BECKER COUNTY MATERIAL RECOVERY BUILDING ADDITION WELL
24413 CO RD 144
DETROIT LAKES, MN 56501

PROJECT NUMBER: 18052

BID DATE & TIME: TUESDAY, JULY 19, 2022 AT 2:00 PM

SPECIFICATIONS FOR:

SINGLE PRIME CONTRACTOR

See drawing sheet C1.0 Fire Protection Well Plan dated 11-12-21 and 6-21-22
SPECIFICATIONS FOR THE:  
BECKER COUNTY MATERIAL BUILDING ADDITION WELL  
24413 CO RD 144  
DETROIT LAKES, MINNESOTA

PROJECT NO. 18052

MUTCHLER BARTRAM ARCHITECTS  ARCHITECT
Professional Corporation  
505 N. Broadway Suite #201  
Fargo, ND 58102  
Telephone: 701-235-5563

MBN ENGINEERING  MECHANICAL CONSULTANT
503 7th Street N. #200  
Fargo, ND 58102  
Telephone: 701-478-6336

BRUCE LAUGTUG, PE  ELECTRICAL CONSULTANT
2108 S University Dr #105B  
Fargo, ND 58103  
Telephone: 701-232-8391

MBN ENGINEERING  CIVIL CONSULTANT
503 7th Street N. #200  
Fargo, ND 58102  
Telephone: 701-478-6336

I hereby certify that this specification was prepared by me or under my direct supervision, and that I am a duly Registered Architect under the laws of the state of North Dakota.

Kevin J. Bartram  June 29, 2022  Registration No. MN 20518

END OF CERTIFICATIONS PAGE
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SECTION 00 1113
ADVERTISEMENT FOR BIDS

PROJECT: BECKER COUNTY MATERIAL RECOVERY BUILDING ADDITION WELL
24413 CO RD 144
DETOUR LAKES, MN 56501
PROJECT NO. 18052

OWNER: BECKER COUNTY ENVIRONMENTAL SERVICES
915 LAKE AVENUE
DETOUR LAKES, MN 56501

The project includes the construction of a well to the existing material recovery facility for Becker County located on the Becker County Solid Waste Campus, 24413, Co Rd 144, Detroit Lakes.

Separate bids for a Prime Contractor for the Becker County Material Recovery will be received by the Becker County Land Use Department, Environmental Services Division at the office of Steve Skoog, Director, 915 Lake Avenue, Detroit Lakes, MN 56501 until 2:00 pm local time, Tuesday, July 19, 2022.

The Information to Bidders, Form of Bid, Form of Contract, and Form of Bid Bond, Form of Performance-Payment Bond, Drawings, Specifications, and other contract documents may be examined at the following places: The office of Mutchler Bartram Architects, Fargo, North Dakota, 58102; and the Builders Exchange of Fargo, North Dakota.

Copies of the Project Documents may be obtained online on the home page “News and Announcements” section at www.co.becker.mn.us. Plan Holders are parties that have downloaded the plans and specifications. Plan Holders will be notified via the website as addenda are issued. It is the Plan Holders responsibility to check the website for any addendums issued and confirm that addenda were received on the Bid Form.

Copies may also be obtained at the office of Mutchler Bartram Architects located at 505 N. Broadway, Suite 201, Fargo, North Dakota 58102. A plan deposit is not required.

The Owner reserves the right to waive any informalities or to reject any or all bids.

Each bid shall be accompanied by a copy of the contractor’s current license renewal certificate and a bidder’s bond in a sum equal to five percent (5%) of the full amount of the bid, executed by the bidder as principal and by a surety company authorized to do business in this state, conditioned that if the principal’s bid be accepted and the contract awarded to the principal, within ten days after notice of award, the principal will execute and effect a contract in accordance with the terms of the bid and a contractor’s bond as required by law the regulations and determinations of the governing board.

All Bidders must be licensed for the highest amount of their bids. A copy of the bidder’s current license must be enclosed in the Bid Bond Envelope.

No bid will be read or considered which does not fully comply with the above provisions as to bond and licenses, and any deficient bid submitted will be resealed and returned to the bidder immediately.

No bidder may withdraw his bid within thirty (30) days after the actual date of the opening thereof.

BY: Steve Skoog, Director
DATE: June 29, 2022

END OF BID SOLICITATION
SECTION 00 2113
INFORMATION TO BIDDERS

SUMMARY

1.01 RECEIPT AND OPENING OF BIDS
Becker County, herein called the Owner, invites separate bids on the form attached hereto for the Becker County Material Recovery Building Addition Well located in Detroit Lakes, Minnesota. Bids will be received by the Owner at the office of Steve Skoog until Tuesday, July 19, 2022 at 2:00 pm and then publicly opened and read aloud. The envelopes containing the bids must be sealed and addressed: Becker County Material Recovery Building Addition, Detroit Lakes, Minnesota.

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 30 days after the actual date of opening thereof.

1.02 PREPARATION OF BID
Each bid must be submitted in a sealed envelope bearing on the outside the following information:

NAME OF PROJECT: Becker County Material Recovery Building Addition Well, Detroit Lakes, Minnesota
NAME OF BIDDER:
ADDRESS OF BIDDER:
THE WORDS: BID PROPOSAL FOR SINGLE PRIME CONTRACTOR

No contract shall be awarded to any contractor unless he is the holder of a license in the class within which the value of the project shall fall as hereinbefore provided.

1.03 SUBCONTRACTS
The bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the Owner. Causes for rejection include but are not limited to the following:

Poor workmanship on past projects.
Lack of cooperation and/or inability to meet construction schedule on past projects. Inadequate personnel to meet construction schedule.
Inability to meet project contract requirements.

The lowest bidder must submit to the Architect a complete list of all suppliers and subcontractors within seven (7) days after the time of the award of contract. Inability to provide a list of acceptable subcontractors shall be just cause for rejection of the bidder’s proposal.

1.04 WAGES
This project is subject to Minnesota Labor Standards and Wages requirements of Minnesota Statutes Chapter 177.
Pursuant to Minnesota Statutes 177.41 to 177.44 and corresponding Rules 5200.1000 to 5200.1120, this project contract is subject to the prevailing wages as established by the Minnesota Department of Labor and Industry. Specifically, all contractors and subcontractors must pay all laborers and mechanics the established prevailing wages for work performed under the contract. Failure to comply with the aforementioned may result in civil or criminal penalties. See Minnesota Department of Labor Prevailing Wages for Becker County attached to this section.

For more information regarding prevailing wage and its application, contact:

Minnesota Department of Labor and Industry
Prevailing Wage unit
443 Lafayette Road N.
St. Paul, MN 55155
Phone: (651) 284-5091
E-mail: dli.prevwage@state.mn.us
Web: www.dli.mn.gov

1.05 WORK HOURS

On-site work shall not occur outside normal working hours of 7 a.m. to 7 p.m. Monday through Friday without the approval of the Owner.

1.06 BID SECURITY

Each bid must be accompanied by a Bid Bond, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner in the amount of 5% of the bid.

Bid bonds shall be made payable to Becker County.

1.07 CONDITIONS OF WORK

Each bidder must inform himself fully of the conditions relating to the construction of the project. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract. Insofar as possible, the contractor in carrying out his work must employ such methods of means as will not cause any interruption of or interference with the work of any other contractor or owner.

Upon award of contract, successful bidders shall order materials and begin off site equipment fabrication.

1.08 SECURITY FOR FAITHFUL PERFORMANCE

Simultaneously with his delivery of the executed contract, each contractor shall furnish a performance-Payment Bond as security for faithful performance of this contract and furnishing materials in connection with this contract. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner. The amount of the bonds shall be 100% of the contract.

1.09 POWER OF ATTORNEY

Attorneys-in-fact who sign bonds on contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.
1.10 LAWS AND REGULATIONS
The bidder’s attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over the construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

Bidders must hold any state required Minnesota Contractor's licenses, carry Minnesota Workmen's Compensation Insurance, and conform to all governing laws of the State of Minnesota.

1.11 METHODS OF AWARD - LOWEST QUALIFIED BIDDER
The contract will be awarded on the basis of base bid or any combination of base bid and such alternates that produce the most complete project as desired by the Owner within the allowable budget.

1.12 OBLIGATION OF BIDDER
At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the drawings and other Contract Documents (including all addenda). The failure or omission of any bidder to examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.

1.13 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT
Contractor's, subcontractor's, and supplier's attention is directed to specification Section 01 6000 - Product Requirements and Substitutions, regarding substitutions of materials and/or equipment.

1.14 SMOKE-FREE BUILDINGS
Smoking in and around the building is prohibited and will be strictly enforced.

1.15 ALCOHOL
Absolutely no alcoholic beverages are allowed on the jobsite at any time during the construction process.

1.16 STATE EXCISE AND USE TAX (SALES TAX)
In submitting the bid the bidder is understood to have included in the bid price the state excise tax on all sales of building materials, supplies and equipment to contractors, subcontractors or builders for the erection of buildings or the alteration, repair or improvement. Contractor shall submit a tax clearance certificate prior to award of contract.

1.17 CONTRACTOR'S REQUEST FOR CLEARANCE FORM
Contractors shall furnish a complete and current Tax Clearance Certificate along with his Performance-Payment Bond, Insurance Certificate and other contractual items along with his signed contracts. If a current Tax Clearance Certificate is not available, Section 01 6100 of this specification includes an application form.
1.18 STORING MATERIALS OFF-SITE
Contractors may store materials off-site and receive payment for said materials upon completion of the attached Agreement for Storing Materials Off-Site in Section 01 6200 of this specification.

