be controlled to between -3 and +4 percent of optimum.

Backfill soils in narrow utility trenches (less than 6 feet wide) below a depth of 5 feet should be compacted to a minimum of 92 percent of the maximum dry density at a moisture content between -3 and +6 percent of optimum (ASTM D698, Standard Proctor). Backfill within the upper 5 feet of narrow trenches, for the full depth of any wider trenches, and around manholes should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum. For trenches more than 5 feet outside of paved areas, backfill should be compacted to a minimum of 90 percent of the maximum dry density at a moisture content that will permit compaction to that level. Lift thicknesses should be appropriately matched to the type of compaction equipment used.

Quality control testing is an important part of any earthwork operation. It is recommended that a representative of the geotechnical engineer periodically monitor earthwork operations to verify proper compliance with these recommendations, including compaction levels.

OSHA's Construction Standards for Excavations require that the contractor's excavation activities follow certain worker safety procedures. These include a requirement that excavations over 4 feet deep be sloped back, shored, or shielded. The soils encountered in the test borings generally classify as type

B and C soils according to the OSHA standard. The maximum allowable slope for an unbraced excavation in these soils is 1H:1V and 1.5H:1V, respectively, although other provisions and restrictions apply. Excavations over 20 feet deep require specific design by a licensed Professional Engineer. The contractor is solely responsible for site/excavation safety and compliance with OSHA regulations. The geotechnical engineer assumes no responsibility for site safety, and the above information is provided only for consideration by the designers.

SURFACE DRAINAGE AND LANDSCAPING

The long-term performance of any project is contingent upon keeping the subgrade soils at more or less constant moisture content, and by not allowing surface drainage a path to the subsurface. Positive surface drainage must be maintained at all times.

Construction staging and grading should provide for removal of surface water from the site. If prolonged ponding of surface water occurs, removal and replacement of wet or disturbed soils may be necessary. Temporary grades should be established to prevent runoff from entering excavations.

OTHER RECOMMENDATIONS

During detailed design, additional issues may arise and possible conflicts may occur with our recommendations. Such issues and conflicts should be resolved through dialogue between the geotechnical engineer and designers. It is recommended that the geotechnical engineer review the final design, including the plans and specifications, to verify that our recommendations are properly interpreted and incorporated into the design.

If any changes are made in the design of the project, including the nature or location of proposed facilities on the site or significant elevation changes, the analysis and recommendations of this report shall not be considered valid unless the changes are reviewed. The analysis and recommendations of this report should not be applied to different projects on the same site or to similar projects on different sites.

The analysis and recommendations in this report are based upon borings at specific locations. The nature and extent of variation between boring locations is impossible to predict. Because of this, geotechnical recommendations are preliminary until they have been confirmed through observation of site excavation and earthwork preparation. If variations appear during subsequent exploration or during construction, we may reevaluate our recommendations and modify them, if appropriate. The geotechnical engineer should be retained during construction to observe compliance with the recommendations of this report and to provide quality control testing of earthwork construction. If these services are provided by others, including the contractor, the entity that provides construction phase observation and testing shares responsibility as the geotechnical engineer of record for implementing or modifying these recommendations.

Respectfully submitted,
Thiele Geotech, Inc.

Prepared by,

Andrew J. Miller, E.I.

Prepared under the supervision of,

Robert K. Lapke, P.E.
Nebraska License E-10089

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APPENDIX

1973 Sanborn Aerial

1982 Sanborn Aerial

2010 Sanborn Aerial

Subsurface Exploration Methods

Legend of Terms

Zone Plan

Boring Location Plan

Boring Logs

Soil Test Summary

Schemmer Boring Logs (No. 06344.002)

Schemmer Soil Test Summary (No. 06344.002)

Consolidation Test

SUBSURFACE EXPLORATION METHODS

The fieldwork for this study was conducted on April 3, 2015. The exploratory program consisted of 12 test borings drilled at the approximate locations shown on the Boring Location Plan. Boring locations were selected to provide the desired site coverage and were adjusted to accommodate access conditions. The boring locations were laid out in the field using a handheld GPS and coordinates from Google Earth. Elevations were interpolated from a preliminary grading plan created by Ehrhart Griffin and Associates. The boring locations and elevations should only be considered accurate to the degree implied by the methods used to define them.

Test borings were advanced using flight augers powered by a truck-mounted drill rig. Soil samples were obtained at selected depths as indicated on the boring logs. A 3-inch nominal diameter thin-walled sampler was hydraulically pushed to obtain undisturbed samples. Disturbed samples were obtained by driving a 2-inch nominal diameter split barrel sampler while conducting standard penetration tests (SPT). The SPT values presented on the boring logs are actual field recorded numbers and have not been corrected for hammer energy or overburden.

The boring logs were prepared based on visual classification of the samples and drill cuttings, and by observation of the drilling characteristics of the subsurface formations. The logs have been supplemented and modified based on the laboratory test results and further examination of the recovered samples. The stratification lines on the boring logs represent the approximate boundary between soil types, but the insitu transition may be gradual.

Water level observations were made at the times stated on the boring logs. The borings were backfilled with drill cuttings at the completion of the fieldwork.

The field boring logs were reviewed to outline the depths, thicknesses, and extent of the soil strata. A laboratory testing program was then developed to further classify the basic soils and to evaluate the engineering properties for use in our analysis.

Laboratory tests to further classify the soils included visual classification, moisture content, dry unit weight, and Atterberg limits. The shear strengths of cohesive samples were evaluated using the unconfined compression test. Soil compressibility was evaluated using the one-dimensional consolidation test.

The boring logs and related information in this report are indicators of subsurface conditions only at the specific locations and times noted. Subsurface conditions, including ground water levels, at other locations of the site may differ significantly from conditions that exist at the sampling locations. Also note that the passage of time may affect conditions at the sampling locations.

LEGEND OF TERMS

Soil Description Terms

Consistency - Fine Grained	Consistency - Coarse Grained	Moisture Conditions
Very Soft, Soft, Firm, Hard, Very Hard	Very Loose, Loose, Medium Dense, Dense, Very Dense	Dry, Slightly Moist, Moist Very Moist, Wet (Saturated)

Sample Identification

Sample Type	Sample Data	Laboratory Data
U -- Undisturbed (Shelby Tube)	No. -- Number	MC -- Moisture content
S -- Split barrel (disturbed)	SPT -- Standard penetration test	γ_d -- Dry unit weight
C -- Continuous sample	bpf -- blows per foot	q_u -- Unconfined compression
A -- Auger cuttings (disturbed)	Rec -- Recovery	LL/PI -- Liquid limit & plasticity index

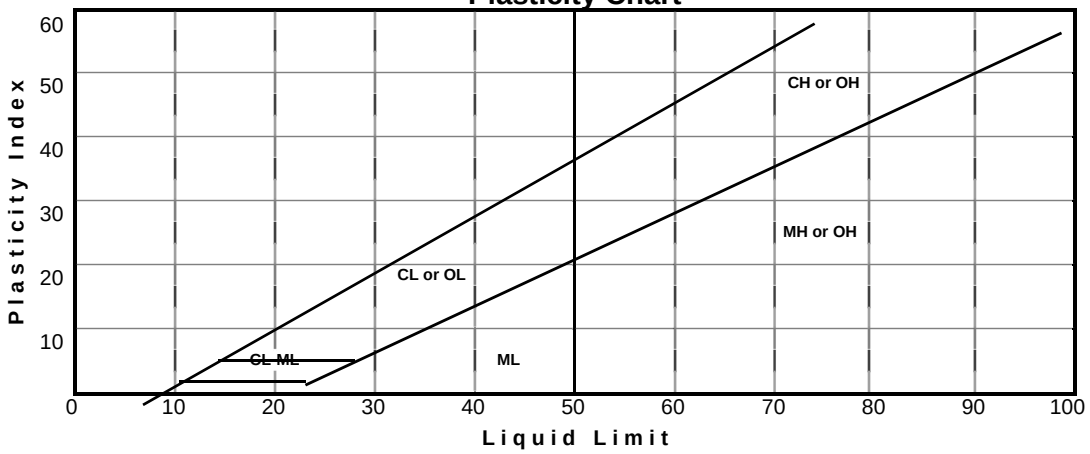
Unified Soil Classification System

Peat	Pt	Highly organic soils	50% or more smaller than No. 200 sieve
Fat Clay	CH	Clay - Liquid Limit > 50 *	
Elastic Silt	MH	Silt - Liquid Limit > 50 *	
Lean Clay	CL	Clay - Liquid Limit < 50 *	
Silt	ML	Silt - Liquid Limit < 50 *	
Silty Clay	CL-ML	Silty Clay *	
Clayey Sand	SC	Sands with 12 to 50 percent smaller than No. 200 sieve *	More than 50% larger than No. 200 sieve and % sand > % Gravel
Silty Sand	SM		
Poorly-Graded Sand with Clay	SP-SC	Sands with 5 to 12 percent smaller than No. 200 Sieve *	
Poorly-Graded Sand with Silt	SP-SM		
Well-Graded Sand with Clay **	SW-SC		
Well-Graded Sand with Silt **	SW-SM		
Poorly-Graded Sand	SP	Sands with less than 5 percent smaller than No. 200 sieve *	
Well-Graded Sand **	SW		
Clayey Gravel	GC	Gravels with 12 to 50 percent smaller than No. 200 Sieve *	More than 50% larger than No. 200 sieve and % gravel > % sand
Silty Gravel	GM		
Poorly-Graded Gravel with Clay	GP-GC	Gravels with 5 to 12 percent smaller than No. 200 sieve *	
Poorly-Graded Gravel with Silt	GP-GM		
Well-Graded Gravel with Clay **	GW-GC		
Well-Graded Gravel with Silt **	GW-GM		
Poorly-Graded Gravel	GP	Gravels with less than 5 percent smaller than No. 200 sieve *	
Well-Graded Gravel **	GW		

* *See Plasticity Chart for definition of silts and clays*

** *See Criteria for Sands and Gravels for definition of well-graded*

Plasticity Chart



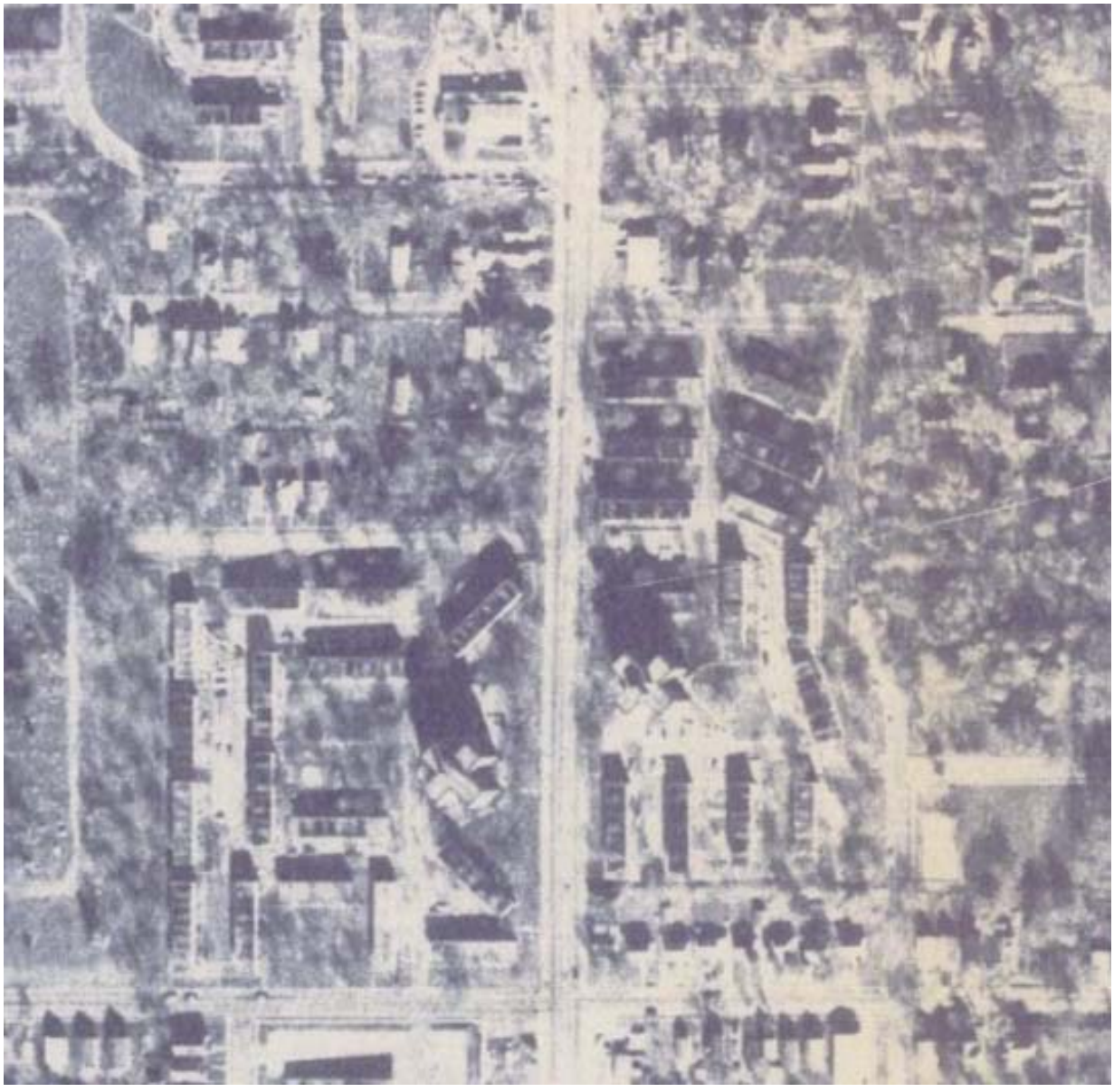
Criteria for Sands and Gravels

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	FINES (silt or clay)
Sieve size	10"	3"	¾"	#4	#10	#40	#200

Well-graded sands (SW) $C_u=D_{60}/D_{10}\geq 6$ and $C_c=(D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

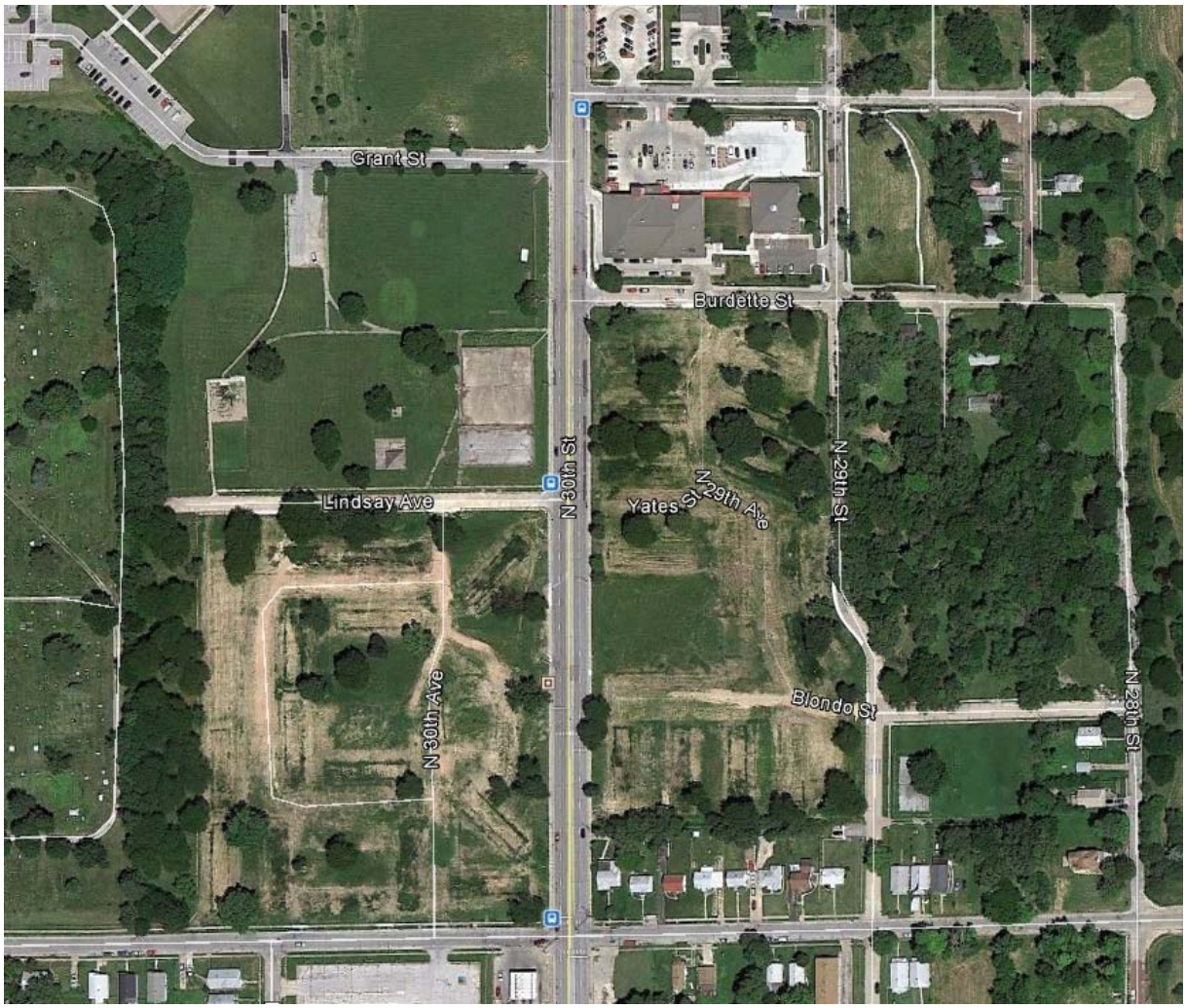
Well-graded gravels (GW) $C_u=D_{60}/D_{10}\geq 4$ and $C_c=(D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