1.19 CONTACTOR ALTERNATES
Contractor alternates or manufacturer’s alternates will be reviewed and awarded on a case by case basis and accepted at the sole discretion of the Owner.

1.20 ALTERNATES
See section 01 2300 - Alternates, for general description of alternates. The technical sections of these specifications shall also apply to the alternate work, whether so noted in each technical section or not.

1.21 SITE DAMAGE AND REPAIRS
Damage to streets, curbs, sidewalks, gravel roads, plantings, buildings, and any other elements surrounding the site shall be repaired to the Owner’s satisfaction by the responsible party.

1.22 DRIVEWAYS AND ENTRANCES
Keep driveways and entrances serving the premises clear and available to the Owner, the Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.23 BUILDERS RISK
Builder’s Risk Insurance shall be provided by the Prime Contractor to cover all work. The policy shall have a deductible of no more than $5,000. The Owner and Architect shall be listed as named insured.

1.24 AMERICAN MADE STEEL
Contractor shall complete this job in accordance with MN Law 2014, Chapter 294, Article 2, Section 22 American made steel.

1.25 WORKERS COMPENSATION
Workers Compensation in accordance with MN Statue 176.181, subdivision 3 and 176.182 shall be included for this project.

1.26 CONTRACT CLOSEOUT
Each contractor will be required to submit the following forms, fully executed, at the appropriate time prior to retainage reduction or final payment.
Signed lien waiver for the amount of each pay request. AIA G706A - Contractor’s Affidavit or Release of Liens.
AIA G706 - Contractor’s Affidavit of Payment of Debts and Claims.

END OF SECTION
**Construction Type:** Commercial

**County Number:** 03

**County Name:** BECKER

**Effective:** 2021-12-27  **Revised:** 2022-01-31

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate. *Note:* Overtime pay after eight (8) hours on the project must be paid even if the worker does not exceed forty (40) hours in the work week.

**Violations should be reported to:**

Department of Labor and Industry  
Prevailing Wage Section  
443 Lafayette Road N  
St Paul, MN 55155  
(651) 284-5091  
DLIPrevWage@state.mn.us

* Indicates that adjacent county rates were used for the labor class listed.

**County:** BECKER (03)

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<td>PIPELAYER (WATER, SEWER AND GAS)</td>
<td>FOR RATE CALL 651-284-5091 OR EMAIL <a href="mailto:DLI.PREVWAGE@STATE.MN.US">DLI.PREVWAGE@STATE.MN.US</a></td>
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<td>108 TUNNEL MINER</td>
<td>FOR RATE CALL 651-284-5091 OR EMAIL <a href="mailto:DLI.PREVWAGE@STATE.MN.US">DLI.PREVWAGE@STATE.MN.US</a></td>
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<td>109* UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)</td>
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<td>110* SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.</td>
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<td>202* BOOM TRUCK</td>
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<td>203* LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS</td>
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<td>205 PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT (ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.</td>
<td>FOR RATE CALL 651-284-5091 OR EMAIL <a href="mailto:DLIPREVWAGE@STATE.MN.US">DLIPREVWAGE@STATE.MN.US</a></td>
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**HIGHWAY/HEAVY POWER EQUIPMENT OPERATOR**

**GROUP 2**

306 GRADER OR MOTOR PATROL

308 TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)

**GROUP 3 ***

2021-12-27

309 ASPHALT BITUMINOUS STABILIZER PLANT

310 CABLEWAY

312 DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)

314 DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER

316 LOCOMOTIVE CRANE OPERATOR

320 TANDEM SCRAPER

322 TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)

**GROUP 4 ***

2021-12-27

323 AIR TRACK ROCK DRILL

324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)

325 BACKFILLER OPERATOR

327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)

328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)

329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS

330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS

331 CHIP HARVESTER AND TREE CUTTER

332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE

334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)

335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT

336 CURB MACHINE

337 DIRECTIONAL BORING MACHINE

338 DOPE MACHINE (PIPELINE)

340 DUAL TRACTOR
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<td>AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)</td>
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GROUP 8 *

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For rate call 651-284-5091 or email DLI.PREVWAGE@STATE.MN.US
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SECTION 00 4000
BID BOND

1.01 GENERAL

A. SUMMARY
   1. This section includes the bid bond. (AIA Document A310 2010).
   2. The Owner will accept other forms as long as they comply with the Bonding requirements of the state of Minnesota.

END OF SECTION
SECTION 00 4100  
BID FORM  

PROJECT:  BECKER COUNTY MATERIAL RECOVERY BUILDING ADDITION WELL  
24413 CO RD 144  
DETROI LAKES, MINNESOTA  

PROJECT NO. 18052  

DATE: ____________________________  

Proposal of ____________________________, hereinafter called bidder, a ____________________________, corporation / partnership / an individual (strike out inapplicable terms), doing business as ____________________________, to Becker County, hereinafter called Owner.  

To the Owner:  
The bidder in compliance with your Invitation for Bids for the construction of the Becker County Material Recovery Building Addition Well, 24413 Co Rd 144, Detroit Lakes, Minnesota, having examined the plans and specifications with related documents and the site of the proposed work and being familiar with all the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies and to construct the project in accordance with the contract documents within the time set forth therein and at the prices stated below.  This price is to cover all expenses incurred in performing the work required under the contract documents of which this proposal is a part.  

Bidder hereby agrees to commence work under this contract on or before a date noted in the Construction Progress Schedule 01 3216 and to have the project fully complete by November 1, 2022.  

Bidder acknowledges receipt of the following addendum: ____________________________  

BASE PROPOSAL:  
Bidder agrees to perform all of the Construction Work described in the specifications and shown on the plans for the sum of ____________________________ dollars, ($__________________).
Bidder understands that the Owner reserves the right to reject any or all bids and to waive an informalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 60 days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a surety bond or bonds as required by the specifications.

The bid security attached in the amount of 5% is to become the property of the owner in the event the contract and bond are not executed within the time above set forth as liquidated damages for the delay and additional expense to the owner caused thereby.

Respectfully submitted,

By: ____________________________
   (signature)

Title: ____________________________

Business Address____________________

(Seal if bid is by a Corporation) ____________________________

Telephone No. ____________________________

Fax No. ____________________________

Email ____________________________

END OF BID FORM
SECTION 00 5000
OWNER CONTRACTOR AGREEMENT FORM

A. A.I.A. Document A101, “Standard Form of Agreement Between Owner and Contractor”, 2007 Edition as published by the American Institute of Architects, Article 1 through 10, inclusive, are hereby made a part of the Contract Documents to same extent as if bound herein and as supplemented hereinafter, is not included with this Project Manual but is available for review at the Architect’s office.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. This section includes Performance/Payment Bond (AIA Document A312-2010). Copies of this document are available from Architect for review.

END OF SECTION
This supplemental agreement is entered into this _____ day of ____________________,
between the ____________________________________________________________
(hereinafter called Owner) and ____________________________________________
(hereinafter called the Contractor), for ______________________________________
WHEREAS, the Contractor desires to store certain materials off the site for use in construction of
__________________________________________ under contract dated ________________ in order to
furnish better storage, and desires to obtain advances for materials properly stored on the
premises of __________________________________________ to the Contractor in accordance with contract provisions as if they were properly stored on the site, provide the following conditions are complied with:
1. The above described warehouse selected for off-site storage must be suitable for storage and satisfactory to Owner;
2. Any extra expense incurred because of off-site storage shall be borne by the Contractor;
3. Storage shall be at the risk of the Contractor and the loss, damage, or destruction of any materials so stored does not relieve the Contractor of the duty to complete the contract and the Contractor shall, if necessary, replace such items at his own expense;
4. The Owner will advance to the Contractor 90% of the invoice value of the materials thus stored;
5. Payments for materials stored off the site will be made only on regular Periodical Estimates at the prescribed monthly intervals the same as for materials stored on the site;
6. All materials stored shall be adequately covered by insurance; and;
7. The consent of the Surety shall be obtained and evidenced by signature hereto.

Becker County
Owner
BY: _____________________________________________

Contractor
BY: _____________________________________________

Surety
BY: _____________________________________________

Countersigned BY: ________________________________
Resident Agent
Attorney-in-Fact

END OF SECTION
SECTION 00 7000
GENERAL CONDITIONS

A.  A.I.A. Document A201, “General Conditions of the Contract for Construction”, 2007 Edition as published by the American Institute of Architects, Article 1 through 15, inclusive, are hereby made a part of the Contract Documents to same extent as if bound herein and as supplemented hereinafter, is not included within this Project Manual but is available for review at the Architect's office.

END OF SECTION
The General Conditions of the Contract for Construction (AIA Document No. A201, 2007 edition or current, 15 Articles) are hereby made part of the Contract Documents whether bound herein or not. This Article 16 contains changes and additions to the AIA A201, cross referenced to the original Article numbers in AIA A201. Where any part of AIA A201 is not modified or voided by this Article 16, the unaltered part remains in effect.

ARTICLE 1 - GENERAL PROVISIONS

1.2.4 The general character and scope of the Work is shown by the Drawings. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all similar parts of the Work.

1.2.5 Figured dimensions shall be followed in preference to scaled measurements. Dimensions on the Drawings are subject to field verification to suit adjacent elements.

1.2.6 Where Specifications are abbreviated type, they indicate complete sentences in the same manner as when a note occurs in the Drawings. Omissions of words such as "the Contractor shall" and "as shown on the Drawings" is intentional. The words "shall" or "shall be" are to be supplied by inference. The term "Provide" shall mean "furnish and install in place".

1.2.7 Where a number is listed in the Specifications (as for gauges, weights, temperatures, amount of time, etc.), the number shall be interpreted as that or better.

ARTICLE 2 - OWNER

No Supplement

ARTICLE 3 - CONTRACTOR

Add 3.4.4 Workmanship and Materials.

a) No trade shall commence Work until conditions are right for carrying out the Work properly, and surfaces to be covered are suitable. b) Manufacturer's printed instructions covering details of installation shall be followed where not in conflict with these Specifications. If there is a conflict, notify the Architect and obtain his approval before proceeding. c) Completed Work shall be left plumb, level, true to line or plain, anchored securely in place free from damage. d) Unless otherwise called for, all pieces of material shall be as large a stock size as is in conformity with standard good practice of the trade. e) Except where in conflict with these specifications, current manufacturer's printed specifications of herein specified proprietary products are made part of these specifications.

3.7.6 Add: Where the Contract Documents require Work better than that required by statute, the Contract Documents shall govern.

3.10.4 Add: The Prime Contractor shall prepare the progress schedule in cooperation with his sub-contractors and obtain written evidence of their concurrence. The first payment will not be certified by the Architect until the progress schedule is received by him.
3.11 Replace the text with: The Prime Contractor shall maintain at the site one copy of all Drawings, Specifications. Addenda, approved Shop Drawings, change orders and other modifications. These shall be available to the Architect during construction. One set of prints shall be kept in good condition and marked as the Work progresses by the Contractor in ink to show all differences of major concealed items from what is called for by the Contract Documents. This is to include such items as main pipes and conduit or changed structural members which cannot be observed on completion even with the use of access doors or removable panels. This set shall be turned over to the Architect at the time of final inspection.

ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

4.2.3 Add: The Architect will not be responsible for the acts or omissions of the Owner.

ARTICLE 5 - SUBCONTRACTORS

No Supplement

ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No Supplement

ARTICLE 7 - CHANGES IN THE WORK

Add:
7.1.4 The Owner or Architect are not responsible to give Notice of Change Orders to the Surety (if any).

ARTICLE 8 - TIME

8.1.5 Add: Minor corrective Work and the replacement of defective Work or materials, and the adjustment of control apparatus will not delay the determination that the Contract is Substantially Complete. See 12.2.2.

8.3.4 Add: The following will not be considered justifications for extension of time unless due to one of the causes stated within this Article 8.

   a) Delay caused by Subcontractor or Supplier except if the Supplier goes out of business and another Supplier cannot be found in time to meet schedule.

   b) Shortage of workmen.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.3.1 Delete everything after the words "Schedule of Values."

Add:
9.3.4 Except where the statutory requirements apply, progress payments shall be made monthly upon application, in the amount of 90% of the Work completed and materials described under 9.3.2. For a Contract over $100 thousand, the Architect will authorize the payment of 100% of the amount completed after a total of 5% of the Contract amount has been retained, providing progress on the Work is in accordance with or ahead of the Contractor's Progress Schedule and is otherwise satisfactory to the Architect, and if the Contractor has filed a Consent of Surety with the Architect.
9.8.1 Add: At 12:01 a.m. on the Date of Substantial Completion, the Owner becomes responsible for the care and operation of the accepted Work.

ARTICLE 10 - PROTECTION OF PERSONS & PROPERTY

No Supplement

ARTICLE 11 - INSURANCE AND BONDS

ADD 11.1.1.9 Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

1. Premises Operations (including XCU as applicable)
2. Independent Contractors' Protective
3. Products and Completed Operations
4. Personal injury Liability with Employment Exclusion deleted
5. Contractual - including specified provisions for Contractor's obligations under Paragraph 3.18 of the General Conditions
6. Owned, non-owned and hired motor vehicles
7. Broad Form Property Damage including Completed Operations
8. Umbrella Excess Liability in the amount of $1,000,000, covering all insurance required in 11.1.1.2 thru .7 and 11.1.3. The self-insured retention in the Umbrella policy shall not exceed $10,000.

The Architect and the Owner assume no responsibility in the event that the limits set above are not adequate.

Comprehensive General Liability and Automobile Liability Policy form or policies shall be written by the same insurer who shall be a company licensed in the State where the Work is located at the time the policy is issued. XCU Property Damaged exclusions shall be eliminated in all cases where made applicable by the liability insurance classification.

11.1.2 Replace the first sentence with: The limits on the basic policies may be any amount acceptable to the insurer furnishing the Umbrella coverage.

The Owner and Architect shall be named as an additional insured under all liability policies carried by the contractor.

11.1.3 Replace the text with: Proof of insurance coverage may be a fully description, standard AIA or ACCORD Certificate of Insurance. The Certificate or Insurance portrays the Insurance Agent's description of coverage provided the Contractor. The Architect will verify the correctness of information contained on the Certificate to the extent of forwarding a certified letter to the insurance company (or, companies in the case of multiple coverage) requesting that they provide notification within twenty (20) days if information contained on the Certificate is incorrect. The Architect will not warrant, however, that information contained on the Certificate is correct, nor does the Architect warrant that the coverage and limits of liability will not be changed by the Contractor or the insurance company during the term of the Work.

Certificates shall contain a statement to the effect that the insurance will not be canceled or allowed to expire unless written notice has been given to the Owner at least 30 days prior to such termination or expiration.
11.3.1 Replace the text with: Builder's Risk Insurance. The Prime Contractor shall effect and maintain "all risk" insurance protection on a completed value form upon new portions of the entire structure on which Work of this Contract is done, using standard insuring forms of their equivalent for this purpose. Such contract of insurance shall be endorsed to include Architectural fees as part of the value insured and shall include permission for partial occupancy prior to completion.

The Owner, all Contractors and all Subcontractors, Architects and Engineers shall be named or designated in such capacity as insured jointly with the Prime Contractor in this policy or policies. Which shall be open to any of the insured's inspection. The Contractor shall accomplish this by having an appropriate rider added to all policies as follows: "The (name of insurance company) does insure (names of Owner, Contractors, Architects, Engineers) and all other Contractors and Subcontractors with them at the described premises, but only to the extent of their individual interests, if any, as they may appear."

In bidding, the Prime Contractor shall include the premium in an amount equal to 100% of his bid plus all his add alternates and the portion of Architect's fee in connection with any loss.

The insurance required by this Article shall be written by a Company licensed in the State where the Work is located at the time the policy is issued.

The insurance required by this Article shall remain in effect until the Date of Substantial Completion. The contract will not be signed until the Owner has received from the Contractor the proper policy and one copy thereof for insurance specified under this Article.

If not covered under the all risk insurance or otherwise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit when Such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2.

The "deductible" portion of the policy shall be paid by the Prime Contractor for all claims whether made by him or any one of the other named insured. The Prime Contractor is encouraged to maintain adequate security and take other precautionary steps as required to minimize the risks covered by this insurance.

All references in other sections of Article 11.3 - Property Insurance, that refer to the owner as Trustee for this type of insurance shall be changed to place the Prime Contractor as Trustee.

11.3.2 Add:

The Contractor shall give notice to the Owner stating when the boilers are to be first operated in order for the Owner to effect the Boiler Insurance. The Owner shall carry the boiler insurance and shall maintain it in effect until all final payments for the Work are made. This insurance shall cover the total value of the boiler equipment at the site, including both new and existing, plus damage to the building and personal property, plus bodily injury and in no case be less than $500,000. The Contractor may at his option carry such insurance until the Owner's insurance takes effect.

11.3.8 Add at end: except when the Owner consents to allow a party with a claim to settle directly with the insurer.
11.4.3 Add: The Contractor shall furnish bond or bonds as described below, covering the faithful performance of the Contract and the payments of all obligations arising thereunder. The Contract will not be signed until the Owner has received the proper bond specified under this Article, issued by a bonding company licensed to do business in the State where the construction will take place.

Where there are State or Federal bond forms required by statute or regulation, the bond or bonds shall be on those forms, in the amount of 100% of the Contract Price.

Bond amounts shall not exceed the single bond limit for the Contractor’s bonding company as set forth in the Federal Register current as of the bid date.

ARTICLE 12 - UNCOVERING & CORRECTION OF WORK

No Supplement

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

No Supplement

END OF SECTION
SECTION 00 7200

ARTICLE 17. SPECIAL CONDITIONS

This Article 17 contains changes and additions to the AIA A201 General Conditions of the contract for construction and Article 16 which are special to this project. The changes and additions are cross referenced to the original Article numbers in AIA A201. Where any part of AIA A201 or Article 16 are not modified or voided by this Article 17, the unaltered part remains in effect.

ARTICLE 3

3.7.1 Permits, Fees and Notices

The Prime Contractor shall secure and pay for any State and Local Building Permits for all work.

END OF SECTION
PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of each prime Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY:

A. Section Includes: This Section includes required recycling and recovery of the following waste materials and applies to listed waste materials produced during the Work:

1. Land Clearing Debris: Solid waste generated solely from land clearing operations, such as stumps and trees.

2. Concrete and Masonry: Clean concrete, brick, rock, and masonry.

3. Metals: Metal scrap including iron, steel, copper, brass, and aluminum.


5. Gypsum Wallboard Scrap: Excess drywall construction materials including cuttings, other scrap, and excess materials. [Edit to suit project.]

6. Paper and Cardboard: Discarded office refuse including unwanted files, correspondence, etc. Clean, Corrugated cardboard used for packaging, etc.

B. Non−Recyclable Waste: Collect and segregate non−recyclable waste for delivery to a permitted landfill site.

1. Mixed Solid Waste: Solid waste commonly collected as a municipal service, exclusive of waste materials listed above.

1.03 DEFINITIONS:

A. Waste Materials are defined as large and small pieces of listed materials which are excess to contract requirements and generally include materials to be recycled and/or recovered from existing construction and items of trimmings, cuttings and damaged goods resulting from new installations, which cannot be effectively used in the Work.