1973 Sanborn



1982 Sanborn

2010 Sanborn



N

0 100 200

SCALE: 1"=200'

ZONE PLAN

Thiele Geotech Inc

PROJECT

HIGHLANDER
NORTH 30th ST. & PARKER ST.
OMAHA, NEBRASKA

JOB # 15100.00 | DATE: 5/14/15

N

0 100 200

SCALE: 1"= 200'

LEGEND:

BORING LOCATION

Thiele Geotech Inc

PROJECT

HIGHLANDER
NORTH 30th ST. & PARKER ST.
OMAHA, NEBRASKA

JOB # 15100.00 DATE: 4/7/15

BORING LOCATION PLAN

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	18.5’	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	18.5’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
		N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-1
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1119’	20’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	moist	hard	lean clay	fill	brick & concrete rubble								
							U-1		11	19.1	109.5	1.64		
			firm											
5							U-2		11	18.1	104.6	0.90		5
	dark brown													
10							U-3		7	19.4	96.9	0.74		10
	brown	very moist	soft	lean clay	Peoria loess									
15							U-4		10	33.9	87.6			15
		wet												
20							U-5		12	33.8	87.7			20
						bottom of hole @ 20’								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-2
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1158'	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	dark brown	slightly moist	soft	lean	fill	appreciable sand and brick								
							U-1		8	14.3	105.4	0.58	LL=41 PI=18 CL	
		moist	firm											
5						mostly brick rubble	U-2		6	21.5	84.8			5
	light brown	moist	firm	lean clay	Peoria loess		U-3		12	22.0	98.8	1.22		
10														10
	light gray						U-4		12	21.3	93.4			
15														15
							U-5		11	27.1	90.5			
20														20
						bottom of hole @ 20'								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	8.5’	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	17.2’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
4/13/15	7.0’	N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-3
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1125’	20’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	dark brown	very moist	firm	lean clay	fill	trace brick								
							U-1		11	24.3	97.3	1.00		
	light gray	very moist	firm	lean clay	Peoria loess									
5	light brown						U-2		11	36.4	83.0			5
		wet	soft											
							U-3		12	36.6	86.4	0.25		
10														10
							U-4		12	35.0	86.9			
15														15
	light gray						U-5		12	33.4	88.9			
20														20
						bottom of hole @ 20’								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-4
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1165'	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	dark brown	very moist	firm	fat clay	altered Peoria loess	blocky								
	light gray	very moist	firm	lean clay	Peoria loess	silty	U-1		8	24.4	94.9	1.12		
5							U-2		12	24.8	89.5	0.80		5
	light brown		soft				U-3		12	27.1	93.6	0.51		
10														10
	reddish brown	moist	firm	fat clay	Loveland loess	blocky iron stains	U-4		12	20.4	90.7			
15														15
	light brown			lean clay			U-5		12	20.5	93.7			
20														20
						bottom of hole @ 20'								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	17.0’	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	17.6’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
4/13/15	15.4’	N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-5
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1135’	20’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	dark brown	very moist	soft	fat clay	fill	trace rubble								
							U-1		11	28.8	86.1	0.62		
5	brown	very moist	soft	lean clay	Peoria loess	iron stains	U-2		11	28.1	88.3	0.64		5
10							U-3		8	27.9	91.8	0.59		10
	reddish brown	very moist	hard	fat clay	Loveland loess	iron stains								
							U-4		12	24.1	97.6			
15	light grayish brown	very moist / wet	hard	fat clay	Kansan till	minor sand								15
20							U-5		12	21.0	105.7			20
						bottom of hole @ 20’								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-6
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1146'	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	very moist	soft	lean clay	fill	trace gravel								
	brown	moist	soft	lean clay	Peoria loess		U-1		12	24.8	89.5	0.30		
5							U-2		12	23.8	86.0	0.41		5
	reddish brown	moist	firm	fat clay	Loveland loess	blocky iron stains								
10							U-3		12	22.3	96.3	1.07		10
	yellowish brown	moist	hard	fat clay	Kansan till	minor sand								
15							U-4		8	17.0	108.8			15
20							U-5		8	15.6	113.0			20
						bottom of hole @ 20'								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-7
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1171'	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	light brown	very moist	soft	lean clay	Peoria loess	silty								
							U-1		12	27.1	92.5	0.55		
			firm											
5							U-2		12	25.5	93.6	0.88		5
			soft											
10							U-3		12	24.3	89.5	0.39		10
	reddish brown	very moist	hard	lean clay	Loveland loess	iron stains								
15							U-4		12	24.7	93.3			15
20							U-5		12	23.4	98.5			20
						bottom of hole @ 20'								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-8
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1172'	40'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	moist	firm	lean clay	fill									
							U-1		12	23.7	95.1	0.96		
	light brown	moist	firm	lean clay	Peoria loess									
5							U-2		12	21.0	89.6	0.75		5
		very moist												
10							U-3		12	24.3	95.2	1.23		10
15							U-4		12	26.0	83.5		LL=35 PI=14 CL	15
20							U-5		12	22.6	93.1			20
	reddish brown	very moist	firm	lean clay	Loveland loess									
25							U-6		12	26.5	91.8			25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-8(cont.)
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1172'	40'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	reddish brown	very moist	firm	lean clay	Loveland loess									
		moist												
30							U-7		12	23.8	98.2			30
		very moist												
35							U-8		12	25.2	98.2			35
40							U-9		12	24.8	100.3			40
						Bottom of hole @ 40'								
45														45
50														50

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-9
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1167'	40'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	moist	hard	lean clay	fill									
							U-1		12	21.8	102.6	1.91		
	light brown	moist	firm	lean clay	Peoria loess	iron stains								
5							U-2		12	19.7	90.0			5
		slightly moist												
							U-3		12	11.5	91.0	1.46		
10														10
							U-4		12	14.1	90.3			
15														15
	reddish brown	moist	firm	lean clay	Loveland loess		U-5		8	21.3	91.4			
20														20
							U-6		4	20.8	97.6			
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-9(cont.)
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1167'	40'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	reddish brown	moist	firm	lean clay	Loveland loess									
30							U-7		12	22.2	96.5			30
	grayish brown	slightly moist	hard	fat clay	Kansan till	minor sand								
35							S-8	25		14.8				35
40							S-9	22		14.5				40
45						Bottom of hole @ 40'								45
50														50

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander	Gorham	Burmeister	15100.00	4/3/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th & Parker St., Omaha, NE	6" flight augers		CME 45B	T-10
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1154'	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	moist	firm	lean clay	fill	trace brick								
							U-1		12	23.2	98.3	0.80		
			soft											
5						trace gravel	U-2		7	19.3	98.0	0.69		5
						rubble at 6'								
	light brown	very moist	firm	lean clay	Peoria loess	iron stains								
10							U-3		12	25.7	91.6	0.88		10
15	brown						U-4		12	29.8	90.6			15
	reddish brown	very moist	firm	fat clay	Loveland loess	iron stains								
20							U-5		12	27.6	93.4			20
						bottom of hole @ 20'								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	38.5’	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	39.0’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
4/13/15	37.2’	N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-11
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1172’	40’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	very moist	firm	lean clay	fill	some brock								
							U-1		12	24.8	99.0	1.14		
		moist												
5							U-2		12	22.0	103.1	0.73	LL=38 PI=16 CL	5
		very moist												
10							U-3		10	32.8	83.6	1.00		10
		moist				rubble 8” thick								
15							U-4		10	20.8	99.5			15
20	light brown	moist	firm	lean clay	Peoria loess		U-5		12	21.1	97.4			20
	light gray													
25							U-6		12	22.7	95.3			25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	38.5’	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	39.0’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
4/13/15	37.2’	N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-11(cont.)
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1172’	40’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	light gray	moist	firm	lean clay	Peoria loess									
		very moist												
30							U-7		12	28.0	92.5			30
	reddish brown	very moist	firm	lean clay	Loveland loess									
35							U-8		12	25.9	93.6			35
		wet												
40							U-9		12	26.2	98.2			40
						Bottom of hole @ 15’								
45														45
50														50

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	38.5’	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	38.5’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
		N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-12
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1165’	40’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	moist	soft	lean clay	fill	some concrete rubble								
							U-1		12	19.8	105.7	0.21		
		very moist	firm											
5							U-2		12	26.6	91.7	1.14		5
10	light brown	moist	hard	lean clay	Peoria loess		U-3		12	17.1	104.3	2.38		10
			firm											
15							U-4		12	21.9	96.8			15
20	brown						U-5		12	23.0	91.9			20
		very moist												
25	reddish brown	very moist	soft	lean clay	Loveland loess		U-6		12	28.5	90.4			25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	38.5’	Highlander	Gappa	Yakel	15100.00	4/3/15
End of Drilling	38.5’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
		N. 30th & Parker St., Omaha, NE	6” flight augers		CME 45B	T-12(cont.
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	grass		1165’	40’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	reddish brown	very moist	soft	lean clay	Loveland loess									
30							U-7		12	31.3	88.9			30
35	reddish brown	very moist	firm	fat clay	Kansan till	minor sand	U-8		12	26.0	98.0			35
	gray		hard											
40		wet					U-9		12	18.4	112.4			40
						bottom of hole @ 40’								
45														45
50														50

Thiele Geotech Inc

SOIL TEST SUMMARY

Project: Highlander

Job No.: 15100.00

Location: N.30th & Parker St., Omaha, NE

Date: 4/20/2015

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT WET (pcf)	UNIT WEIGHT DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (%)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	PASS #200 (%)		REMARKS
T-1	U-1	0.5-2	2.85	19.1	130.5	109.5	0.538	96	1.64	3.4						
	U-2	3.5-5	2.85	18.1	123.5	104.6	0.610	80	0.90	3.2						
	U-3	8.5-10	2.85	19.4	115.6	96.9	0.739	71	0.74	6.0						
	U-4	13.5-15		33.9	117.3	87.6	0.923	99								
	U-5	18.5-20		33.8	117.4	87.7	0.921	99								
T-2	U-1	0.5-2	2.85	14.3	120.5	105.4	0.598	65	0.58	4.6	41	23	18		CL	
	U-2	3.5-5		21.5	103.0	84.8	0.987	59								
	U-3	8.5-10	2.85	22.0	120.6	98.8	0.705	84	1.22	5.7						
	U-4	13.5-15		21.3	113.3	93.4	0.805	72								
	U-5	18.5-20		27.1	115.0	90.5	0.862	85								
T-3	U-1	0.5-2	2.85	24.3	120.9	97.3	0.731	90	1.00	5.5						
	U-2	3.5-5		36.4	113.3	83.0	1.029	96								
	U-3	8.5-10	2.85	36.6	118.1	86.4	0.950	100	0.25	15.1						
	U-4	13.5-15		35.0	117.3	86.9	0.939	100								
	U-5	18.5-20		33.4	118.5	88.9	0.896	100								
T-4	U-1	0.5-2	2.85	24.4	118.1	94.9	0.775	85	1.12	7.1						
	U-2	3.5-5	2.85	24.8	111.7	89.5	0.882	76	0.80	1.1						
	U-3	8.5-10	2.85	27.1	119.0	93.6	0.799	92	0.51	7.9						
	U-4	13.5-15		20.4	109.2	90.7	0.858	64								
	U-5	18.5-20		20.5	113.0	93.7	0.798	70								
T-5	U-1	0.5-2	2.85	28.8	111.0	86.1	0.956	81	0.62	4.0						
	U-2	3.5-5	2.85	28.1	113.2	88.3	0.908	84	0.64	3.7						
	U-3	8.5-10	2.85	27.9	117.4	91.8	0.835	90	0.59	10.2						
	U-4	13.5-15		24.1	121.1	97.6	0.727	90								
	U-5	18.5-20		21.0	128.0	105.7	0.594	96								
T-6	U-1	0.5-2	2.85	24.8	111.7	89.5	0.882	76	0.30	1.0						
	U-2	3.5-5	2.85	23.8	106.4	86.0	0.960	67	0.41	2.5						
	U-3	8.5-10	2.85	22.3	117.8	96.3	0.749	80	1.07	2.4						
	U-4	13.5-15		17.0	127.4	108.8	0.548	84								
	U-5	18.5-20		15.6	130.6	113.0	0.491	86								
T-7	U-1	0.5-2	2.85	27.1	117.6	92.5	0.821	89	0.55	5.7						
	U-2	3.5-5	2.85	25.5	117.5	93.6	0.800	86	0.88	5.0						
	U-3	8.5-10	2.85	24.3	111.3	89.5	0.882	74	0.39	0.7						
	U-4	13.5-15		24.7	116.3	93.3	0.806	83								
	U-5	18.5-20		23.4	121.5	98.5	0.711	89								

Thiele Geotech Inc

SOIL TEST SUMMARY

Project: Highlander

Job No.: 15100.00

Location: N.30th & Parker St., Omaha, NE

Date: 4/20/2015

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT WET (pcf)	UNIT WEIGHT DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (%)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	PASS #200 (%)		REMARKS
T-8	U-1	0.5-2	2.85	23.7	117.6	95.1	0.772	83	0.96	9.4						
	U-2	3.5-5	2.85	21.0	108.4	89.6	0.880	64	0.75	2.1						
	U-3	8.5-10	2.85	24.3	118.2	95.2	0.771	85	1.23	4.7						
	U-4	13.5-15	2.50	26.0	105.2	83.5	1.018	69			35	21	14		CL	consol
	U-5	18.5-20		22.6	114.0	93.1	0.810	75								
	U-6	23.5-25		26.5	116.2	91.8	0.834	86								
	U-7	28.5-30		23.8	121.7	98.2	0.715	90								
	U-8	33.5-35		25.2	122.9	98.2	0.717	95								
	U-9	38.5-40		24.8	125.2	100.3	0.679	99								
T-9	U-1	0.5-2	2.85	21.8	124.9	102.6	0.643	91	1.91	6.6						
	U-2	3.5-5		19.7	107.8	90.0	0.871	61								
	U-3	8.5-10	2.85	11.5	101.5	91.0	0.851	37	1.46	1.7						
	U-4	13.5-15		14.1	103.0	90.3	0.866	44								
	U-5	18.5-20		21.3	110.9	91.4	0.843	68								
	U-6	23.5-25		20.8	117.9	97.6	0.726	77								
	U-7	28.5-30		22.2	118.0	96.5	0.746	81								
	S-8	33.5-35		14.8												
	S-9	38.5-40		14.5												
T-10	U-1	0.5-2	2.85	23.2	121.0	98.3	0.715	88	0.80	4.6						
	U-2	3.5-5	2.85	19.3	116.9	98.0	0.720	73	0.69	2.7						
	U-3	8.5-10	2.85	25.7	115.2	91.6	0.839	83	0.88	2.5						
	U-4	13.5-15		29.8	117.6	90.6	0.860	94								
	U-5	18.5-20		27.6	119.2	93.4	0.805	93								
T-11	U-1	0.5-2	2.85	24.8	123.4	99.0	0.703	95	1.14	7.9						
	U-2	3.5-5	2.85	22.0	125.8	103.1	0.634	94	0.73	5.4	38	22	16		CL	
	U-3	8.5-10	2.85	32.8	111.0	83.6	1.015	87	1.00	4.8						
	U-4	13.5-15		20.8	120.1	99.5	0.694	81								
	U-5	18.5-20		21.1	118.0	97.4	0.730	78								
	U-6	23.5-25		22.7	117.0	95.3	0.767	80								
	U-7	28.5-30		28.0	118.4	92.5	0.821	92								
	U-8	33.5-35		25.9	117.8	93.6	0.800	87								
	U-9	38.5-40		26.2	123.9	98.2	0.715	99								
T-12	U-1	0.5-2	2.85	19.8	126.6	105.7	0.595	90	0.21	2.7						
	U-2	3.5-5	2.85	26.6	116.0	91.7	0.838	86	1.14	3.4						
	U-3	8.5-10	2.85	17.1	122.1	104.3	0.616	75	2.38	5.2						
	U-4	13.5-15		21.9	118.0	96.8	0.740	80								
	U-5	18.5-20		23.0	113.1	91.9	0.833	75								
	U-6	23.5-25		28.5	116.2	90.4	0.863	89								
	U-7	28.5-30		31.3	116.7	88.9	0.895	94								
	U-8	33.5-35		26.0	123.5	98.0	0.719	98								
	U-9	38.5-40		18.4	133.1	112.4	0.499	100								

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BORING NUMBER B-1

CLIENT Brinshore Development LLC
PROJECT NAME Seventy 5 North Revitalization
PROJECT NUMBER 06344.002
PROJECT LOCATION North 30th St. and Lindsay Ave., Omaha, Nebraska
DATE STARTED 4/20/13 COMPLETED 4/20/13
GROUND ELEVATION 1157.9 ft USGS HOLE SIZE 4 Inches
DRILLING CONTRACTOR O'Malley Drilling Inc.
GROUND WATER LEVELS:
DRILLING METHOD 4" OD Continuous Flight Auger
AT TIME OF DRILLING --- NONE
LOGGED BY ODI CHECKED BY LAK
AT END OF DRILLING --- NONE
NOTES
AFTER DRILLING --- Backfilled Immediately

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	WATER CONTENT (%)	DRY UNIT WT. (pcf)	UC STRENGTH (tsf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Fill, Lean clay, medium plasticity, grayish brown and dark brown, moist, stiff, trace sand, brick fragments and other building debris	UD 1	44		4.5+	24	103	1.92				
			UD 2	44		4.5+	20	103					
5		(CL) Loveland Loess, Lean clay, medium plasticity, brown to reddish brown, dry to slightly moist, stiff, layered, roots	UD 3	39		4.5+	14	96	1.39				
			UD 4	33		4.5+	15	107					
10		(CL) Loveland Formation, Lean clay, medium plasticity, slightly moist, hard, blocky, calcareous deposits, heavy ferrous staining	UD 5	67		4.0	20	106	4.5				
15		(CL) Loveland Loess, Lean clay, medium plasticity, reddish brown, moist, very stiff, blocky, calcareous deposits	UD 6	89		3.5							
20		Bottom of borehole at 20.0 feet.											