B. Recycling is defined as the process of collecting and preparing recyclable materials and reusing them in their original form or in manufacturing processes that do not cause the destruction of recyclable materials in a manner that precludes further use.

C. Recovery is defined as any process that reclaims materials, substances, energy, or other products contained within or derived from waste on−site. It includes waste−to−energy, composting, and other processes.

1.04 SUBMITTALS:

A. Construction Waste Management Plan: Before start of construction, submit a construction waste management plan for approval of Contracting Officer's Representative indicating how
Contractor proposes to collect, segregate, recycle, and recover at least 75% of construction wastes and debris generated by the Work. Submit documentation indicating compliance with regulations specified under “Quality Assurance” article below. Include a list of recycling facilities to which indicated recyclable materials will be sent for recycling. Identify materials that are not recyclable or otherwise recoverable that must be disposed of in a landfill or other means acceptable under governing State of Minnesota and local regulations. List permitted landfills and/or other disposal means to be employed. Indicate instances where compliance with requirements of this specification does not appear to be possible and request resolution from the Contracting Officer through the Contracting Officer’s Representative.

B. Delivery Receipts: Provide to the Construction Quality Manager delivery receipts for waste materials salvaged and sent to permitted waste materials processors or recyclers within 48 hours of delivery that indicate the location and name of firm accepting recyclable waste materials, types of materials, net weights of each type, date of delivery and value of materials.

1.05 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with applicable requirements of the State of Minnesota and applicable local ordinances and regulations concerning management of construction, demolition, land clearing, inert, and yard trash debris and subsequent modifications and amendments to same.

B. Disposal Sites, Recyclers, and Waste Materials Processors: Use only facilities properly permitted by the State of Minnesota and by local authorities where applicable.

C. Pre-Construction Waste Management Conference: Prior to beginning work at the site, schedule and conduct a conference to review the Construction Waste Management Plan and discuss procedures, schedules and specific requirements for waste materials recycling and disposal. Discuss coordination and interface between Contractor and other construction activities. Identify and resolve problems of compliance with requirements. Record minutes of the meeting, identifying conclusions reached and matters requiring further resolution. Maintain waste management as an agenda item at future construction meetings.

1. Attendees: Contractor and related Contractor personnel associated with work of this section, including personnel in charge of the waste management program; Construction Quality Manager; Architect; material suppliers where appropriate; and such additional Owner personnel as Owner deems appropriate.

2. Plan Revision: Make revisions to Construction Waste Management Plan agreed upon during the meeting and incorporate resolutions agreed to be made subsequent to the meeting. Submit revised plan to Architect for approval.

D. Implementation: Designate an on-site party responsible for instructing workers and implementing Construction Waste Management Plan. Distribute copies of Construction Waste Management Plan to jobsite foreman and each subcontractor. Include waste management and recycling in worker orientation. Provide on-site instruction on appropriate separation, handling, recycling, and recovery methods to be used by all parties at the appropriate stages of the work at the site. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators. Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.06 STORAGE AND HANDLING:

A. Site Storage: Remove materials for recycling and recovery from the work location to
approved containers or storage area as required. Failure to remove waste materials will be considered cause for withholding payment and termination of Contract.

B. Position containers for recyclable and recoverable waste materials at a designated location on the Project Site. If materials are sorted on site, provide separate collection containers or storage areas for not less than the following materials:
   1. Concrete and masonry.
   3. Untreated lumber.
   4. Gypsum wallboard scrap. [Edit to suit project]
   5. Paper and cardboard.

C. Change-out loaded containers for empty containers as demand requires.

D. Handling: Deposit indicated recyclable, and recoverable materials in storage areas or containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

E. If the contamination chemically combines with the material so that it cannot be cleaned, do not deposit into the recycle containers. In such case, request resolution by the Construction Quality Manager for disposal of the contaminated material. Directions from the Construction Quality Manager do not relieve the Contractor of responsibility for compliance with all legal and regulatory requirements for disposal, nor shall such directions cause a request for modification of the Contract.

1.07 PROJECT SITE CONDITIONS:

A. Environmental Requirements: Transport recyclable and recoverable waste materials from the Work Area to containers and carefully deposit in the containers without excess noise and interference with other activities, to minimize noise and dust.

   1. Do not place recyclable waste materials on the ground adjacent to a container.

B. Existing Conditions: Coordinate with "Instructions to Bidders" and "Supplementary Conditions".

PART 2 PRODUCTS (Not Used)
PART 3 EXECUTION:

3.01 WASTE MANAGEMENT

A. General: Implement waste management procedures in accordance with approved Construction Waste Management Plan. Maintain procedure throughout the life of this Contract.

B. Source Separation On– or Off–Site: Either separate, store, protect, and handle at the project site all identified recyclable and recoverable waste products to prevent contamination of materials and maximize recyclability and recoverability of materials. Or mix all identified recyclable and recoverable waste products for separation off-site.

C. Arrange for the regular collection, transport from the site, and delivery to respective approved recycling centers of indicated recyclable waste materials. Maintain records accessible to the Architect for verification of construction waste materials recycling and recovery.
D. **Delivery Receipts:** Arrange for timely pickups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent contamination of materials. Keep and maintain records of deliveries to recycling facilities and pickups of waste materials at the site by others as specified above.

### 3.02 RECYCLABLE WASTE MATERIALS HANDLING:

A. **General:** The following paragraphs supplement handling requirements for various of the materials identified for classification and recycling listed in Part 1 "Summary" article above. (Note to author: If the following materials are not recyclable in your area, delete them from the specifications.)

B. **Land clearing Debris:** Pile wood debris from land clearing in a clean storage area free from large amounts of dirt and other non-wood materials. Chip smaller size tree limbs on site and use as plant mulch. Cut larger tree limbs and trunks into 16 inch lengths and advertise as green firewood if hardwood or softwood suitable for burning. Transport other wood including tree roots to a County waste and recycling center.

C. **Concrete and Masonry:** Free of metals, woods and other contaminates. If possible during demolition, crush existing concrete and concrete masonry units on-site into aggregate size. Store crushed material on-site in clean area to avoid contamination from other materials or building processes. Reuse on-site crushed material for fill, for stabilizing soils, or as base and sub-base materials. If crushing on site is impractical, store material during demolition processes on site in clean, uncontaminated area. Transport concrete and masonry materials to a certified concrete recycler as needed.

D. **Metals:** Cut items to lengths and sizes to fit within the container provided when necessary. Where there is sufficient quantity of a specific recyclable waste item (for example; salvaged metal roofing or duct work), make special arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up. Coordinate special arrangements with the Construction Quality Manager.

E. **Untreated Wood:** Salvaged wood materials to be free of metals, concrete, gypsum wallboard, insulation, and other contaminating materials. Stack dimensional wood into like piles. For example, store 2x4s with other 2x4s, and 2x6s with other 2x6s. Also, if quantity is sufficient, separate piles into lengths of 4-foot increments. Reuse lumber on site as studs, backing, blocking or other uses where appropriate. Stack non-dimensional wood in piles for possible reuse on-site or transport off-site. Depending on size of lumber, recycle or chip wood for plant mulch. If wood materials cannot be used on site, transport to a certified wood recycler or reuse center.

F. **Gypsum Wallboard Scrap:** Separate gypsum wallboard from other wastes. Dispose of waste gypsum wallboard off-site at a gypsum reclamation or recycling facility, or on-site as a soil amendment.

1. For on-site application as a soil amendment, incorporate waste gypsum wallboard in landscape areas under construction, at a rate of 50 pounds per 1000 square feet, or approximately one ton per acre.
   
   a) Material must be unpainted gypsum wallboard from new construction, ground to reduce material to a fine particle size (70% passing a 100 mesh screen), and must be fully incorporated into the soil surface.

G. **Paper and Cardboard:** Classify and handle waste paper goods as follows:

1. **Bond Paper:** General office quality paper used for specifications, correspondence, copiers, PC laser printers, and FAX machines. Collect in separate container at each workstation and deposit loose inappropriate recycle container as required.
2. **Newsprint**: Newspapers and tabloid style advertising (slick finish magazines and advertising materials are not typically recyclable). Collect in single location and deposit as required in appropriate recycle container.

3. **Diazoo Prints (drawings)**: Set up single location for collection. Roll together to minimize space. Deposit as required in appropriate recycle container.

4. **Cardboard and paper board cartons and boxes**: Knock−down, fold flat, and deposit in appropriate recycle container.

H. **Other Items**: Where recyclability classification of any given waste material is unclear, verify with the Construction Quality Manager.

**END OF SECTION**
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.
B. Documentation of changes in Contract Sum and Contract Time.
C. Change procedures.
D. Correlation of Contractor submittals based on changes.

1.02 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Mutchler Bartram Architects for approval.
B. Forms filled out by hand will not be accepted.
C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.
B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Mutchler Bartram Architects for approval.
C. Forms filled out by hand will not be accepted.
D. Execute certification by signature of authorized officer.
E. Submit three copies of each Application for Payment.

1.04 MODIFICATION PROCEDURES

A. For other required changes, Mutchler Bartram Architects will issue a document signed by Becker County instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.
B. For changes for which advance pricing is desired, Mutchler Bartram Architects will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 20 days.
C. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
D. Substantiation of Costs: Provide full information required for evaluation.
   1. Provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead* and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
   3. * Overhead includes general office operating costs that are not direct costs related to the project. Overhead items would include but are not limited to general company insurance, office rental or operating costs, company vehicles and/or equipment, etc. Overhead shall also include Performance-Payment Bond costs associated with the contract amendments.
E. Proposals may be either "Add" or "Deduct" types as necessary to cover the change.