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BORING NUMBER B-2

CLIENT Brinshore Development LLC
PROJECT NAME Seventy 5 North Revitalization
PROJECT NUMBER 06344.002
PROJECT LOCATION North 30th St. and Lindsay Ave., Omaha, Nebraska
DATE STARTED 4/20/13 COMPLETED 4/20/13
GROUND ELEVATION 1155.1 ft USGS HOLE SIZE 4 inches
DRILLING CONTRACTOR O'Malley Drilling Inc.
GROUND WATER LEVELS:
DRILLING METHOD 4" OD Continuous Flight Auger
AT TIME OF DRILLING --- NONE
LOGGED BY ODI CHECKED BY LAK
AT END OF DRILLING --- NONE
NOTES Offset 30' East
AFTER DRILLING --- Backfilled immediately

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	WATER CONTENT (%)	DRY UNIT WT. (pcf)	UC STRENGTH (tsf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) Loveland Formation, Lean clay, medium plasticity, brown and reddish brown, moist to very moist, blocky ferrous staining, trace root hairs	UD 1	67		2.75	25	99	1.33				
5		(CL) Loveland Loess, Lean clay, medium plasticity, reddish brown, slightly moist, stiff, calcareous deposits, roots, root holes	UD 2	44		4.5+	15						
		becomes light reddish brown and moist	UD 3	39		4.5	17	107	1.28				
10			UD 4	100		4.0	20	105					
		becomes reddish brown with carbonized roots	UD 5	94		3.5							
15		(CH) Kansan Till, Fat clay with some sand, high plasticity, light olive gray and brown, moist, very stiff, calcareous deposits											
20			UD 6	89		4.5+	19	111	2.12				

Bottom of borehole at 20.0 feet.

SCHEMMER BORING LOG - GINT STD US LAB.GDT - 5/8/13 15:51 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\06344.002.GPJ

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BORING NUMBER B-3

CLIENT Brinshore Development LLC
PROJECT NAME Seventy 5 North Revitalization
PROJECT NUMBER 06344.002
PROJECT LOCATION North 30th St. and Lindsay Ave., Omaha, Nebraska
DATE STARTED 4/20/13 COMPLETED 4/20/13
GROUND ELEVATION 1166.2 ft USGS HOLE SIZE 4 inches
DRILLING CONTRACTOR O'Malley Drilling Inc.
GROUND WATER LEVELS:
DRILLING METHOD 4" OD Continuous Flight Auger
AT TIME OF DRILLING --- NONE
LOGGED BY ODI CHECKED BY LAK
AT END OF DRILLING --- NONE
NOTES Offset 30' Southwest
AFTER DRILLING --- Backfilled Immediately

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	WATER CONTENT (%)	DRY UNIT WT. (pcf)	UC STRENGTH (tsf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Fill, Lean clay, low to medium plasticity, brownish gray, hard, with sand, gravel, brick, concrete fragments and chunks, and other building debris	UD 1	89		4.5+	15	104	3.9				
			UD 2	78			16	117					
5			UD 3	56		4.5+							
			UD 4	44		4.5+							
10		(CL) Transition Loess, Lean clay, low plasticity, gray, moist, stiff, heavy ferrous staining, root holes	UD 5	100		2.75	24	94	1.13				
15		(CL) Loveland Loess, Lean clay, medium plasticity, reddish brown, stiff, ferrous staining	UD 6	100		3.0	24	101	1.75				
20		Bottom of borehole at 20.0 feet.											

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BORING NUMBER B-4

CLIENT Brinshore Development LLC
PROJECT NUMBER 06344.002
DATE STARTED 4/20/13 COMPLETED 4/20/13
DRILLING CONTRACTOR O'Malley Drilling Inc.
DRILLING METHOD 4" OD Continuous Flight Auger
LOGGED BY ODI CHECKED BY LAK
NOTES

PROJECT NAME Seventy 5 North Revitalization
PROJECT LOCATION North 30th St. and Lindsay Ave., Omaha, Nebraska
GROUND ELEVATION 1165.2 ft USGS HOLE SIZE 4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NONE
AT END OF DRILLING --- NONE
AFTER DRILLING --- Backfilled immediately

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	WATER CONTENT (%)	DRY UNIT WT. (pcf)	UC STRENGTH (tsf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(ML) Transition Loess, Silt, low plasticity, gray to brownish gray, moist, medium dense, ferrous staining, calcareous deposits and stringers, root holes	UD 1	89		3.5	22	99	1.34				
			UD 2	56		4.5+	17	102					
5			UD 3	100		4.5+	19	92					
			UD 4	67		4.5+	18	98	1.83				
10		(CL) Loveland Loess, lean clay, medium plasticity, reddish brown to brown, moist, carbon staining											
			UD 5	78		4.5+							
15													
			UD 6	72		3.0	20	97					
20		Bottom of borehole at 20.0 feet.											

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BORING NUMBER B-5

CLIENT Brinshore Development LLC
PROJECT NUMBER 06344.002
DATE STARTED 4/20/13 COMPLETED 4/20/13
DRILLING CONTRACTOR O'Malley Drilling Inc.
DRILLING METHOD 4" OD Continuous Flight Auger
LOGGED BY ODI CHECKED BY LAK
NOTES

PROJECT NAME Seventy 5 North Revitalization
PROJECT LOCATION North 30th St. and Lindsay Ave., Omaha, Nebraska
GROUND ELEVATION 1158.3 ft USGS HOLE SIZE 4 Inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- NONE
AT END OF DRILLING --- NONE
AFTER DRILLING --- Backfilled Immediately

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	WATER CONTENT (%)	DRY UNIT WT. (pcf)	UC STRENGTH (tsf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Fill, Lean clay, low to medium plasticity, brown to brownish gray, moist, hard, trace sand and brick fragments, ferrous staining, root hairs	UD 1	67		4.5+	20	107	3.04				
		trace concrete fragments	UD 2	78		4.5+	23						
5		(CL) Loveland Loess, medium plasticity, brown to reddish brown, moist, stiff, ferrous staining, trace carbonized roots	UD 3	89		3.0	23	98	1.27				
			UD 4	72		4.0	21	103					
10		(CH) Kansan Till, Fat clay with some sand, high plasticity, light olive gray and brown, moist, very stiff, calcareous deposits	UD 5	94		4.5+	16	114	2.49				
15													
20			SS 6	100									

Bottom of borehole at 20.0 feet.

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GEOTECHNICAL ENGINEERING DIVISION

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SUMMARY OF SOIL TEST RESULTS

PROJECT: Seventy 5 North Revitalization

TSA JOB NO: 06344.002

CLIENT: Brinshore Development, LLC

DATE: 04/26/13

LOCATION: North 30th St. and Lindsay Ave., Omaha, NE

BORING No.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIAM. (in.)	SAMPLE LENGTH (in.)	WATER CONTENT (%)	UNIT WT. WET (pcf)	UNIT WT. DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (ε, %)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	PL	PI	PASSING #200 (%)	SYMBOL	REMARKS
B-1	U-1	1-2.5	2.751	5.8	24.3	128.3	103.2	0.62	100	1.915	6.5						
	U-2	3.5-5	2.796	5.2	20.2	123.6	102.8	0.63	86								
	U-3	6-7.5	2.797	5.8	14.3	109.2	95.5	0.75	51	1.397	1.6						
	U-4	8.5-10	2.805	3.1	14.5	122.7	107.2	0.56	69								
	U-5	13.5-15	2.761	5.9	20.3	127.2	105.7	0.58	93	4.486	9.1						
	U-6	18.5-20															
B-2	U-1	1-2.5	2.724	5.9	25.2	124.2	99.2	0.69	98	1.329	9.2						
	U-2	3.5-5			15.4												
	U-3	6-7.5	2.750	5.8	16.5	124.3	106.7	0.57	78	1.282	2.5						
	U-4	8.5-10	2.747	4.9	20.4	126.2	104.9	0.59	92								
	U-5	13.5-15							100								
	U-6	18.5-20	2.802	5.9	19.2	132.7	111.3	0.50	100	2.115	8.0						
B-3	U-1	1-2.5	2.855	5.9	14.8	119.8	104.3	0.60	66	3.901	3.0						
	U-2	3.5-5	2.833	2.6	16.2	135.6	116.7	0.43	100								
	U-3	6-7.5															
	U-4	8.5-10															
	U-5	13.5-15	2.824	5.9	23.9	116.3	93.9	0.78	82	1.127	2.9						
	U-6	18.5-20	2.839	5.8	24.0	125.7	101.4	0.65	99	1.749	7.2						
B-4	U-1	1-2.5	2.868	5.6	22.2	120.5	98.6	0.70	85	1.338	8.1						
	U-2	3.5-5	2.851	5.8	16.8	118.7	101.6	0.65	70								
	U-3	6-7.5	2.882	5.8	19.0	109.8	92.3	0.81	63								
	U-4	8.5-10	2.859	5.2	17.5	115.6	98.4	0.70	67	1.832	2.5						
	U-5	13.5-15															
	U-6	18.5-20	2.874	2.2	20.4	117.1	97.2	0.72	76								

Moisture Content by ASTM D2216, Unconfined Compression by ASTM D2166, Atterberg Limits by ASTM D4318, Classification by ASTM D2487

SCHEMMER
ARCHITECTS | ENGINEERS | PLANNERS

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Council Bluffs, IA 51503-5268
phone: 712-329-0300
fax: 712-329-9970

GEOTECHNICAL ENGINEERING DIVISION

SUMMARY OF SOIL TEST RESULTS

PROJECT: Seventy 5 North Revitalization

CLIENT: Brinshore Development, LLC

LOCATION: North 30th St. and Lindsay Ave., Omaha, NE

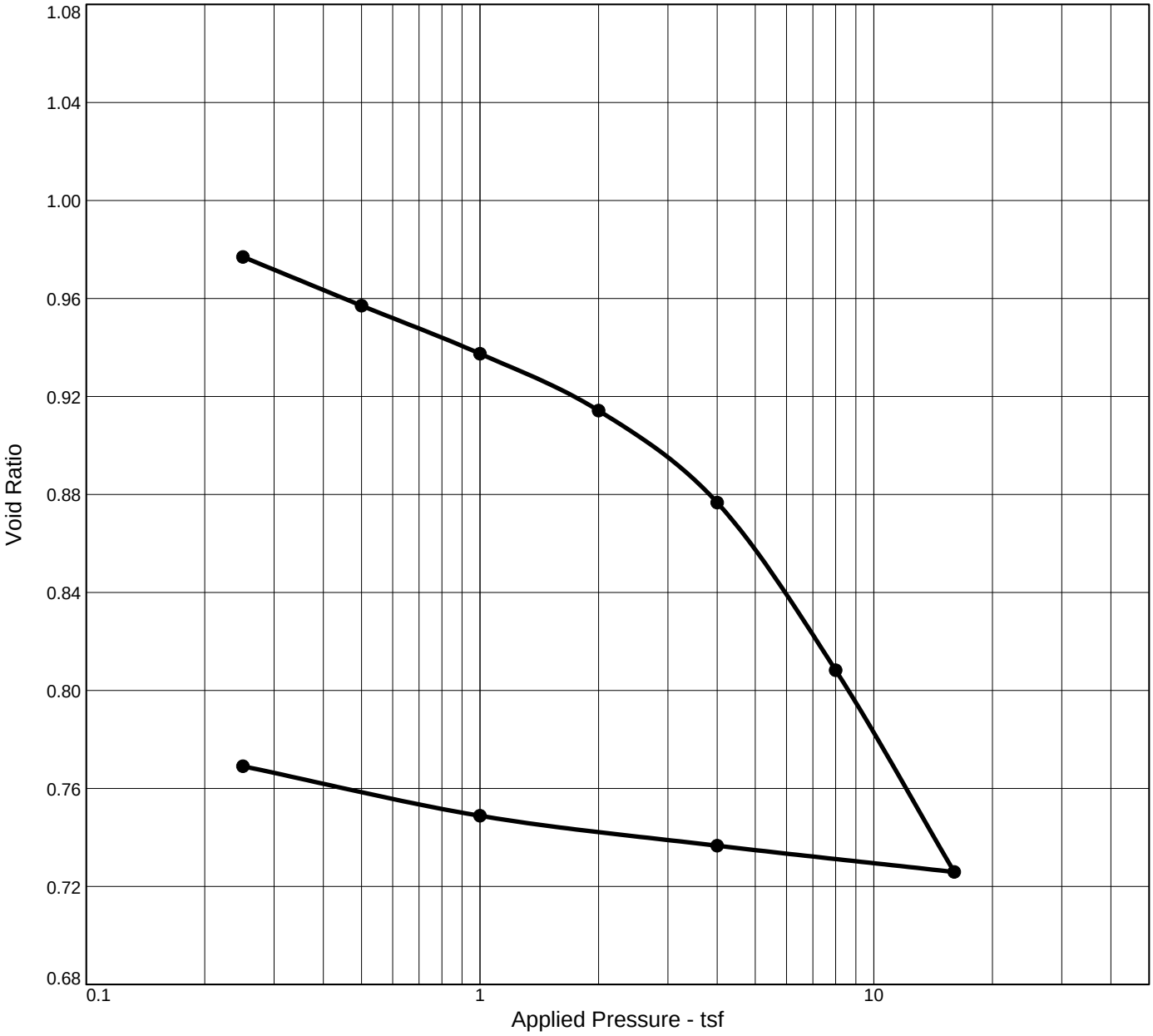
TSA JOB NO: 06344.002

DATE: 04/26/13

BORING No.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIAM. (in.)	SAMPLE LENGTH (in.)	MOISTURE CONTENT (%)	DENSITY WET (pcf)	DENSITY DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (ε, %)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	PASSING #200 (%)	SYMBOL	REMARKS
B-5	U-1	1-2.5	2.862	5.8	19.7	127.6	106.7	0.57	93	3.037	6.4						
	U-2	3.5-5			22.6												
	U-3	6-7.5	2.872	5.4	22.9	120.9	98.4	0.70	88	1.268	6.4						
	U-4	8.5-10	2.773	5.8	21.0	124.0	102.5	0.63	89								
	U-5	13.5-15	2.871	5.7	16.1	132.2	113.8	0.47	92	2.494	4.3						
	U-6	18.5-20															

Moisture Content by ASTM D2216, Unconfined Compression by ASTM D2166, Atterberg Limits by ASTM D4318, Classification by ASTM D2487

CONSOLIDATION TEST REPORT



MATERIAL DESCRIPTION	USCS	AASHTO
light brown lean clay	CL	

LL	PI	Sp. Gr.	Overburden (tsf)	Dry Dens. (pcf)		Moisture		Saturation		Void Ratio		P_c (tsf)	C_c
				Init.	Final	Init.	Final	Init.	Final	Init.	Final		
35	14	2.7	0.79	83.5		26.0 %	26.7	68.8 %	93.6 %	1.019	0.769	4.23	0.27

Preparation Process:	D2435 Method	C_r	Swell Press. (tsf)	%
Condition of Test:		0.02		

Project No. 15100.00 **Client:**

Project: Highland

Source of Sample: T-8 **Depth:** 13.5-15 **Sample Number:** U-4

Remarks:

Checked By:

Title:

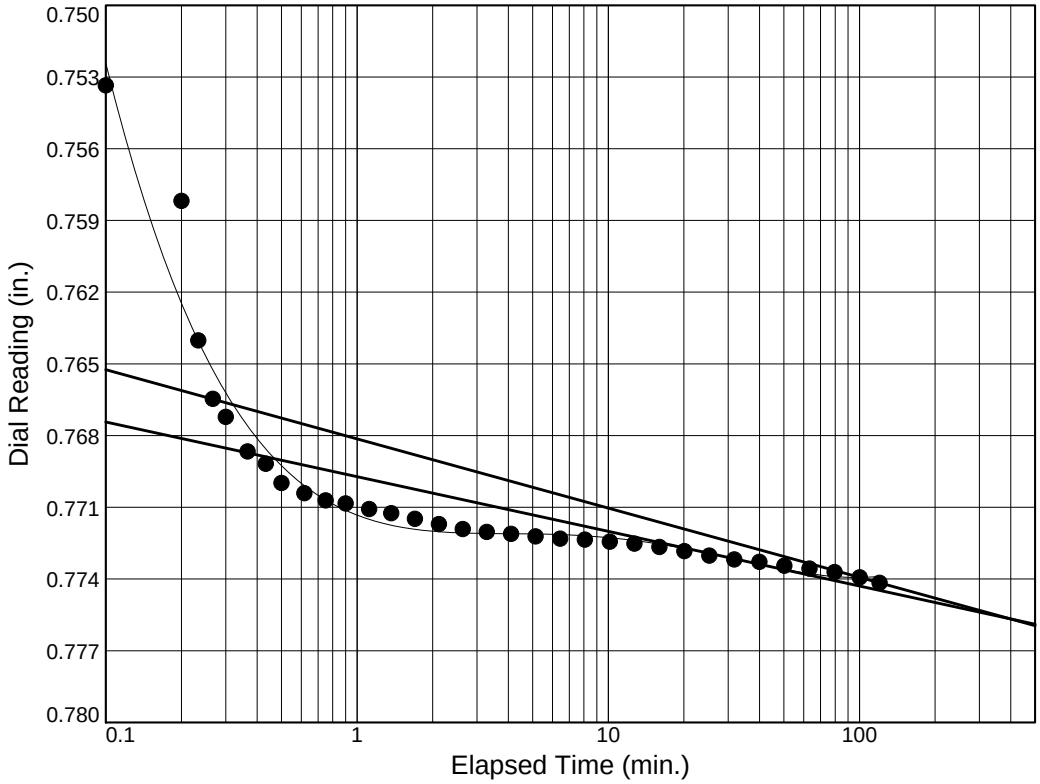
Figure

THIELE GEOTECH, INC.

Dial Reading vs. Time

Project No.: 15100.00
Project: Highland

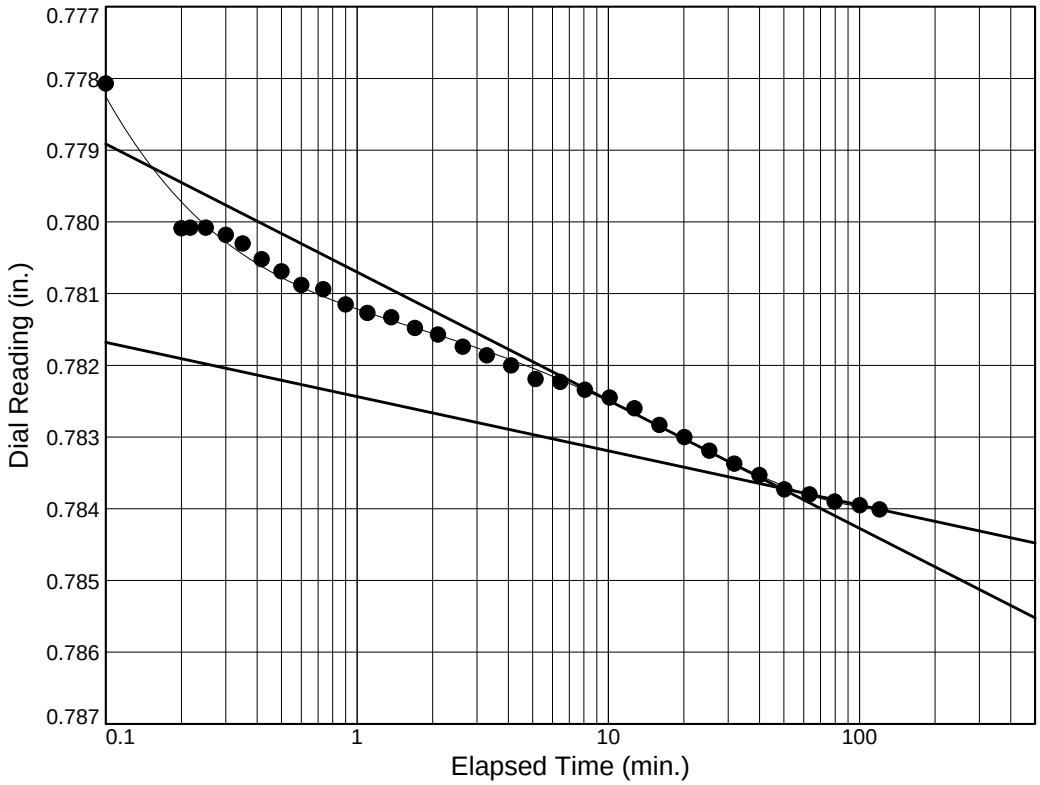
Source of Sample: T-8 Depth: 13.5-15 Sample Number: U-4



Load No.= 1
Load= 0.25 tsf
D_0 = 0.7532
D_{50} = 0.7645
D_{100} = 0.7757
T_{50} = 0.24 min.

C_v @ T_{50}
1.980 ft.^{2}/day

C_α = 0.006



Load No.= 2
Load= 0.50 tsf
D_0 = 0.7720
D_{50} = 0.7779
D_{100} = 0.7837
T_{50} =

C_α = 0.002

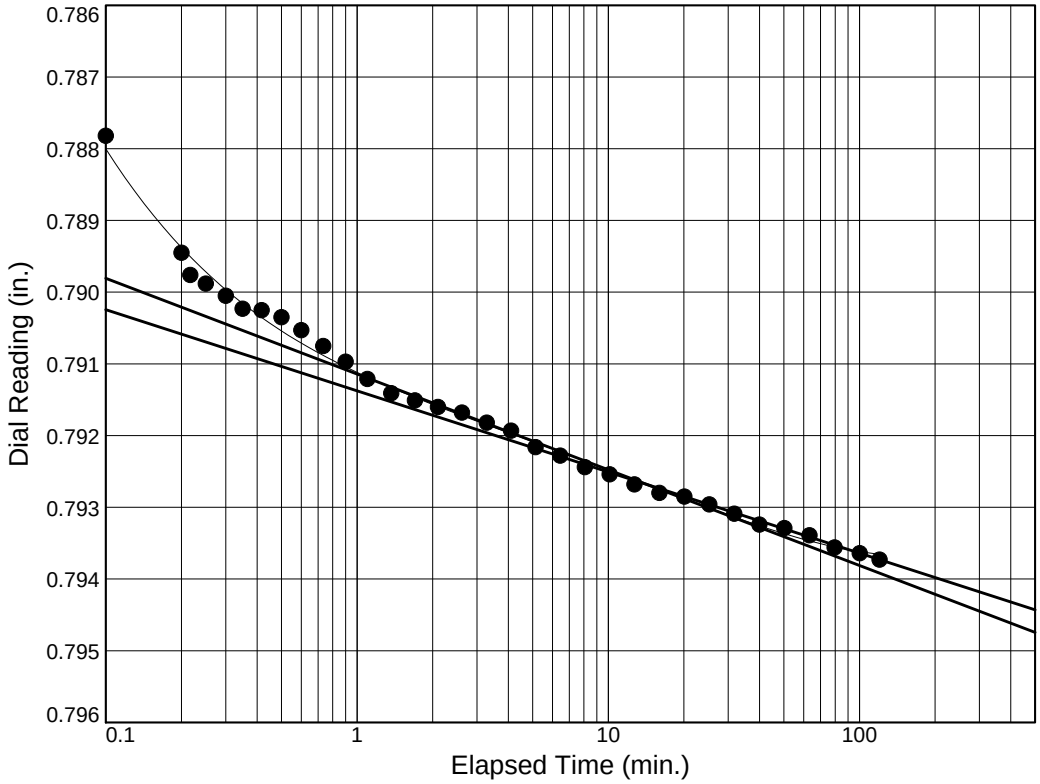
Figure

THIELE GEOTECH, INC.

Dial Reading vs. Time

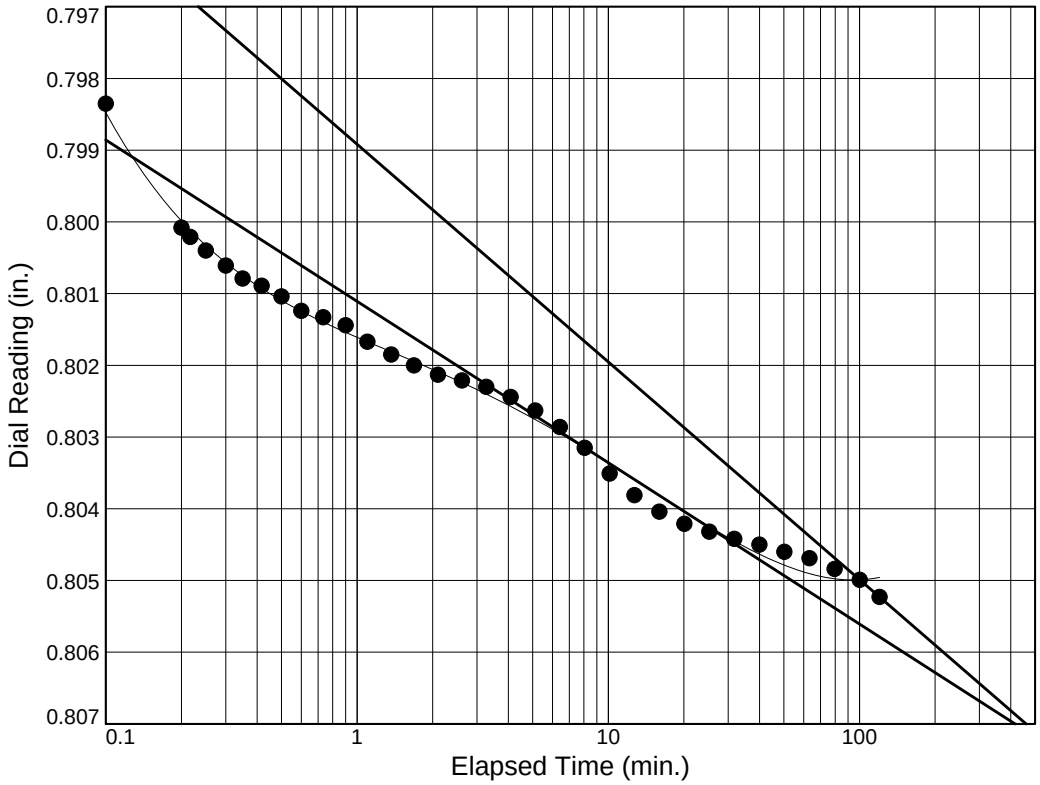
Project No.: 15100.00
Project: Highland

Source of Sample: T-8 Depth: 13.5-15 Sample Number: U-4



Load No.= 3
Load= 1.00 tsf
D_0 = 0.7812
D_{50} = 0.7869
D_{100} = 0.7927
T_{50} =

C_α = 0.002



Load No.= 4
Load= 2.00 tsf
D_0 = 0.7900
D_{50} = 0.7987
D_{100} = 0.8074
T_{50} = 0.11 min.

C_v @ T_{50}
4.165 ft.^{2}/day

C_α = 0.006

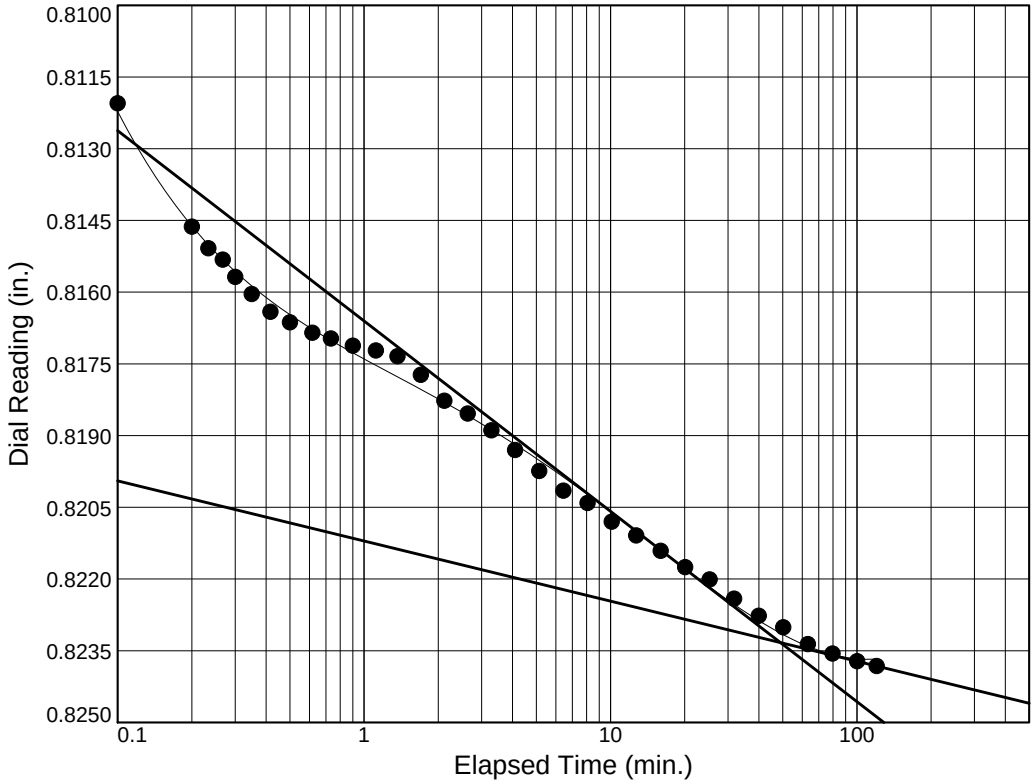
Figure

THIELE GEOTECH, INC.