F. Allowable mark ups for overhead and profit.
   1. All proposals shall include allowances for overhead and profit as follows:

G. When change order proposals include an add and deduct as part of the same change, one
   overhead and one profit figure shall be used for the difference. Overhead and profit figures shall
   be based on the following table.

H. CONSTRUCTION CONTRACT AMOUNTS
   1. Add type change order proposal mark-up shall not exceed the following:
      Overhead 4%
      Profit 3%
   2. Deduct type change order proposal mark-ups shall not be less than the following:
      Overhead 4%
      Profit 3%

I. Execution of Change Orders: Mutchler Bartram Architects will issue Change Orders for
   signatures of parties as provided in the Conditions of the Contract.

J. After execution of Change Order, promptly revise Schedule of Values and Application for
   Payment forms to record each authorized Change Order as a separate line item and adjust the
   Contract Sum.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.
B. Site mobilization meeting.
C. Progress meetings.
D. Construction progress schedule.
E. Submittals for review, information, and project closeout.
F. Number of copies of submittals.
G. Submittal procedures.

1.02 PROJECT COORDINATION

A. Project Coordinator: Prime Contractor.
B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for truck access, traffic, and parking facilities.
C. During construction, coordinate use of site and facilities through the Project Coordinator.
D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
G. Make the following types of submittals to Mutchler Bartram Architects through the Project Coordinator:
   1. Requests for interpretation.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Design data.
   6. Manufacturer's instructions and field reports.
   7. Applications for payment and change order requests.
   8. Progress schedules.
   9. Coordination drawings.
   10. Correction Punch List and Final Correction Punch List for Substantial Completion.
   11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Project Coordinator will schedule a meeting after Notice of Award.
B. Attendance Required:
   1. Steve Skoog, Becker County.
   3. Contractor.
C. Agenda:
   1. Submission of executed bonds and insurance certificates.
   3. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   4. Designation of personnel representing the parties to Contact and Mutchler Bartram Architects.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.


D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Mutchler Bartram Architects, Becker County, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
   1. Contractor.
   2. Becker County.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

C. Agenda:
   1. Temporary utilities provided by Becker County.
   2. Survey and building layout.
   4. Schedules.
   5. Application for payment procedures.
   6. Procedures for testing.
   7. Procedures for maintaining record documents.
   8. Requirements for start-up of equipment.
   9. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Mutchler Bartram Architects, Becker County, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required:
   1. Contractor.
   2. Becker County.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Maintenance of progress schedule.
   7. Corrective measures to regain projected schedules.
   8. Planned progress during succeeding work period.
   10. Effect of proposed changes on progress schedule and coordination.
   11. Other business relating to Work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Mutchler Bartram Architects, Becker County, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.
C. Within 10 days after joint review, submit complete schedule.
D. Submit updated schedule with each Application for Payment.

3.05 SUBMITTALS FOR REVIEW
A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.
B. Submit to Mutchler Bartram Architects, for review for the limited purpose of checking for conformance with information given and the construction documents.
C. Samples will be reviewed only for aesthetic, color, or finish selection.
D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 SUBMITTALS FOR INFORMATION
A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer’s instructions.
   6. Manufacturer’s field reports.
   7. Other types indicated.
B. Submit for Mutchler Bartram Architects’ knowledge as contract administrator or for Becker County. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT
A. Submit Correction Punch List for Substantial Completion.
B. Submit Final Correction Punch List for Substantial Completion.
C. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   5. Other types as indicated.
D. Submit for Becky County’s benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS
A. Documents for Review:
   1. Small Size Sheets, Not Larger Than 11x17 inches (430 mm): Submit the number of copies that Contractor requires, plus one copy that will be retained by Mutchler Bartram Architects.
   2. Larger Sheets, Not Larger Than 36 x 48 inches (910 x 1220 mm): Submit the number of opaque reproductions that Contractor requires, plus one copy that will be retained by Mutchler Bartram Architects.
B. Documents for Information: Submit five (5) copies.
C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Mutchler Bartram Architects.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES
A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the
Contract Documents and coordinating related Work.

2. Do not reproduce the Contract Documents to create shop drawings.

3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Deliver submittals to Mutchler Bartram Architects at business address.

G. Schedule submittals to expedite the Project, and coordinate submission of related items.

H. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

I. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

J. Provide space for Contractor and Mutchler Bartram Architects review stamps.

K. When revised for resubmission, identify all changes made since previous submission.

L. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

M. Submittals not requested will not be recognized or processed.

END OF SECTION
1.01 SUMMARY
   A. This section covers the Project Construction Schedule and Time for Completion.
   B. Time for Completion:
      1. As noted in the Information to Bidders 00 2113, the project must be fully complete by
         November 1, 2022.
      2. The Architect will make every effort to expedite the project through prompt review of shop
         drawings, early decisions regarding construction questions, and any other assistance that
         can be offered the Contractors during the construction process.

1.02 PROJECT CONSTRUCTION
   A. The Project Construction Schedule will begin approximately August 3, 2022 or as weather allows,
      and in no case will the deadline be extended beyond November 1, 2022. This Construction
      Schedule will become part of each contractor's contract.
   B. There is no liquidating damages nor penalty attached to any of the contracts for this project but
      each contractor will be required by contract to commit the necessary forces, both on the job and
      administratively to assure that delivery of materials and equipment as well as adequate labor to
      meet the Construction Schedule. If during the course of the construction period a contractor is
      unable to confirm his ability to meet the Project Construction Schedule or has demonstrated the
      same, the Owner reserves the right to terminate the contract and, if possible, secure another
      contractor that can meet the Project Construction Schedule.
   C. Bidders Time and Personnel:
      Each Bidder shall include in his proposal adequate provisions for time and personnel to meet the
      Project Construction Schedule which could include overtime if necessary.
   D. Material and Equipment Delivery:
      If the delivery time for any material and/or equipment called for on the drawings or specified
      herein, is anticipated by a bidder to be a problem in regard to meeting the Project Construction
      Schedule, such bidder is asked to contact the Architect immediately so a change if required, can
      be made to maintain the Schedule.

1.03 SUBMITTALS
   A. Comply with Section 01 3000 - Administrative Requirements.
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Control of installation.
   B. Testing and inspection services.

1.02 TESTING AND INSPECTION AGENCIES
   A. Prime Contractor will employ and pay for services of an independent testing agency to perform specified testing.
   B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION
   A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
   B. Comply with manufacturers' instructions, including each step in sequence.
   C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Mutchler Bartram Architects before proceeding.
   D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
   E. Have Work performed by persons qualified to produce required and specified quality.
   F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
   G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

2.02 TESTING AND INSPECTION
   A. Testing Agency Duties:
      1. Provide qualified personnel at site. Cooperate with Mutchler Bartram Architects and Contractor in performance of services.
      2. Perform specified sampling and testing of products in accordance with specified standards.
      3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
      4. Promptly notify Mutchler Bartram Architects and Contractor of observed irregularities or non-conformance of Work or products.
      5. Perform additional tests and inspections required by Mutchler Bartram Architects.
      6. Submit reports of all tests/inspections specified.
   B. Limits on Testing/Inspection Agency Authority:
      1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
      2. Agency may not approve or accept any portion of the Work.
      3. Agency may not assume any duties of Contractor.
      4. Agency has no authority to stop the Work.
   C. Contractor Responsibilities:
      1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
      2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
      3. Provide incidental labor and facilities:
         a. To provide access to Work to be tested/inspected.
         b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
c. To facilitate tests/inspections.
d. To provide storage and curing of test samples.

4. Notify Mutchler Bartram Architects and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.

5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

6. Arrange with Becker County’s agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Mutchler Bartram Architects.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

2.03 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Mutchler Bartram Architects, it is not practical to remove and replace the Work, Mutchler Bartram Architects will direct an appropriate remedy or adjust payment.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.
B. Temporary telecommunications services.
C. Temporary sanitary facilities.
D. Temporary Controls: Barriers, enclosures, and fencing.
E. Security requirements.
F. Vehicular access and parking.
G. Waste removal facilities and services.
H. Project identification sign.
I. Field offices.

1.02 FIELD OFFICE AND OTHER FACILITIES:

A. The Prime Contractor shall provide:
   1. A field office to be set up to accommodate a plan file, desk, chair and meeting tables and chairs for small progress meetings.
      a. Temporary sanitary facilities including temporary toilets with door, coat hook, and toilet paper, suitably located on or near the job site to serve all construction personnel. Provide at least one (1) toilet for each 20 workers on the job site.
      b. Maintain grass and weeds.
      c. Erosion control at catch basins shall be a silt barrier, and as defined in the documents.
      d. Fire extinguishers as required during construction.

   B. Construction telephone: Each contractor is responsible for his own phone service.

   C. Temporary enclosures, etc.:
      1. Temporary enclosures such as may be required for protection against the weather during construction shall be provided as needed to carry on the work throughout the cold weather.

1.03 TEMPORARY LIGHT AND POWER:

A. The Prime Contractor shall provide all temporary power for the construction of the project.

1.04 TEMPORARY WATER SUPPLY:

A. Prime Contractor to supply all temporary water for the construction of the project.

1.05 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Becker County.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.06 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.07 PROJECT IDENTIFICATION
A. Provide project identification sign of design, construction, and location approved by Becker County.

END OF SECTION
SECTION 01 5713
EROSION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.
B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
C. Restoration of areas eroded due to insufficient preventive measures.
D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractors.

1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Site Grading: Temporary and permanent grade changes for erosion control.
B. Section 31 2323 - Fill and Backfill.
C. Section 32 1123 - Aggregate Base Course: Temporary and permanent roadways.

1.03 REFERENCE STANDARDS


1.04 PERMITTING REQUIREMENTS

A. Construction General Permit (CGP)

1. The Construction General Permit authorizes the discharge of storm water associated with construction activity and small construction activity as defined under the National Pollutant Discharge Elimination System (NPDES)/ State Disposal System (SDS) program.
   a. Construction activity includes clearing, grading, excavation, that disturbs land of equal to or greater than five (5) acres and includes the disturbance of less than five (5) acres of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb five (5) acres or more.
   b. Small construction activity includes clearing, grading, excavation, that disturbs land of equal to or greater than one (1) acre, and includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one and less than five (5) acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility.
2. To obtain coverage under the general permit, the General Contractor must submit the following:
   a. Notice of Intent (NOI).
   b. General Stormwater Permit for Construction Activity.
   c. Storm Water Pollution Prevention Plan (SWPPP).

B. Notice of Intent (NOI)
   1. The General Contractor shall complete the NOI form for construction activity.
      a. NOI form can be found on the Minnesota Pollution Control Agency website:
         http://www.pca.state.mn.us/.
      b. All Contractors is responsible for the day to day supervision of construction activities and is responsible for compliance with the permit conditions.

C. General Stormwater Permit for Construction Activity
   1. The General Contractor shall complete the application prior to conducting any construction activity.
   2. The application can be found on the Minnesota Pollution Control Agency website:
      http://www.pca.state.mn.us/.

D. Storm Water Pollution Prevention Plan (SWPPP)
   1. All Contractors shall develop a SWPPP and shall be completed prior to submitting any permit application to the MPCA and prior to conducting any construction activity.
      a. The SWPPP requirements can be found on the Minnesota Pollution Control Agency website: http://www.pca.state.mn.us/.

1.05 TERMINATION OF COVERAGE

A. Notice of Termination (NOT)
   1. Contractor(s) wishing to terminate coverage under the CGP must submit a Notice of Termination (NOT) to the MPCA.
   2. Contractor(s) must submit a NOT within 30 days after one or more of the following conditions have been met:
      a. Final Stabilization has been achieved on all portions of the site for which the contractor is responsible.
      b. Another Owner/Contractor has assumed control over all areas of the site that have not been finally stabilized.

1.06 PERFORMANCE REQUIREMENTS

A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP), whether the project is required by law to comply or not.

B. Also comply with all more stringent requirements of State of MN Erosion and Sedimentation Control Manual.


E. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
   1. Contractor will obtain permits and pay for securities required by authority having jurisdiction.
   2. Owner will withhold payment to equivalent to all fines resulting from non-compliance with applicable regulations.

F. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

G. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 10 years.

H. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

J. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

K. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

L. Open Water: Prevent standing water that could become stagnant.

M. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

N. Coordination: All Contractors are responsible for coordinating work and environmental impacts with the General Contractor. Concerns must be addressed and incorporated into the SWPPP prior to construction. General Contractor is responsible for upholding and managing the SWPPP.

O. Fines: Fines incurred due to non-compliance by contractors shall be levied to the responsible contractor.

1.07 SUBMITTALS

A. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

B. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

C. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures that must remain after Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS
A. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

B. Bales: Air dry, rectangular straw bales.
1. Cross Section: 14 by 18 inches, minimum.
2. Bindings: Wire or string, around long dimension.

C. Bale Stakes: One of the following, minimum 3 feet long:
1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.
2. Wood, 2 by 2 inches in cross section.

D. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.
3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533/D4533M.
7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
8. Manufacturers:
   b. TenCate www.tencate.com/
   c. Propex Geosynthetics www.propexglobal.com

E. Silt Fence Posts: One of the following, minimum 5 feet long:
1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.
2. Softwood, 4 by 4 inches in cross section.
3. Hardwood, 2 by 2 inches in cross section.

F. Gravel: See Section 32 1123 for aggregate.

PART 3 EXECUTION

3.01 EXAMINATION
A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION
A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES
A. Erosion Prevention Practices:
   1. General Contractor must plan for and implement appropriate construction phasing, vegetative buffer strips, horizontal slope grading and other construction practices that minimize erosion, so that the inspection and maintenance requirements are complied with.
   2. All exposed soil areas with a continuous positive slope within 200 lineal feet of a surface water, must have temporary erosion protection or permanent cover for the exposed soil areas year round. This includes constructed storm water management pond side slopes and any exposed soil areas with a positive slope to a storm water conveyance system, such as a curb and gutter system, storm sewer inlet, temporary or permanent drainage ditch or other natural or man made systems that discharge to a surface water. See the guidelines below:
a. Slopes steeper than 3:1: Establish temporary or permanent cover within 7 days.
b. Slopes 10:1 to 3:1: Establish temporary or permanent cover within 14 days.
c. Flatter than 10:1: Establish temporary or permanent cover within 21 days.

3. The normal wetted perimeter of any temporary or permanent drainage ditch that drains water from a construction site, or diverts water around a site, must be stabilized within 200 lineal feet from the property edge, or from the point of discharge to any surface water. Stabilization must be completed within 24 hours of connecting to a surface water.

4. Pipe outlets must be provided with temporary or permanent energy dissipation within 24 hours of connection to a surface water.

B. Sediment Control Practices

1. Sediment control practices must minimize sediment from entering surface waters, including curb and gutter systems and storm sewer inlets.
   a. Temporary or permanent drainage ditches and sediment basins that are designed as part of a treatment system require sediment control practices only as appropriate for site conditions.
   b. If the down gradient treatment system is overloaded, additional up gradient sediment control practices must be installed to eliminate the overloading, and the SWPPP must be amended to identify these additional practices.
   c. In order to maintain sheet flow and minimize rill and/or gullies, there shall be no unbroken slope length of greater than 75 feet for slopes with a grade of 3:1 or steeper.

2. Sediment control practices must be established on all down gradient perimeters before any up gradient land disturbing activities begin. These practices shall remain in place until final stabilization has been established.
   a. Linear Sediment Barriers: Made of silt fences.
      1) Provide linear sediment barriers:
         (a) Along downhill perimeter edge of disturbed areas, including soil stockpiles.
         (b) Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
         (c) Along the toe of cut slopes and fill slopes.
         (d) Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.
         (e) Across the entrances to culverts that receive runoff from disturbed areas.
      2) Space sediment barriers with the following maximum slope length upslope from barrier:
         (a) Slope of Less Than 2 Percent: 100 feet.
         (b) Slope Between 2 and 5 Percent: 75 feet.
         (c) Slope Between 5 and 10 Percent: 50 feet.
         (d) Slope Between 10 and 20 Percent: 25 feet.
         (e) Slope Over 20 Percent: 15 feet.

3. The timing of the installation of sediment control practices may be adjusted to accommodate short-term activities such as clearing or grubbing, or passage of vehicles. Any short-term activity must be completed as quickly as possible and the sediment control practices must be installed immediately after the activity is completed. However, sediment control practices must be installed before the next precipitation event even if the activity is not complete.

4. All storm drain inlets must be protected by appropriate BMP's during construction until all sources with potential for discharging to the inlet have been stabilized.

5. Temporary soil stockpiles must have silt fence or other effective sediment controls, and cannot be placed in surface waters, including storm water conveyances such as curb and gutter systems, or conduits and ditches.

6. Vehicle tracking of sediment from the construction site must be minimized by BMP's such as rock construction pads, concrete or steel wash racks, or equivalent systems. Street
sweeping must be used if such BMP’s are not adequate to prevent sediment from being tracked onto the street.

   1) Width: 30 feet, minimum.
   2) Length: 50 feet, minimum.
   3) Provide at each construction entrance from public right-of-way.
   4) Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

7. The General Contractor must install all temporary sedimentation basins if outlined in the plan documents.

C. Dewatering and Basin Draining

1. Dewatering or basin draining (e.g., pumped discharges, trench/ditch cuts for drainage) related to the construction activity that may have turbid or sediment laden discharge water must be discharged to a temporary or permanent sedimentation basin on the project site whenever possible. If the water cannot be discharged to a sedimentation basin prior to entering the surface water, it must be treated with the appropriate BMP’s, such that the discharge does not adversely affect the receiving water or downstream landowners. The General Contractor must ensure that discharge points are adequately protected from erosion and scour. The discharge must be dispersed over natural rock riprap, sand bags, plastic sheeting or other accepted energy dissipation measures. Adequate sedimentation control measures are required for discharge water that contains suspended solids.

2. All water from dewatering or basin draining activities must be discharged in a manner that does not cause nuisance conditions, erosion in receiving channels or on downslope properties, or inundations in wetlands causing significant adverse impact to the wetland.

3. The water table can be high and often fluctuates seasonally. The Contractor shall take this fact into account when preparing their bid. All dewatering is considered incidental to the Project.

4. If the Contractor intends to dewater any construction area and discharge that water to a drain or stream, they must first obtain coverage under Minnesota’s General Permit to discharge from temporary dewatering activities. To obtain coverage under the permit or for additional information, contact the Minnesota Pollution Control Agency. Any costs associated with the permit shall be paid for by the Contractor.

D. Pollution Prevention Management Measures

1. Contractors shall implement the following pollution prevention management measures on the site:
   a. Solid Waste: Collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with governing state regulations.
   b. Hazardous Materials: Oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge. Restricted access to storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste must be in compliance with governing state health department regulations.
   c. External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff must be contained and waste properly disposed of. No engine degreasing is allowed on site.