Dial Reading vs. Time

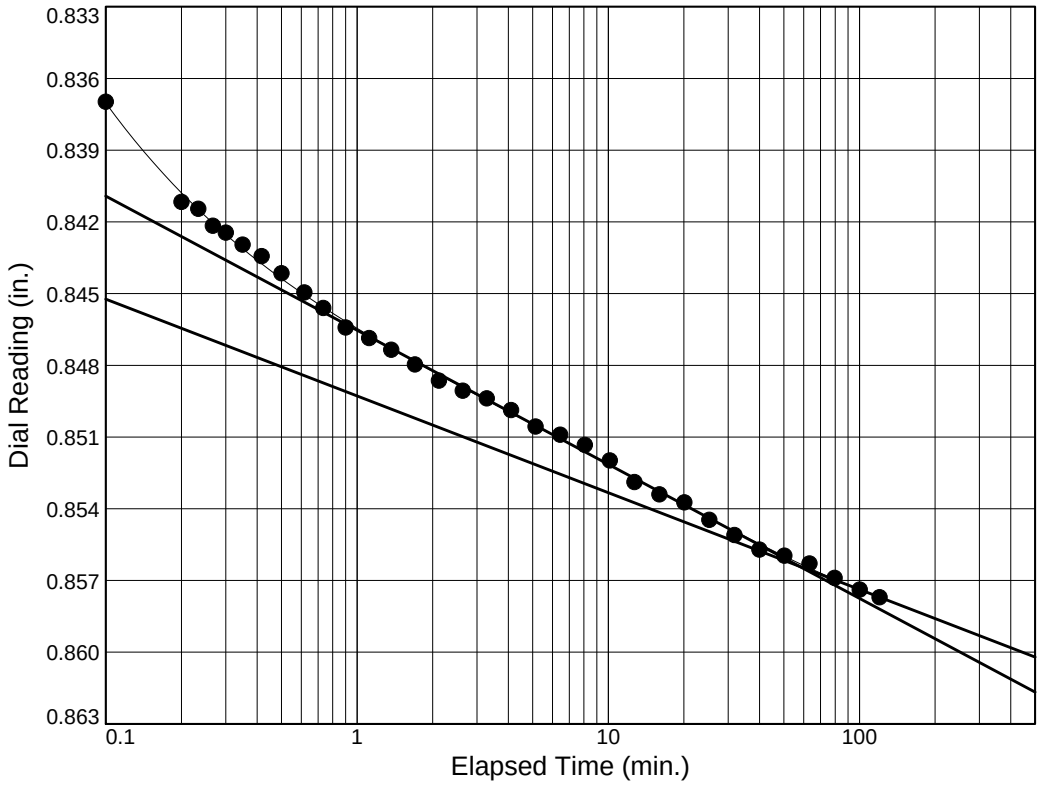
Project No.: 15100.00
Project: Highland

Source of Sample: T-8 Depth: 13.5-15 Sample Number: U-4



Load No.= 5
Load= 4.00 tsf
D_0 = 0.7999
D_{50} = 0.8116
D_{100} = 0.8233
T_{50} =

C_α = 0.003



Load No.= 6
Load= 8.00 tsf
D_0 = 0.8160
D_{50} = 0.8362
D_{100} = 0.8564
T_{50} =

C_α = 0.008

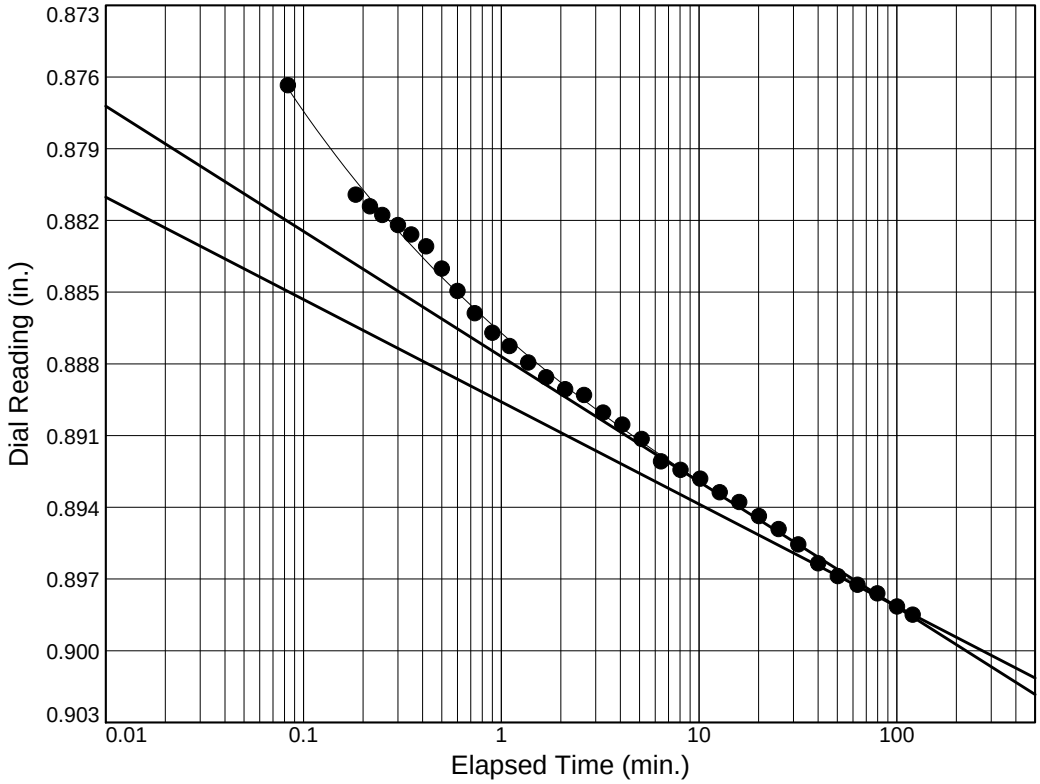
Figure

THIELE GEOTECH, INC.

Dial Reading vs. Time

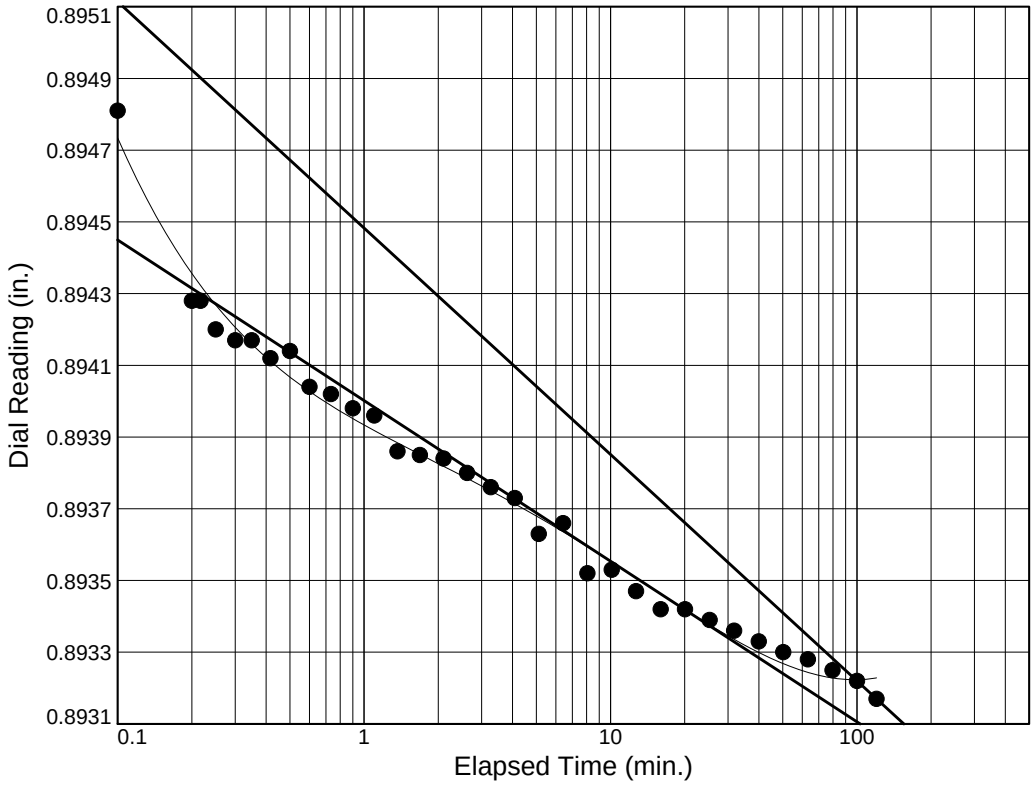
Project No.: 15100.00
Project: Highland

Source of Sample: T-8 Depth: 13.5-15 Sample Number: U-4



Load No.= 7
Load= 16.00 tsf
D_0 = 0.8466
D_{50} = 0.8723
D_{100} = 0.8980
T_{50} =

C_α = 0.009



Load No.= 8
Load= 4.00 tsf
D_0 = 0.9116
D_{50} = 0.9022
D_{100} = 0.8928
T_{50} =

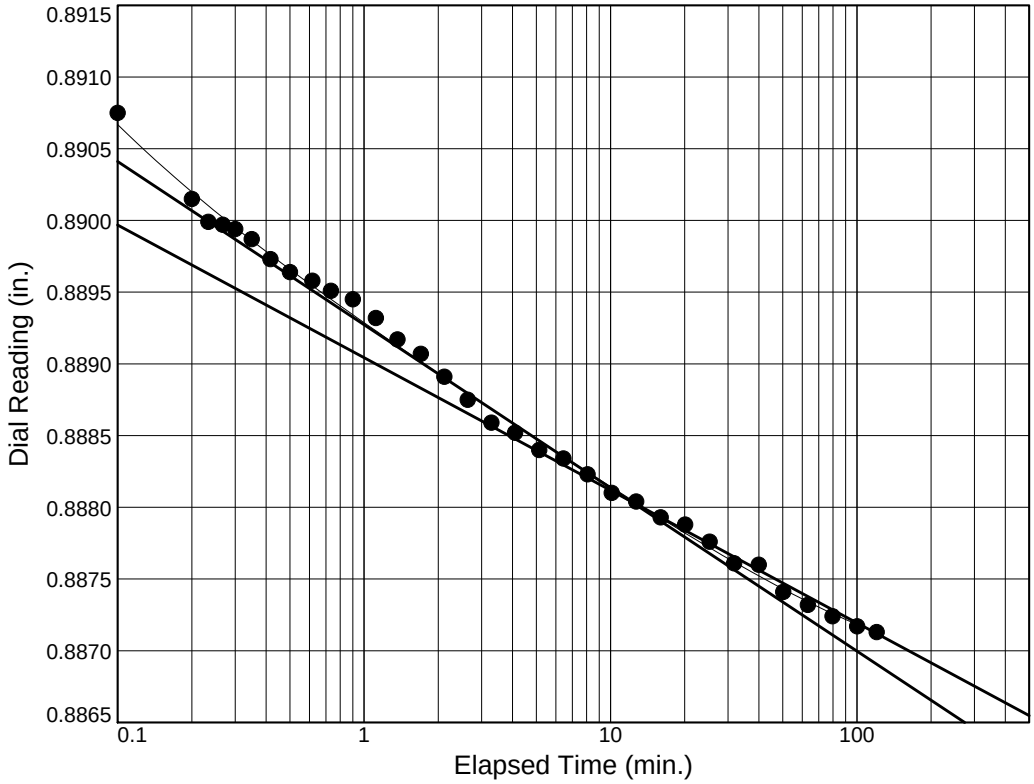
Figure

THIELE GEOTECH, INC.

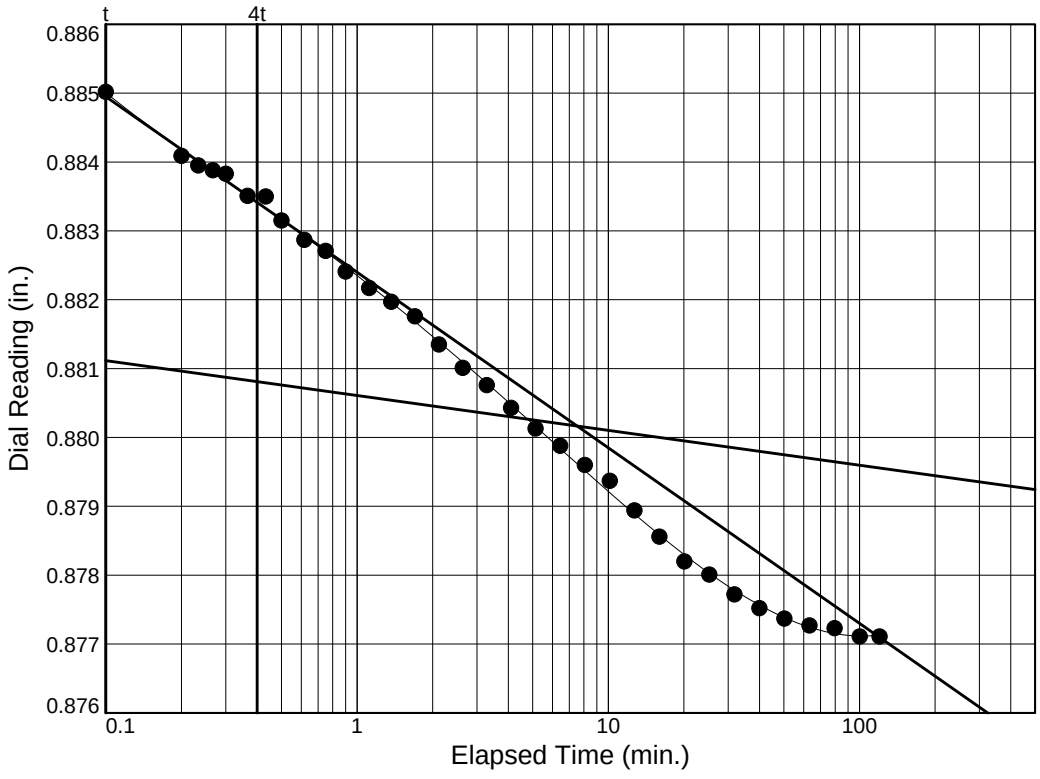
Dial Reading vs. Time

Project No.: 15100.00
Project: Highland

Source of Sample: T-8 Depth: 13.5-15 Sample Number: U-4



Load No.= 9
Load= 1.00 tsf
D_0 = 0.8991
D_{50} = 0.8936
D_{100} = 0.8880
T_{50} =



Load No.= 10
Load= 0.25 tsf
D_0 = 0.8866
D_{50} = 0.8834
D_{100} = 0.8802
T_{50} = 0.41 min.

C_v @ T_{50}
0.905 ft.^{2}/day

Figure

THIELE GEOTECH, INC.

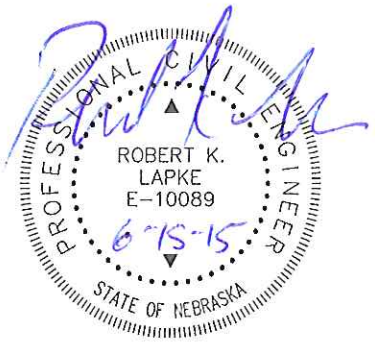

PROFESSIONAL CIVIL ENGINEER
ROBERT K.
LAPKE
E-10089
5-19-15
STATE OF NEBRASKA

Thiele Geotech Inc

Geotechnical Exploration Report

Highlander Phase I

North 30th Street and Parker Street
Omaha, Nebraska



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June 15, 2015
TG Project No. 15100.01

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Geotechnical Exploration Report

Highlander Phase I

Table of Contents

INTRODUCTION

Thiele Geotech, Inc. has completed a geotechnical exploration study for the proposed Highlander Phase I project to be located near North 30th Street and Parker Street in Omaha, Nebraska. The purpose of this study was to identify the general soil and ground water conditions underlying the site; to evaluate engineering properties of the existing soils; to provide earthwork and site preparation recommendations; and to recommend design criteria and parameters for foundations, pavements, and other earth supported improvements.

This study included soil borings, laboratory testing, and engineering analysis. A series of 11 test borings was spaced across the project site at strategic locations. Previous preliminary geotechnical explorations were conducted on site by Thiele Geotech (TG#15100.00) and Schemmer (No. 06344.002). The soil information collected from these studies has also been used to develop the recommendations provided in this report. The field and laboratory data from this study is presented in the Appendix, along with a description of investigative methods.

The drilling and testing performed for this study were conducted solely for geotechnical analysis. No analytical testing or environmental assessment has been conducted. Any statements or observations in this report regarding odors, discoloration, or suspicious conditions are strictly for the information of our client. An environmental assessment of the project site was previously conducted by others.

It should also be noted that this report was prepared for design purposes only, and may not be sufficient for a contractor in bid preparation. Prospective contractors should evaluate potential construction problems on the basis of their own knowledge and experience in the local area and on similar projects, taking into account their own intended construction methods and procedures.

This report is an instrument of service prepared for use by our client on this specific project. The report may be duplicated as necessary and distributed to those directly associated with this project, including members of the design team and prospective contractors. However, the technical approach and report format shall be considered proprietary and confidential, and this report may not be distributed in whole or in part to any third party not directly associated with this project. By using and relying on this report, all other parties agree to the same terms, conditions, and limitations to which the client has agreed.

PROJECT DESCRIPTION

Our understanding of the project is based upon information provided by Ehrhart, Griffin & Associates, Inc.

The Highlander project site is generally bound on the north by Grant Street, on the east by North 29th Street, on the south by Parker Street, and on the west by Pleasant Hill Cemetery and Prospect Hill Cemetery. A majority of the site was previously developed with low income residential structures. The structures on the east side of North 30th Street were completely demolished prior to August of 2009 and the structures on the west side were completely demolished prior to June of 2010. All basements within the site have been backfilled. Based on the preliminary geotechnical explorations conducted by Thiele Geotech and Schemmer, moderate compactive effort was used on the basement backfill, but the soil appears to not have been completely free of demolition rubble and debris.

Anticipated structures for the project include: multi-story apartment complexes, residential town homes, single-story commercial buildings, multi-story senior living complex, etc. Accompanying infrastructure and parking lot pavement will also be constructed. First level parking garages are also anticipated in a few of the multi-story apartment complexes.