E. Final Stabilization

1. The Earthwork Contractor is responsible for final stabilization of the site.

2. The General Contractor must submit a Notice of Termination within 30 days after final stabilization has been completed, or another Contractor has assumed control over all areas of the site that have not undergone final stabilization.

3. Final Stabilization can been accomplished once the following items have been completed:
   a. All soil disturbing activities at the site have been completed and all soils have been stabilized by a uniform perennial vegetative cover with a density of 70 percent over
the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions have been established.

b. All drainage ditches, constructed to drain water from the site after construction is complete, must be stabilized to preclude erosion.

c. All temporary synthetic, and structural erosion prevention and sediment control BMP's must be removed.

d. The General Contractor must clean out all sediment from conveyances and from temporary sedimentation basins that are to be used as permanent water quality management basins.

e. Sediment must be stabilized to prevent if from being washed back into the basin, conveyances or drainageways discharging off-site or to surface waters. The cleanout of permanent basins must be sufficient to return the basin to design capacity.

F. Construction Entrances: Traffic-bearing aggregate surface.

1. Width: 30 feet, minimum.
2. Length: 50 feet, minimum.
3. Provide at each construction entrance from public right-of-way.
4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

G. Linear Sediment Barriers: Made of silt fences.

1. Provide linear sediment barriers:
   a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
   b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
   c. Along the toe of cut slopes and fill slopes.
   d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.
   e. Across the entrances to culverts that receive runoff from disturbed areas.

2. Space sediment barriers with the following maximum slope length upslope from barrier:
   a. Slope of Less Than 2 Percent: 100 feet.
   b. Slope Between 2 and 5 Percent: 75 feet.
   c. Slope Between 5 and 10 Percent: 50 feet.
   d. Slope Between 10 and 20 Percent: 25 feet.
   e. Slope Over 20 Percent: 15 feet.

H. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

3.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:

1. Excavate minimum of 6 inches.
2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
3. Place and compact at least 6 inches of 1 1/2 to 3 1/2 inch diameter stone.

B. Silt Fences:

1. Store and handle fabric in accordance with ASTM D4873/D4873M.
2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
5. Install with top of fabric at nominal height and embedment as specified.
7. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
8. Fasten fabric to wood posts using one of the following:
   a. Four nails per post with 3/4 inch diameter flat or button head, 1 inch long, and 14 gage, 0.083 inch shank diameter.
   b. Five staples per post with at least 17 gage, 0.0453 inch wire, 3/4 inch crown width and 1/2 inch long legs.
10. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Straw Bale Rows:
   1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.
   2. Install bales so that bindings are not in contact with the ground.
   3. Embed bales at least 4 inches in the ground.
   4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.
   5. Fill gaps between ends of bales with loose straw wedged tightly.
   6. Place soil excavated for trench against bales on the upslope side of the row, compacted.

D. Temporary Mulching Over Large Areas:
   1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.

E. Temporary Seeding:
   1. When hydraulic seeder is used, seedbed preparation is not required.
   2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
   3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
   4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
   5. Incorporate fertilizer into soil before seeding.
   6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
   7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
   8. Repeat irrigation as required until grass is established.

3.05 INSPECTIONS & MAINTENANCE
A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
B. All inspections and maintenance conducted during construction must be recorded in writing and these records must be retained with the SWPPP. Records of each inspection and maintenance activity shall include:
   1. Date and time of inspection.
   2. Name of person(s) conducting inspections.
   3. Finding of inspections, including recommendations for corrective actions.
   4. Corrective actions taken (including dates, times, and party completing maintenance activities.
   5. Date and amount of rainfall events greater than 1/2 inch (0.5 inches) in 24 hours.
   6. Documentation of changes made to the SWPPP.
C. All erosion prevention and sediment control Best Management Practices (BMP's) must be inspected to ensure integrity and effectiveness. All non functional BMP's must be repaired, replaced, or supplemented with functional BMP's. The General Contractor must investigate and comply with the following inspection and maintenance requirements:

1. Silt Fences:
   a. Promptly replace fabric that deteriorates unless need for fence has passed.
   b. Remove silt deposits that exceed one-third of the height of the fence.
   c. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

2. Straw Bale Rows:
   a. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.
   b. Remove silt deposits that exceed one-half of the height of the bales.
   c. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

3. Surface Waters:
   a. Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of sediment being deposited by erosion.
   b. The General Contractor must remove all deltas and sediment deposited in surface waters, including drainage ways, catch basins and other drainage systems and restabilize the areas where sediment removal results in exposed soil. Removal and stabilization must take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access constraints.
   c. The General Contractor shall use all reasonable efforts to obtain access. If precluded, removal and stabilization must take place within seven (7) calendar days of obtaining access.
   d. The General Contractor is responsible for contacting all local, regional, state and federal authorities and receiving any applicable permits, prior to conducting any work.

4. Construction Exit Locations:
   a. Construction site vehicle exits must be inspected for evidence of off-site sediment migration onto paved surfaces.
   b. Tracked sediment must be removed from all off-site paved surfaces within 24 hours of discovery.

5. Temporary and Permanent Best Management Practices (BMP's):
   a. The General Contractor is responsible for the operation and maintenance of all permanent water quality management BMP's, as well as all erosion prevention and sediment control BMP's, for the duration of the project; or until another Contractor has resumed control over all areas of the site that have not been finally stabilized; or the site has undergone final stabilization.

6. Migrated Sediment Off-Site:
   a. If sediment escapes the construction site, off-site accumulations of sediment must be removed in a manner and at a frequency sufficient to minimize off-site impacts.

D. Clean out temporary sediment control structures weekly and relocate soil on site.

E. Place sediment in appropriate locations on site; do not remove from site.

3.06 RECORD RETENTION
A. The SWPPP, including all certificates, reports, and records must be made available to the federal, state and local officials within 72 hours upon request for the duration of the permit and for three (3) years following the Notice of Termination.
3.07 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Owner's Representative.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION
PART 1 GENERAL

1.01 RELATED REQUIREMENTS
   A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

1.02 SUBMITTALS
   A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers’ standard data to provide information specific to this Project.
   B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
   C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
      1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS
   A. Provide new products unless specifically required or permitted by the Contract Documents.
   B. DO NOT USE products having any of the following characteristics:
   C. Where all other criteria are met, Contractor shall give preference to products that:
      1. If used on interior, have lower emissions, as defined in Section 01 6116.
      2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
      3. Have a published GreenScreen Chemical Hazard Analysis.

2.02 PRODUCT OPTIONS
   A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
   B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
   C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES
   A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
   B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
   C. A request for substitution constitutes a representation that the submitter:
      1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
      2. Will provide the same warranty for the substitution as for the specified product.
      3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Becker County.
      4. Waives claims for additional costs or time extension that may subsequently become apparent.
   D. Substitution Submittal Procedure:
      1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
3. The Muchter Bartram Architects will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING
A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
D. Transport and handle products in accordance with manufacturer’s instructions.
E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION
A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
B. Store and protect products in accordance with manufacturers’ instructions.
C. Store with seals and labels intact and legible.
D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
E. For exterior storage of fabricated products, place on sloped supports above ground.
F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
G. Comply with manufacturer's warranty conditions, if any.
H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
I. Prevent contact with material that may cause corrosion, discoloration, or staining.
J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION
SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Project Record Documents.
B. Operation and Maintenance Data.
C. Warranties and bonds.

1.02 RELATED REQUIREMENTS
A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
B. Individual Product Sections: Specific requirements for operation and maintenance data.
C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS
A. Project Record Documents: Submit documents to Mutchler Bartram Architects for review.
B. Operation and Maintenance Data:
   1. For equipment, or component parts of equipment put into service during construction and operated by Becker County, submit completed documents within ten days after acceptance.
   2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Mutchler Bartram Architects comments. Revise content of all document sets as required prior to final submission.
   3. Submit two sets of revised final documents in final form within 10 days after final inspection.
C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Becker County’s permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 EXECUTION

2.01 PROJECT RECORD DOCUMENTS
A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Addenda.
   3. Change Orders and other modifications to the Contract.
   4. Manufacturer’s instruction for assembly, installation, and adjusting.
B. Ensure entries are complete and accurate, enabling future reference by Becker County.
C. Store record documents separate from documents used for construction.
D. Record information concurrent with construction progress.
E. Record Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

2.02 OPERATION AND MAINTENANCE DATA
A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

2.03 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Becker County's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION
SECTION 02 3000
SUBSURFACE INVESTIGATION

GENERAL

1.01 SUMMARY

A. This section covers the soil or test borings. Should the contractor desire to review the entire soil report which includes method of testing, general soil description, recommended unit loading, soil samples, and soil classifications, this report is attached. This subsurface investigation is from the original project. If site conditions change, the contractor should contact the Architect.

END OF SECTION
GEOTECHNICAL EXPLORATION
AND ENGINEERING REVIEW

Becker County Recycling Building
Detroit Lakes, Minnesota

NTI Project No. 17-13979.100
May 11, 2017

Becker County Environmental Services Department  
915 Lake Avenue  
Detroit Lakes, MN 56501

Attn: Mr. Steve Skoog

Subject: Geotechnical Exploration and Engineering Review  
Proposed Becker County Recycling Building  
Detroit Lakes, Minnesota  
NTI Project No. 17-13979.100

In accordance with your request and subsequent April 13, 2017 authorization, Northern Technologies, LLC (NTI) conducted a Geotechnical Exploration for the above referenced project. Our services included advancement of exploration borings and preparation of an engineering report with recommendations developed from our geotechnical services. Our work was performed in general accordance with our proposal of April 7, 2017.