SURFACE AND SUBSURFACE CONDITIONS

SITE CONDITIONS

The project site is generally bound on the north by Grant Street, on the east by North 29th Street, on the south by Parker Street, and on the west by Prospect Hill Cemetery and Pleasant Hill Cemetery. For the most part, the site is primarily surfaced with grass. Sparsely planted woody vegetation from previous site development is located throughout the site. The entire western boundary, which slopes upward towards the cemeteries, is heavily wooded. Surface water generally drains from west to east towards North 30th Street. A recreation area and playground are located near the northern limit.

LOCAL GEOLOGY

The surface geology of eastern Nebraska is Pleistocene in age and consists of eolian (wind-blown) deposits of Peoria and Loveland loess. The loess formed in dune-shaped hills along the Missouri River and various tributaries. The Peoria loess typically consists of silty lean clays that are stiff when dry but become softer with increasing moisture content. The Peoria sometimes exhibits low unit weight and is collapse susceptible. The Loveland loess is an older deposit, and typically consists of lean clays. The Loveland generally exhibits higher unit weights and shear strengths than the Peoria. Perched moisture conditions sometimes occur above the Peoria/Loveland interface.

The loess overlies Pleistocene glacial deposits of Kansan and Nebraskan till. The till consists of lean to fat clays mixed with sand, gravel, and occasional cobbles. The glacial deposits are generally fairly deep, but are sometimes near the surface at lower elevations on steep slopes. Cretaceous sandstone or Pennsylvanian limestone and shale form the bedrock unit below the glacial deposits. The depth to bedrock is normally great, and rock is rarely encountered in construction.

Along drainageways, alluvial and colluvial deposits are typically present. These soils were formed by erosion of the adjoining loess-mantled hills. Alluvial deposits are generally present along creeks and in major drainageways. The upper several feet of alluvium are usually stiffer due to the effects of desiccation. Colluvial soils are usually located at the base of steep slopes and in upland draws, and are formed by local creep and sloughing.

SOIL CONDITIONS

The soils encountered in the test borings generally consisted of man-placed fill, altered Peoria loess, Peoria loess, Loveland loess, and Kansan Till.

Man-placed fill was encountered in every boring except for borings T-15, T-18 and T-20. The man-placed fill layer thickness ranged from 2 feet in T-19 to 8.5 feet in borings T-13 and T-14. It was generally described as a dark brown to light gray, moist to very moist, soft to hard, lean clay. As was the case for the fill samples collected in the preliminary studies, minor to moderate amounts of brick,

concrete, and glass were encountered within the layer. Based on an assumed Standard Proctor (ASTM D698), the fill had a compaction range of 94 to over 100 percent.

A 2.5-feet thick layer of altered Peoria loess was encountered in boring T-13. This is a weathered layer of Peoria loess that has been altered physically and chemically due to the effects of freeze-thaw, exposure, and has become organic rich from years of vegetative growth. It was generally described as a dark brown, very moist, firm, lean clay.

Peoria loess was encountered in borings T-13 thru T-15, and T-18 thru T-23. The Peoria loess layer thickness ranged from 8 feet in boring T-19 to 28 feet in boring T-15. It was generally described as a light brown to light gray, moist to wet, soft to firm, lean clay.

Loveland loess was encountered in borings T-15 thru T-20. The Loveland loess layer thickness ranged from 1.5 feet in boring T-20 to 10 feet in boring T-17. It was generally described as a light brown to reddish brown, moist to wet, soft to firm, lean to fat clay.

Kansan till was encountered in borings T-16, T-17 and T-20. It was described as a light brown to brown, very moist to wet, soft to hard, fat clay.

Ranges of engineering properties from laboratory tests on selected samples are presented in Table 1.

Table 1 - Laboratory Results

Soil Layer	Moisture Content (%)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (tsf)	Classification *(LL/PI)*
Man-placed fill	18 to 25	92 to 109	0.2 to 2.1	CL (visual)
Altered Peoria loess	31	87	0.7	CL (visual)
Peoria loess	19 to 34	86 to 102	0.3 to 1.4	CL (33/10) (37/17)
Loveland loess	21 to 28	93 to 104	0.6 to 1.5	CL (visual) CH (visual)
Kansan till	21 to 33	100 to 107	- -	CH (visual)

GROUND WATER OBSERVATIONS

Ground water levels were observed in the borings as presented in Table 2. Note that ground water levels may fluctuate due to seasonal variations and other factors. The materials encountered in the test borings have relatively low permeabilities and observations over an extended period of time through use of piezometers or cased borings would be required to better define current ground water conditions.

Table 2 - Water Level Observations

Boring Number	Boring Elevation (ft.)	Water Level (ft. below grade)		Ground Water Elevation (ft.)
		During Drilling	After Drilling	
T-14	1124.0	13.5	12.2	1111.8
T-15	1143.0	13.5	17.3	1125.7

Perched ground water is commonly observed near the Peoria loess/Loveland loess interface. A perched ground water condition occurs when surface water percolates downward through the relatively permeable Peoria loess deposits to the less permeable Loveland loess. This commonly creates a zone of saturated loess soils above the Loveland loess that have relatively low strength and high compressibility, which appears to be the condition at this site.

ANALYSIS AND RECOMMENDATIONS

GENERAL

The Highlander project is significant in scope and will ultimately include several multi-story apartment complexes, multi-story senior living complex, retail strip mall, multi-story rental housing units, infrastructure, interior access roads, parking lots, and sidewalks. This project will be constructed in numerous phases over a period of time.

Thiele Geotech performed 12 preliminary borings across the project site to supplement the 5 preliminary borings drilled by Schemmer previously. The preliminary geotechnical exploration report dated May 19, 2015 (TG#15100.00) provided overlot grading recommendations for the project site. This geotechnical exploration focuses on providing structure specific foundation recommendations for the Phase I structures. Additional geotechnical explorations will be required to develop foundation recommendations for the structures contained in the future phases.

The soils encountered within the borings varied moderately across the project site. Due to this, area-specific foundation recommendations have been provided. The Zone Plan, located in the Appendix, highlights the locations of the zones referred to in the Shallow Foundation and Intermediate Foundation sections.

Based on the anticipated finished floor elevations of 1121 and 1124 feet for the structures located in Zones A and B, respectively, it is likely that perched groundwater will be encountered at the base of these building pad overexcavations. General dewatering recommendations have been provided in the Dewatering section of this report. The soils located at the base of these building pad overexcavations will likely be saturated and soft. Base stabilization measures may be necessary to permit compaction of fill. This may include use of a layer of crushed rock or a geotextile, or both.

SITE PREPARATION – ZONE F

As stated in the preliminary geotechnical report, the soil conditions consisting entirely of natural soils within boring T-7 may have not been an adequate representation of the overall soil conditions in this zone. Boring T-22 was drilled roughly 200 feet south of boring T-7. The soil conditions in boring T-7 displayed approximately 5 feet of man-placed fill underlain by Peoria loess to the termination depth of 15 feet. The man-placed fill samples appeared to be generally free of previous building materials and was moderately well compacted. However, numerous previous structure existed and were backfilled in this Zone. A representative of the geotechnical engineer should be provided the opportunity to observe the subgrade conditions during overlot grading. The geotechnical engineer should also be notified of any unsuitable conditions encountered in footing excavations. In the event that unsuitable bearing materials are encountered, the footing excavations will likely need to be extended through the fill and into the natural Peoria loess layer. Due to the assumed variations in the previous structure backfill soils,

the undercut procedure may be structure specific. A reduced bearing pressure has been provided for the Zone F structures.

DEWATERING

As displayed in Table 2 in both studies, ground water was encountered at varying elevations throughout the site. This ground water is most likely perched atop a less permeable fat clay Loveland loess or Kansan till layer. Minor to significant cuts are anticipated in select areas on site to establish the proposed grades. In addition, building pad overexcavation will be required for a majority of the structures on site. Surrounding infrastructure will also be installed through cut and cover processes. The perched ground water may have a tendency to pump up to the surface in areas due to heavy machinery traffic. In addition, ground water may also be encountered in the sewer trench and building pad overexcavations, especially in Zones A and B. In the event that a perched water table is encountered, dewatering will likely need to be accomplished through use of sump pits and pumps to control water within the clay material. A dewatering contractor may need to be consulted for an opinion on how best to control ground water on the project site.

PIPE BEDDING

Soil bearing capacity is not of major concern because the installation of the pipe will not increase the net effective overburden pressure on the underlying soils. Therefore the main point of concern is constructability and side support; the pipe bedding must support the pipe at proper line and grade during placement and compaction of earth backfill and provide lateral support for flexible pipes.

Granular bedding material is recommended for all cut and cover pipe installation on this project. Normal bedding thickness include a minimum of 4 inches or 1/8 of the nominal pipe diameter for pipes over 42 inches; however, we expect soft conditions throughout the entire project and bedding thicknesses will need to be adjusted as discussed in the following paragraph. Bedding material should have a nominal size of 1½ inches.

Perched groundwater may exhibit soft and unstable conditions at the bottom of trench and manhole excavations in select areas of the project site. An increased bedding thickness will therefore be required. Bedding thicknesses should be field adjusted to accommodate conditions as they change along the project alignment. As a minimum for small pipes with diameters of 24 to 42 inches, an additional 6 to 12 inches of bedding material should be anticipated to support the pipe. This increased bedding material may be a 3 inch nominal size material.

EARTHWORK AND EXCAVATIONS

Rubble and waste materials from site clearing and demolition should be removed from the site and lawfully disposed or recycled. Waste materials should not be buried on-site. Demolition of structures should include excavation and removal of foundations and floor slabs. Areas disturbed during

demolition of the existing structures should be thoroughly evaluated by the geotechnical engineer prior to placement of structural fill. Where trees are cleared, the stumps should be excavated and removed.

Relocation of any existing utility lines within the zone of influence of proposed construction areas should also be completed as part of the site preparation. The lines should be relocated to areas outside of the proposed construction. Excavations created by removal of the existing lines should be cut wide enough to allow for use of heavy construction equipment to recompact the fill. In addition, the base of the excavations should be evaluated by a geotechnical engineering representative prior to placement of fill.

Topsoil and vegetation should be stripped to a depth of 4 to 6 inches in areas to be disturbed during grading, including borrow and fill areas. Stripping depths will likely vary and should be adjusted to remove all vegetation and root systems. A representative of the geotechnical engineer should monitor the stripping operations to observe that all unsuitable materials have been removed. Care should be exercised to separate these materials to avoid incorporation of the organic matter in structural fill sections.

Surfaces to receive fill should be broken up and recompacted to allow new fill to bond to the existing soil. Slopes steeper than 5H:1V should be benched before placing fill.

With the exception of rubble fill soils, the excavated site soils will generally be suitable for reuse as structural fill, although some moisture conditioning may be required. Any off-site borrow should be a clean, inorganic silt or lean clay with a liquid limit less than 45 and a plasticity index less than 20. Borrow material should not contain an appreciable amount of roots, rock, or debris, and should not contain any foreign material with a dimension greater than 3 inches.

All fills should be placed and compacted as structural fill. Fill should be placed in thin lifts not to exceed 8 inches loose thickness. Structural fill should be compacted with a sheepsfoot type roller to a minimum of 95 percent of the maximum dry density (ASTM D698, Standard Proctor). Moisture content should be controlled to between -3 and +4 percent of optimum.

Backfill soils in narrow utility trenches (less than 6 feet wide) below a depth of 5 feet should be compacted to a minimum of 92 percent of the maximum dry density at a moisture content between -3 and +6 percent of optimum (ASTM D698, Standard Proctor). Backfill within the upper 5 feet of narrow trenches, for the full depth of any wider trenches, and around manholes should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum. For trenches more than 5 feet outside of paved areas, backfill should be compacted to a minimum of 90 percent of the maximum dry density at a moisture content that will permit compaction to that level. Lift thicknesses should be appropriately matched to the type of compaction equipment used.

Quality control testing is an important part of any earthwork operation. It is recommended that a representative of the geotechnical engineer periodically monitor earthwork operations to verify proper compliance with these recommendations, including compaction levels.

OSHA's Construction Standards for Excavations require that the contractor's excavation activities follow certain worker safety procedures. These include a requirement that excavations over 4 feet deep be sloped back, shored, or shielded. The soils encountered in the test borings generally classify as type B and C soils according to the OSHA standard. The maximum allowable slope for an unbraced excavation in these soils is 1H:1V and 1.5H:1V, respectively, although other provisions and restrictions apply. Excavations over 20 feet deep require specific design by a licensed Professional Engineer. The contractor is solely responsible for site/excavation safety and compliance with OSHA regulations. The geotechnical engineer assumes no responsibility for site safety, and the above information is provided only for consideration by the designers.

SHALLOW FOUNDATIONS

With the Site Preparation procedures highlighted in this report and in the preliminary geotechnical exploration report (TG#15100.00), the site conditions identified are favorable for the use of conventional spread foundations to support structural loads for the proposed structures in Zones A, B, E, F, G, H and J. Based on our bearing capacity, settlement analysis, and recommended site preparation procedures, a net allowable bearing pressure of 2,500 pounds per square foot was determined for Zones A, B, E, G, H and J. Since a building pad overexcavation was not recommended for Zone F, a reduced bearing pressure of 1,500 pounds per square foot was determined. These allowable bearing pressures may be used to size wall footings and column pads. These bearing pressures were calculated based on a safety factor of 3 against bearing failure. Foundation settlements are estimated at less than 1 inch total and ½ inch differential over a span of 20 feet. If maximum design loads significantly exceed 150 kips for columns or 5 kips per foot for walls, these bearing pressures may not be applicable and should be reevaluated.

It is recommended that column footings be at least 3 feet square and that load bearing wall footings be at least 16 inches wide. Exterior footings and footings in unheated areas should be founded a minimum of 3.5 feet below adjacent grade to provide reasonable frost protection. It is recommended that all footings be steel reinforced.

The condition of the bearing soils can vary in and should be observed by the geotechnical engineer at the time of excavation. If unsuitable bearing soils are identified, especially in Zone F, they should be removed and replaced by structural fill. As an alternative, the footing bottom could be extended through unsuitable materials if suitable material is present below.

Partially buried structure walls will be subjected to lateral earth pressures due to an unbalanced soil height nearing 15 feet. The properties listed in Table 3 can be used in wall design.

Table 3 - Lateral Earth Pressure Values

Property	Coefficient	Drained Conditions	Undrained Conditions
Active Lateral Pressure	0.40	40 pcf (Equivalent Fluid)	85 pcf (Equivalent Fluid)
At-Rest Lateral Pressure	0.50	50 pcf (Equivalent Fluid)	90 pcf (Equivalent Fluid)
Passive Resistance	2.00	250 pcf (Equivalent Fluid)	125 pcf (Equivalent Fluid)
Soil Unit Weight (compacted backfill)		120 pcf	60 pcf
Base Adhesion *		500 psf	500 psf
** Multiply by contact area to determine lateral resistance, limited to ½ of the vertical load* *Note: Coefficients and equivalent fluid values are for level backfill. Sloping backfill adds significantly greater load to the wall. These values should be re-evaluated if sloping backfill conditions are present.*			

If the top of the wall is able to deflect inward approximately 0.4% of the wall height, then active earth pressures can develop. However, if the wall is braced or otherwise restricted from deflecting, such as a basement wall braced by floor framing at the top, then at-rest earth pressures should be used. Safety factors of 2.0 for sliding and for overturning are recommended. Drainage measures should be incorporated in the wall to ensure drained conditions. Proper backfill compaction is also an important factor in long-term stability.

INTERMEDIATE FOUNDATIONS

The site conditions for the structure located in Zone H are not favorable for the use of conventional spread foundations to support the proposed structural loads. We recommend use of an intermediate foundation system such as the *Geopier* Rammed Aggregate Pier®(RAP) system to support the building foundations.

A *Geopier* RAP system is a patented design/build intermediate foundation soil improvement process which consists of constructing shallow aggregate columns of highly compacted crushed aggregate materials to improve the bearing conditions under isolated or continuous spread footings, mat foundation systems, and/or grade supported slabs. Based on a preliminary design conducted by a *Geopier* design engineer, an allowable bearing capacity around 4,000 to 5,000 psf could be expected and result in less than 1 inch of total settlement for these conditions and less than 3/4 inch of differential movement.

Geopier RAP elements are constructed by drilling a 30 inch diameter hole in the ground to depths ranging from about 7 to 20 feet below the foundation support elements. Once the desired penetration is achieved, a lift of open-graded crushed aggregate is placed in the bottom of the hole and, using the patented ramming system, is densified to form a stabilizing layer. RAP installation proceeds with subsequent lifts of well-graded crushed aggregate placed in about 12 inches in thickness. Each lift is

rammed with a high-energy beveled tamper that both densifies the aggregate and forces the aggregate laterally into the sidewalls of the hole. This action increases the lateral stress in surrounding soil; thereby further stiffening the stabilized composite soil mass. The result of *Geopier* RAP installation is a significant strengthening and stiffening of subsurface soils that then support on-grade slabs and high-capacity footings.

The *Geopier* RAP soil reinforcement system is proprietary and would be designed and installed under the direction of Ground Improvement Engineering, the (licensed) regional specialty designer (licensed by Geopier Foundation Company). Due to the specialty nature of this soil improvement procedure, we recommend that a performance specification be used for this system.

We recommend that a static field modulus test be preformed to verify the design parameters. The test RAP element should be loaded to 150 percent or more of the design capacity. Installation of the modulus test RAP element should be monitored by a representative of our firm.

SEISMIC SITE CLASS

Seismic structural design requirements are dictated by a site classification based on average soil properties within the top 100 feet. Based on our local experience, the soil profile was estimated below the maximum boring depth. The average undrained shear strength was then estimated based on the actual laboratory testing and on assumed soil properties for the deeper soil profile.

The site classifies as Site Class D (stiff soil profile) according to Table 1613.5.2 of the 2006 International Building Code.

FLOOR SLABS

To avoid localized slab failures, it is important that interior backfill around foundation elements and in plumbing trenches be properly compacted. Interior backfill should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor).

To provide uniform support for floor slabs, the upper 6 inches of the subgrade should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor). Care should be taken to maintain the condition of the subgrade. Areas that become saturated, frozen, or disturbed should be reworked prior to slab placement. Any unstable areas should be excavated and replaced with structural fill. A granular cushion beneath the floor slab is considered a construction convenience and may be used, but is not considered critical to proper slab performance.

A 10 mil thick vapor retarder is recommended beneath the concrete to inhibit upward migration of moisture through the slab. Care should be taken when finishing concrete placed directly on a vapor retarder to minimize potential problems with curling and blistering.

Interior partition walls weighing up to 1,000 pounds per lineal foot may be supported directly on the floor slab. It is recommended that control joints be provided between partition walls that bear on the floor slab and walls supported on footings. Entrance slabs should be designed as structural stoops with a cavity beneath the slab to accommodate frost heave.

Contraction joints are important to control the location of cracks in the floor slab that result from stresses caused by normal drying shrinkage. Joints should be cut as soon as practical after the concrete has set sufficiently to support foot traffic, and must be cut before any shrinkage cracks form. Contraction joints should be cut to a minimum of ¼ of the slab thickness (1/5 of the thickness for early entry saw method). Joints should be spaced no more than 30 times the thickness of the slab or 15 feet maximum. Panels should be kept as square as possible, with the length to width ratio limited to 125 percent. Dowel bars should be used for load transfer across construction joints where slabs are subjected to heavy loads. Joints should be carefully planned and laid out to match column lines and to meet reentrant corners. Joints should be perpendicular to edges and should not form angles less than 45 degrees or over 225 degrees. To accommodate the relative movement that commonly occurs between floors and foundations, isolation joints should be provided against walls, and diamond or circular isolation joints should be constructed around columns.

PAVEMENTS

Pavement site preparation recommendations have been provided in the preliminary geotechnical exploration report created by Thiele Geotech. (TG#15100.00)

Pavement performance is directly affected by the degree of compaction, uniformity, and stability of the subgrade. This is particularly important where traffic from heavy trucks is anticipated. The final subgrade should be reworked and compacted immediately prior to pavement construction. The subgrade should then be proof rolled, and any unstable areas should be excavated and replaced to create a uniform and stable subgrade.

For concrete pavements, it is recommended that the upper 12 inches of the subgrade be compacted to a minimum of 90 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D1557, Modified Proctor). Subgrade preparation should extend a minimum of 2 feet laterally beyond the edge of the pavement.

For asphalt pavements, greater stability is required due to the extreme loading conditions placed on the subgrade during laydown. Subgrades for asphalt pavements should be prepared by compacting the upper 12 inches to a minimum of 92 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D1557, Modified Proctor). Subgrade preparation should extend a minimum of 2 feet laterally beyond the edge of the pavement, including the concrete curb and gutter section.

Under sidewalks, the upper 6 inches of the subgrade should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum (ASTM D698, Standard Proctor). Subgrade preparation should extend laterally 6 inches beyond the edge of the sidewalk

Based on the forgoing subgrade preparation procedures, recommended minimum pavement thicknesses are provided in Table 4. These minimum thicknesses are prescriptive values based on traffic classification, and not on a detailed analysis using traffic counts. It should be noted that life cycle costs for concrete pavements are generally lower, despite their higher initial cost. Local experience has shown that well constructed concrete pavements typically perform better, have lower maintenance costs, and have longer service lives than comparable asphalt pavements. Note that we do not recommend using an aggregate base as part of the pavement section due to concerns over drainage and freeze/thaw deterioration of the base material.

Table 4 - Minimum Pavement Thicknesses

Pavement Category	Pavement Type/Thickness (inches)	
	Concrete	**Full Depth Asphalt**
Sidewalks	4	- -
Parking Areas	5	6
Drive Lanes *(concentrated traffic - occasional trucks)*	5	7
Medium Duty *(up to 3 trucks/day)*	6	8
Dumpster Pads *(including pickup area)*	7	- -
Subgrade Support Values: CBR = 3, k=120 pci *Materials: (reference City of Omaha Standard Specifications for Public Works Construction, 2014 Edition)* *concrete - mix type L6S (f'_c = 4,000 psi) (Section 500)* *asphalt surface - mix type SPR w/ PG64-34 binder (Section 400)* *asphalt base - mix type SPR Coarse w/ PG64-34 binder (Section 400)*		

Contraction joints are important to control the location of cracks in concrete pavement that result from stresses caused by normal drying shrinkage and thermal effects. A proper jointing system will enhance structural capacity and prolong the life span of a concrete pavement as well as improve ride quality. Contraction joints should be cut to a minimum of ¼ of the slab thickness (1/5 of the thickness for early entry saw method). Joints should be cut as soon as practical after the concrete has set sufficiently to support foot traffic, and must be cut before any shrinkage cracks form. Joints should be spaced no more than 24 times the thickness of the slab or 12½ feet maximum. Panels should be kept as square as possible, with the length to width ratio limited to 125 percent. Dowel bars should be used for load transfer across construction joints, and should be considered for contraction joints subjected to

heavy truck traffic. Joints should be carefully planned and laid out to meet inlets, drainage structures, reentrant corners, and radiuses. Joints should be perpendicular to edges and radiuses, and should not form angles less than 45 degrees or over 225 degrees. Isolation joints should be provided around any structures.

We recommend that joints be sealed to reduce moisture infiltration and to reduce the accumulation of non-compressible materials. Joint sealing should be considered as a two part process, sealing of the exposed sawcut face of the concrete and sealing of the joint itself. Following sawcutting and cleaning the joints with compressed air, a penetrating concrete sealer (Silane, Silicate, or Siliconate based) should be spray applied to the joint extending outwards a minimum of 8 inches either side of the sawcut. This penetrating sealer will help to limit moisture infiltration along the sawcut face, helping to mitigate premature joint damage from freeze-thaw cycles. Following the spray applied sealer, a hot pour joint sealer can be used to fill the sawcut. Use of backer rods is not recommended.

Backfill behind curbs and within islands/medians should consist of relatively impervious cohesive soils. Backfill should be compacted to a minimum of 95 percent of the maximum dry density (ASTM D698) to minimize subsidence and to reduce moisture infiltration around the edges of the pavement. Granular soils should not be used for fill in islands as this can increase infiltration into the subgrade. Porous fills, including granular material and loosely placed clay soils, also act as a reservoir that can allow moisture to seep through cracks and joints onto the pavement surface, sometimes long after the water is trapped. This condition is especially pronounced when loose backfill consolidates and allows surface water to pond.

SURFACE DRAINAGE AND LANDSCAPING

The long-term performance of any project is contingent upon keeping the subgrade soils at more or less constant moisture content, and by not allowing surface drainage a path to the subsurface. Positive surface drainage away from structures must be maintained at all times. Landscaped areas should be designed and built such that irrigation and other surface water will be collected and carried away from the structure.

Construction staging and grading should provide for removal of surface water from the site. If prolonged ponding of surface water occurs, removal and replacement of wet or disturbed soils may be necessary. Temporary grades should be established to prevent runoff from entering excavations or footing trenches. Backfill should be placed as soon as structural strength requirements are met, and should be graded to drain away from the building.

The final grade of the foundation backfill and any overlying pavements should have a positive slope away from foundation walls on all sides. For grass or landscape covered areas, a minimum slope of 1 inch per foot for 5 to 10 feet away from the building is recommended. A minimum slope of 2 percent is recommended for grassed or landscaped areas of the site away from the building. For paved areas,

minimum slopes of 1 percent for concrete pavements and 1½ percent for asphalt pavements are recommended. Pavements and exterior slabs that abut the structure should be carefully sealed against moisture intrusion at the joint.

OTHER RECOMMENDATIONS

During detailed design, additional issues may arise and possible conflicts may occur with our recommendations. Such issues and conflicts should be resolved through dialogue between the geotechnical engineer and designers. It is recommended that the geotechnical engineer review the final design, including the plans and specifications, to verify that our recommendations are properly interpreted and incorporated into the design.

If any changes are made in the design of the project, including the nature or location of proposed facilities on the site or significant elevation changes, the analysis and recommendations of this report shall not be considered valid unless the changes are reviewed. The analysis and recommendations of this report should not be applied to different projects on the same site or to similar projects on different sites.

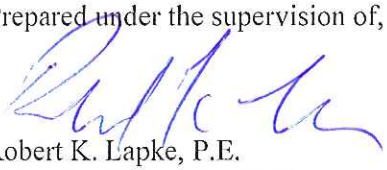
The analysis and recommendations in this report are based upon borings at specific locations. The nature and extent of variation between boring locations is impossible to predict. Because of this, geotechnical recommendations are preliminary until they have been confirmed through observation of site excavation and earthwork preparation. If variations appear during subsequent exploration or during construction, we may reevaluate our recommendations and modify them, if appropriate. The geotechnical engineer should be retained during construction to observe compliance with the recommendations of this report and to provide quality control testing of earthwork construction. If these services are provided by others, including the contractor, the entity that provides construction phase observation and testing shares responsibility as the geotechnical engineer of record for implementing or modifying these recommendations.

Respectfully submitted,
Thiele Geotech, Inc.

Prepared by,

Andrew J. Miller, E.I.

Prepared under the supervision of,



Robert K. Lapke, P.E.
Nebraska License E-10089

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APPENDIX

Subsurface Exploration Methods

Legend of Terms

Zone Plan

Boring Location Plan

Boring Logs

Soil Test Summary

SUBSURFACE EXPLORATION METHODS

The fieldwork for this study was conducted on May 26, 2015. The exploratory program consisted of 11 test borings drilled at the approximate locations shown on the Boring Location Plan. Boring locations were selected to provide the desired site coverage and were adjusted to accommodate access conditions. The boring locations were laid out in the field using a handheld GPS and coordinates from Google Earth. Elevations were interpolated from a preliminary grading plan created by Ehrhart Griffin and Associates. The boring locations and elevations should only be considered accurate to the degree implied by the methods used to define them.

Test borings were advanced using flight augers powered by a truck-mounted drill rig. Soil samples were obtained at selected depths as indicated on the boring logs. A 3-inch nominal diameter thin-walled sampler was hydraulically pushed to obtain undisturbed samples. Disturbed samples were obtained by driving a 2-inch nominal diameter split barrel sampler while conducting standard penetration tests (SPT). The SPT values presented on the boring logs are actual field recorded numbers and have not been corrected for hammer energy or overburden. Auger samples were obtained directly from the drill cuttings.

The boring logs were prepared based on visual classification of the samples and drill cuttings, and by observation of the drilling characteristics of the subsurface formations. The logs have been supplemented and modified based on the laboratory test results and further examination of the recovered samples. The stratification lines on the boring logs represent the approximate boundary between soil types, but the insitu transition may be gradual.

Water level observations were made at the times stated on the boring logs. The borings were backfilled with drill cuttings at the completion of the fieldwork.

The field boring logs were reviewed to outline the depths, thicknesses, and extent of the soil strata. A laboratory testing program was then developed to further classify the basic soils and to evaluate the engineering properties for use in our analysis.

Laboratory tests to further classify the soils included visual classification, moisture content, dry unit weight, and Atterberg limits. The shear strengths of cohesive samples were evaluated using the unconfined compression test.

The boring logs and related information in this report are indicators of subsurface conditions only at the specific locations and times noted. Subsurface conditions, including ground water levels, at other locations of the site may differ significantly from conditions that exist at the sampling locations. Also note that the passage of time may affect conditions at the sampling locations.

LEGEND OF TERMS

Soil Description Terms

Consistency - Fine Grained	Consistency - Coarse Grained	Moisture Conditions
Very Soft, Soft, Firm, Hard, Very Hard	Very Loose, Loose, Medium Dense, Dense, Very Dense	Dry, Slightly Moist, Moist Very Moist, Wet (Saturated)

Sample Identification

Sample Type	Sample Data	Laboratory Data
U -- Undisturbed (Shelby Tube)	No. -- Number	MC -- Moisture content
S -- Split barrel (disturbed)	SPT -- Standard penetration test	γ_d -- Dry unit weight
C -- Continuous sample	bpf -- blows per foot	q_u -- Unconfined compression
A -- Auger cuttings (disturbed)	Rec -- Recovery	LL/PI -- Liquid limit & plasticity index

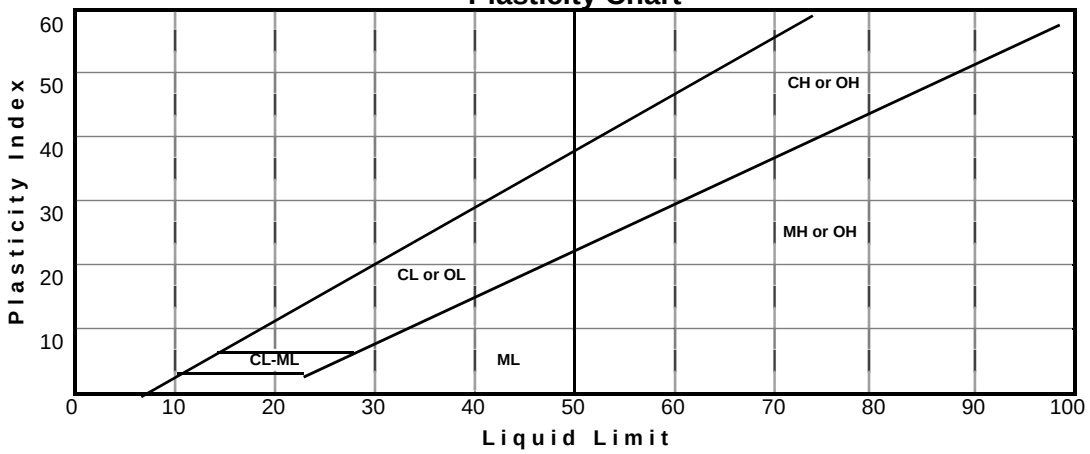
Unified Soil Classification System

Peat	Pt	Highly organic soils	50% or more smaller than No. 200 sieve
Fat Clay	CH	Clay - Liquid Limit > 50 *	
Elastic Silt	MH	Silt - Liquid Limit > 50 *	
Lean Clay	CL	Clay - Liquid Limit < 50 *	
Silt	ML	Silt - Liquid Limit < 50 *	
Silty Clay	CL-ML	Silty Clay *	
Clayey Sand	SC	Sands with 12 to 50 percent smaller than No. 200 sieve *	More than 50% larger than No. 200 sieve and % sand > % Gravel
Silty Sand	SM		
Poorly-Graded Sand with Clay	SP-SC	Sands with 5 to 12 percent smaller than No. 200 Sieve *	
Poorly-Graded Sand with Silt	SP-SM		
Well-Graded Sand with Clay **	SW-SC		
Well-Graded Sand with Silt **	SW-SM		
Poorly-Graded Sand	SP	Sands with less than 5 percent smaller than No. 200 sieve *	
Well-Graded Sand **	SW		
Clayey Gravel	GC	Gravels with 12 to 50 percent smaller than No. 200 Sieve *	More than 50% larger than No. 200 sieve and % gravel > % sand
Silty Gravel	GM		
Poorly-Graded Gravel with Clay	GP-GC	Gravels with 5 to 12 percent smaller than No. 200 sieve *	
Poorly-Graded Gravel with Silt	GP-GM		
Well-Graded Gravel with Clay **	GW-GC		
Well-Graded Gravel with Silt **	GW-GM		
Poorly-Graded Gravel	GP	Gravels with less than 5 percent smaller than No. 200 sieve *	
Well-Graded Gravel **	GW		

* *See Plasticity Chart for definition of silts and clays*

** *See Criteria for Sands and Gravels for definition of well-graded*

Plasticity Chart



Criteria for Sands and Gravels

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	FINES (silt or clay)
Sieve size	10"	3"	¾"	#4	#10	#40	#200

Well-graded sands (SW) $C_u=D_{60}/D_{10}\geq 6$ and $C_c=(D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

Well-graded gravels (GW) $C_u=D_{60}/D_{10}\geq 4$ and $C_c=(D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

N

0 100 200

SCALE: 1"=200'

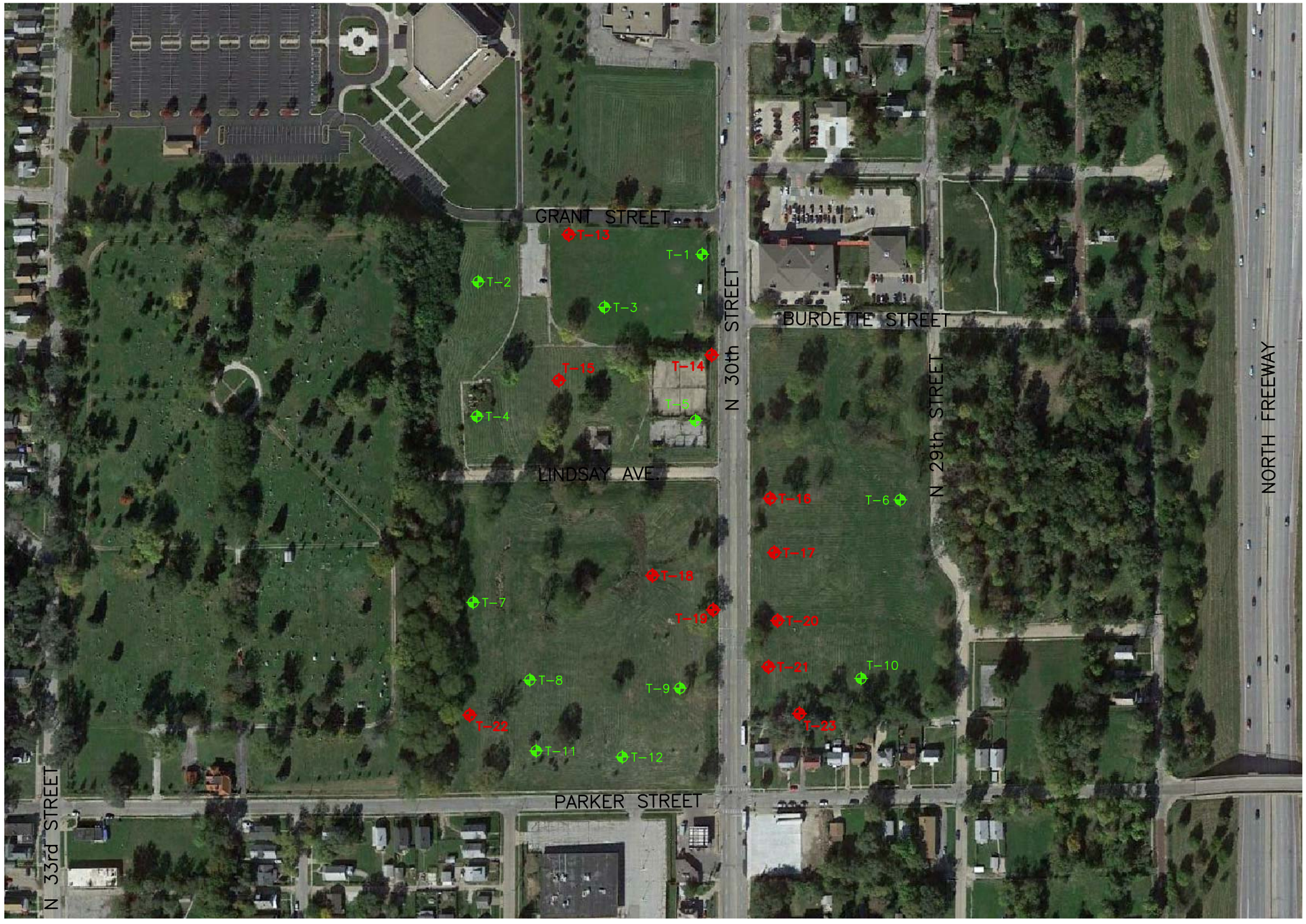
ZONE PLAN

Thiele Geotech Inc

PROJECT

HIGHLANDER
NORTH 30th ST. & PARKER ST.
OMAHA, NEBRASKA

JOB # 15100.00 | DATE: 5/14/15



0 100 200

SCALE: 1"= 200'

LEGEND:

BORING LOCATION

PREVIOUS BORING LOCATION

Thiele Geotech Inc

PROJECT

HIGHLANDER PHASE I
NORTH 30th ST. & PARKER ST.
OMAHA, NEBRASKA

JOB # 15100.01 | DATE: 6/10/15

BORING LOCATION PLAN

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-13
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1144'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	dark brown	moist	hard	lean clay	fill	trace brick								
							U-1		11	19.7	107.5	1.65		
5	light gray	very moist	soft			trace gravel	U-2		12	25.1	97.3	0.64		5
10	dark brown	very moist	soft	lean clay	altered Peoria loess		U-3		10	31.1	87.0	0.73		10
	brown	very moist	soft	lean clay	Peoria loess									
15							U-4		11	28.7	85.7			15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	13.5’	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	12.2’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
		N. 30th St. & Parker St., Omaha, NE	6” flight augers		CME 45B	T-14
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1124’	15’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	moist	hard	lean clay	fill									
							U-1		12	20.0	101.4			
	dark brown		soft			some brick & gravel	U-2		12	22.9	97.9	0.71		
5														5
	brown	very moist	soft	fat clay	Kansan till	fine gravel	U-3		10	30.3	91.2	0.54		
10														10
		wet												
	light brown						U-4		12	32.9	90.2	0.34		
15														15
						bottom of hole @ 15’								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	13.5’	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	17.3’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
		N. 30th St. & Parker St., Omaha, NE	6” flight augers		CME 45B	T-15
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1143’	35’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	very moist	firm	lean clay	Peoria loess									
							U-1		6	24.8	96.6			
	light gray													
							U-2		11	24.9	95.8			
5														5
	light brown						U-3		12	31.3	89.1			
10														10
		wet					U-4		12	33.9	86.2			
15														15
	light gray						U-5		12	27.4	97.6	0.95		
20														20
							U-6		12	24.8	101.6	1.40		
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	13.5’	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	17.3’	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
		N. 30th St. & Parker St., Omaha, NE	6” flight augers		CME 45B	T-15(cont.)
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1143’	35’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	light gray	wet	firm	lean clay	Peoria loess									
30	reddish brown	wet	soft	lean clay	Loveland loess		U-7		12	28.1	95.7	0.61		30
35							U-8		11	28.2	95.6			35
40						bottom of hole @ 35’								40
45														45
50														50

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-16
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1145'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	moist	firm	fat clay	fill	minor brick & gravel								
							U-1		7	20.0	104.6	1.04		
		very moist	soft											
5							U-2		6	24.2	91.9	0.20		5
	light reddish brown	moist	firm	lean clay	Loveland loess									
							U-3		12	22.6	97.9	0.70		
10														10
							U-4		12	21.6	102.0			
15	light brown	moist	hard	fat clay	Kansan till	trace sand								15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-17
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1154'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	moist	hard	lean clay	fill	trace brick and concrete								
							U-1		10	19.7	108.3	2.14		
5	reddish brown	very moist	soft	lean clay	Loveland loess		U-2		11	24.4	96.5	0.67		5
10	light brown		firm				U-3		12	24.1	99.5	0.81		10
15	light brown	moist	hard	fat clay	Kansan till	minor sand	U-4		12	20.8	106.6			15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-18
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1160'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	light gray	moist	firm	lean clay	Peoria loess									
							U-1		9	21.8	100.2			
5		very moist	soft				U-2		12	24.8	89.3	0.42	LL=33 PI=10 CL	5
10	gray						U-3		12	24.4	93.4	0.56		10
	reddish brown	moist	firm	fat clay	Loveland loess									
15							U-4		12	22.8	101.9	1.49		15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/826/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-19
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1165'	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	grayish brown	moist	hard	lean clay	fill									
							U-1		11	18.6	109.2	2.75		
	light brown	moist	firm	lean clay	Peoria loess									
5							U-2		11	23.4	93.4	0.80		5
	gray						U-3		11	18.5	94.4	1.26		
10														10
	reddish brown	moist	hard	fat clay	Loveland loess									
							U-4		11	20.8	101.4			
15														15
	light brown			lean clay			U-5		12	21.9	96.7			
20														20
						bottom of hole @ 20'								
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-20
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1158'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	light brown	very moist	firm	lean clay	Peoria loess									
							U-1		12	25.6	91.9	0.94		
							U-2		12	23.6	92.6	0.80		
5														5
	reddish gray	moist	soft	lean clay	Loveland loess		U-3		12	23.2	93.4	0.62		
10														10
	light brown	moist	hard	fat clay	Kansan till	minor sand								
							U-4		11	22.4	100.3			
15														15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-21
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1161'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	moist	hard	lean clay	fill	minor brick, glass and wood								
							U-1		9	20.1	105.1	1.75		
5	light brown	very moist	firm	lean clay	Peoria loess		U-2		12	26.7	90.9	0.87		5
			soft				U-3		12	20.0	89.1	0.44		
10														10
	gray		firm				U-4		11	21.2	94.9			
15														15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-22
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1177'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	moist	firm	lean clay	fill	trace gravel & plastic								
							U-1		7	23.4	99.5	0.72		
		very moist	soft				U-2		9	25.1	96.5	0.53		
5	light gray	very moist	soft	lean clay	Peoria loess									5
10	light brown						U-3		12	24.6	89.9	0.51		10
15							U-4		12	25.0	95.0			15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	Highlander Phase I	Morrissey	Burmeister	15100.01	5/26/15
End of Drilling	N/E	LOCATION	DRILLING METHOD		DRILL RIG	BORING NO.
(none encountered)		N. 30th St. & Parker St., Omaha, NE	6" flight augers		CME 45B	T-23
		LOCATION OF BORING	TYPE OF SURFACE		ELEVATION	DEPTH
boring backfilled with cuttings		see Boring Location Plan	weeds		1159'	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	brown	moist	soft	lean clay	fill	appreciable brick & gravel								
							U-1		7	18.2	100.5	0.35		
5	light brown	very moist	soft	lean clay	Peoria loess		U-2		12	27.5	91.5	0.47	LL=37 PI=17 CL	5
							U-3		12	26.3	91.5	0.78		
10														10
	light brown						U-4		12	25.4	91.8			
15														15
						bottom of hole @ 15'								
20														20
25														25

Thiele Geotech Inc

SOIL TEST SUMMARY

Project: Highlander Phase I

Job No.: 15100.01

Location: N. 30th St. & Parker St., Omaha, NE

Date: 6/3/2015

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT WET (pcf)	UNIT WEIGHT DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (%)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	PASS #200 (%)		REMARKS
T-13	U-1	0.5-2	2.85	19.7	128.7	107.5	0.567	94	1.65	7.2						
	U-2	3.5-5	2.85	25.1	121.8	97.3	0.731	93	0.64	3.4						
	U-3	8.5-10	2.85	31.1	114.1	87.0	0.935	90	0.73	7.9						
	U-4	13.5-15		28.7	110.3	85.7	0.965	80								
T-14	U-1	0.5-2		20.0	121.7	101.4	0.662	82								
	U-2	3.5-5	2.85	22.9	120.3	97.9	0.720	86	0.71	5.4						
	U-3	8.5-10	2.85	30.3	118.8	91.2	0.847	97	0.54	15.0						
	U-4	13.5-15	2.85	32.9	119.9	90.2	0.868	100	0.34	15.0						
T-15	U-1	0.5-2		24.8	120.5	96.6	0.745	90								
	U-2	3.5-5		24.9	119.7	95.8	0.758	89								
	U-3	8.5-10		31.3	117.0	89.1	0.890	95								
	U-4	13.5-15		33.9	115.4	86.2	0.955	96								
	U-5	18.5-20	2.85	27.4	124.3	97.6	0.727	100	0.95	15.0						
	U-6	23.5-25	2.85	24.8	126.8	101.6	0.658	100	1.40	13.0						
	U-7	28.5-30	2.85	28.1	122.7	95.7	0.760	100	0.61	15.0						
	U-8	33.5-35		28.2	122.5	95.6	0.762	100								
T-16	U-1	0.5-2	2.85	20.0	125.6	104.6	0.610	89	1.04	6.4						
	U-2	3.5-5	2.85	24.2	114.1	91.9	0.834	78	0.20	4.5						
	U-3	8.5-10	2.85	22.6	120.0	97.9	0.720	85	0.70	1.7						
	U-4	13.5-15		21.6	124.0	102.0	0.652	89								
T-17	U-1	0.5-2	2.85	19.7	129.7	108.3	0.555	96	2.14	4.1						
	U-2	3.5-5	2.85	24.4	120.0	96.5	0.747	88	0.67	4.8						
	U-3	8.5-10	2.85	24.1	123.5	99.5	0.693	94	0.81	3.3						
	U-4	13.5-15		20.8	128.7	106.6	0.581	97								
T-18	U-1	0.5-2		21.8	122.0	100.2	0.682	86								
	U-2	3.5-5	2.85	24.8	111.5	89.3	0.886	76	0.42	6.4	33	23	10		CL	
	U-3	8.5-10	2.85	24.4	116.2	93.4	0.803	82	0.56	2.7						
	U-4	13.5-15	2.85	22.8	125.1	101.9	0.654	94	1.49	3.3						
T-19	U-1	0.5-2	2.85	18.6	129.6	109.2	0.543	93	2.75	5.5						
	U-2	3.5-5	2.85	23.4	115.3	93.4	0.803	79	0.80	1.5						
	U-3	8.5-10	2.85	18.5	111.9	94.4	0.785	64	1.26	1.2						
	U-4	13.5-15		20.8	126.1	104.4	0.614	91								
	U-5	18.5-20		21.9	117.8	96.7	0.742	80								
T-20	U-1	0.5-2	2.85	25.6	115.5	91.9	0.833	83	0.94	2.5						
	U-2	3.5-5	2.85	23.6	114.5	92.6	0.819	78	0.80	1.7						
	U-3	8.5-10	2.85	23.2	115.1	93.4	0.804	78	0.62	2.9						
	U-4	13.5-15		22.4	122.7	100.3	0.680	89								

Thiele Geotech Inc

SOIL TEST SUMMARY

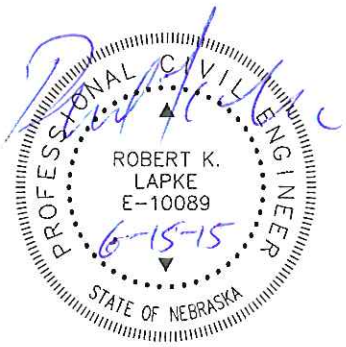
Project: Highlander Phase I

Job No.: 15100.01

Location: N. 30th St. & Parker St., Omaha, NE

Date: 6/3/2015

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT WET (pcf)	UNIT WEIGHT DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (%)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	PASS #200 (%)		REMARKS
T-21	U-1	0.5-2	2.85	20.1	126.3	105.1	0.602	90	1.75	5.9						
	U-2	3.5-5	2.85	26.7	115.1	90.9	0.854	84	0.87	1.5						
	U-3	8.5-10	2.85	20.0	106.9	89.1	0.891	61	0.44	3.4						
	U-4	13.5-15		21.2	115.0	94.9	0.775	74								
T-22	U-1	0.5-2	2.85	23.4	122.7	99.5	0.694	91	0.72	8.0						
	U-2	3.5-5	2.85	25.1	120.7	96.5	0.746	91	0.53	9.2						
	U-3	8.5-10	2.85	24.6	111.9	89.9	0.875	76	0.51	0.9						
	U-4	13.5-15		25.0	118.8	95.0	0.773	87								
T-23	U-1	0.5-2	2.85	18.2	118.8	100.5	0.676	73	0.35	6.2						
	U-2	3.5-5	2.85	27.5	116.7	91.5	0.841	88	0.47	2.2	37	20	17		CL	
	U-3	8.5-10	2.85	26.3	115.6	91.5	0.841	85	0.78	1.9						
	U-4	13.5-15		25.4	115.1	91.8	0.835	82								


PROFESSIONAL CIVIL ENGINEER
ROBERT K.
LAPKE
E-10089
6-15-15
STATE OF NEBRASKA