Soil samples obtained at the site will be held for 60 days at which time they will be discarded. Please advise us in writing if you wish to have us retain them for a longer period. You will be assessed an additional fee if soil samples are retained beyond 60 days.

We appreciate the opportunity to have been of service on this project. If there are any questions regarding the soils explored or our review and recommendations, please contact us at your convenience at (701) 232-1822.

Northern Technologies, LLC

Josh Holmes, P.E.  
Project Engineer

Dan Gibson, P.E.  
Senior Engineer

cc: MBA - Kevin Bartram
GEOTEchnical EXPLoration
and ENgineering Review

Becker County Recycling Building
Detroit Lakes, Minnesota

NTI Project No. 17-13979.100
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**GEOTECHNICAL EXPLORATION AND ENGINEERING REVIEW**

Becker County Recycling Building  
Detroit Lakes, Minnesota

NTI Project No. 17-13979.100

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**APPENDICES**

Appendix A - Geotechnical Evaluation of Recovered Soil Samples, Field Exploration Procedures, General Notes, Classification of Soils for Engineering Purposes, Excavation Oversize Diagram

Appendix B - Ground Water Issues, Geotextile Fabric, Placement and Compaction of Engineered Fill, Swelling of Clay Soils, Project Sumps

Appendix C - Site Diagram, Boring Logs
1.0 EXECUTIVE SUMMARY

We briefly summarize below our geotechnical recommendations for the proposed project. The summary must be read in complete context with our report.

We conclude you may support the proposed Becker County Recycling Building (Building) by founding of standard shallow footings on competent, non-organic natural soil(s) or engineered fill, as recommended within our report.

- Building linear strip footings and interior column footings (if required) may be proportioned using the maximum net allowable soil bearing pressures of Table 2.
- Our exploration indicates fill extends to approximately 0.5 feet at project borings. We understand site grading has previously occurred to level the site. You should anticipate similar but variable depth of fill across the project. We recommend additional evaluation during site stripping and excavation to confirm removal of unsuitable soils from below project construction.

- Measurable groundwater was not encountered during or at completion of the borings. However, the color change or mottingling observed during classification of recovered soil samples suggest prior presence of ground water within the depth of soil sampling at this site.

Overall, the site soils are conducive to movement of ground water both laterally and vertically. The moisture content of such soils can vary annually and per recent precipitation. Such soils and other regional dependent conditions may produce ground water entry of project excavations. We direct your attention to other report sections and appendices attachments concerning ground water issues and subsurface drainage.

- Through material composition, clay soils have a tendency to swell with absorption of moisture. This is especially true for fat clays (CH) or silty fat clays (CH-MH) due to increased montmorillonite mineral content. The attachment presented within the appendices provides a brief description of the swell process of clay, and provides limited recommendation(s) for reducing this risk on your project. Note a major attribute contributing to swell of clays is absorption of moisture under reduced confinement. Continuous drainage of site excavations is necessary to reduce swelling impacts to your project.
2.0 INTRODUCTION

2.1 Site / Project Description

The proposed Recycling Building is to be constructed approximately ¾ mile south of the existing Solid Waste Transfer Station locate near the County Road 144 and Highway 59 in Detroit Lakes, Minnesota. The pre-engineered metal structure will utilize standard shallow footings for support of above grade loads.

2.2 Scope of Services

The purpose of this report is to present a summary of our geotechnical exploration and provide generalized opinions and recommendations regarding the soil conditions and design parameters for founding of the project. Our “scope of services” was limited to the following:

1. Explore the project subsurface by means of four (4) standard penetration borings extending to maximum depth of 26 feet, and conduct laboratory tests on representative samples to characterize the engineering and index properties of the soils.
2. Prepare a report presenting our findings from our field exploration, laboratory testing, and engineering recommendations for footing depths, allowable bearing capacity, estimated settlements, floor slab support, excavation, engineered fill, backfill, compaction and potential construction difficulties related to excavation, backfilling and drainage.

3.0 EXPLORATION PROGRAM RESULTS

3.1 Exploration Scope

Site geotechnical drilling occurred on April 24, 2017 with individual borings advanced at approximate locations as presented on the diagram within the appendices. NTI located the borings relative to existing site features, and determined the approximate elevation of the borings relative to the temporary benchmark (TBM), the top of the existing concrete drain located northeast of the site on the east side of the entrance road (see site plan). The elevation of the TBM, as assigned by NTI, is 200.0 feet.

3.2 Surface Conditions

The property for the proposed Building is currently vacant with minimal vegetative cover. We assume this lot has not been previously developed, does not include demolition material from prior occupancy or from other off site locations. Surface drainage appears to generally flow west and south towards farm field and eventually to Oak Lake. The elevation change between borings is less than 1.5 feet.
3.3 Subsurface Conditions

Please refer to the boring logs within the appendices for a detailed description and depths of stratum at each boring. The boreholes were backfilled with auger cuttings, or abandoned using high solids bentonite or neat cement grout per state statute. Minor settlement of infill soil will occur with Owner responsible for final closure of the boreholes. The general geologic origin of retained soil samples is listed on the boring logs. The upper portion of the soil profile for each boring was sampled using auger flights and is approximate.

The overall subsurface soil profile at the borings consists of approximately 0.5 feet of fill underlain by rather stiff to very stiff Collapsed Glacial Sediment (CGS) soils and medium dense to very dense Outwash soils which extend to the termination depth of the borings (maximum 26 feet). The CGS soils are comprised of lean clay and sandy lean clay with varying color, sand and gravel content, moisture content, and unit weight. The Outwash soils are comprised of sand, silty sand, and gravel with varying color, grain size, gravel content, and unit weight. Cobble and boulders were encountered during drilling operations within the CGS and Outwash soils at depths greater than 6 feet below grade. Additional comment on the evaluation of recovered soil samples is presented within the report appendices.

3.4 Ground Water Conditions

The drill crew observed the borings for ground water and noted cave-in depth of borings, if any, during and at the completion of drilling activities. These observations and measurements are noted on the boring logs.

*Measurable groundwater was not encountered during or at completion of the borings. However, the color change or mottling observed during classification of recovered soil samples suggest prior presence of ground water within the depth of soil sampling at this site.*

Overall, the site soils are conducive to movement of ground water both laterally and vertically. The moisture content of such soils can vary annually and per recent precipitation. Such soils and other regional dependent conditions may produce ground water entry of project excavations. We direct your attention to other report sections and appendices concerning ground water issues and subsurface drainage. The cave-in depths of the borings were recorded as varying from approximately 8 to 11 feet below existing grade.

3.5 Laboratory Test Program

Our analysis and recommendations of this report are based upon our interpretation of the standard penetration resistance determined while sampling soils, hand penetrometer test results obtained during classification of retained soils, and experience with similar soils from other sites near the project. The results of such tests are summarized on the boring logs or attached test forms.
4.0 ENGINEERING REVIEW AND RECOMMENDATIONS

The following recommendations are based on our present knowledge of the project. We ask that you or your design team notify us immediately if significant changes are made in building size, location or design as we would need to review our current recommendations and provide modified or different recommendations with respect to such change(s).

4.1 Project Scope

We understand the Building will include concrete foundation walls and footings for support of above grade construction. According to Solien and Larson Engineering, P.C., column loads will not exceed 75 kips and wall loads will not exceed 1 kip per lineal foot (klf). We anticipate the project will include a modest ½ to 1 ½ foot increase in grade to promote drainage from the structure. Our assessment of project soils, opinions, and report recommendations are based directly on application of estimated structural loads to site soils.

4.2 Site Preparation

Project construction, as proposed, will involve stripping of the site and implementation of corrective grading. We typically recommend removal of all fill and/or any unsuitable material(s) encountered during advancement of project excavations. Our field exploration indicates removal of fill should result in excavations extending approximately 0.5 feet below existing grade. We understand the fill was placed during previous site grading related to this project. At minimum, we recommend compaction and testing of the existing fill prior to placement of additional fill and footing construction. Additional excavation will be necessary to achieve frost protection of footing construction. Table 1 provides a summary of excavation necessary to remove unsuitable materials at respective borings.

<table>
<thead>
<tr>
<th>Boring Number</th>
<th>Existing Ground Elevation (feet, NTI Datum)</th>
<th>Depth of Materials (feet)</th>
<th>Removal of Unsuitable Materials</th>
<th>Excavation Elevation (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB-1</td>
<td>198.3</td>
<td>0.5</td>
<td>Fill</td>
<td>197.8</td>
</tr>
<tr>
<td>SB-2</td>
<td>197.6</td>
<td>0.5</td>
<td>Fill</td>
<td>197.1</td>
</tr>
<tr>
<td>SB-3</td>
<td>197.0</td>
<td>Surface Organics (if any)</td>
<td></td>
<td>197.0</td>
</tr>
<tr>
<td>SB-4</td>
<td>197.2</td>
<td>Surface Organics (if any)</td>
<td></td>
<td>197.2</td>
</tr>
</tbody>
</table>

Note 1 Refer to report recommendations associated with excavation at, and within the vicinity of the soil borings.

We recommend that you oversize all earthwork improvements and excavations where fill materials are placed below foundations. The minimum excavation oversize should extend per the requirements outlined on the diagram within the report appendices.
You should pump seepage from excavations continuously until the Geotechnical Engineer of Record or their designated representative determines such seepage no longer impacts the bearing soils, engineered fill system, backfill system or soils and concrete placement.

The Geotechnical Engineer of Record or their designated representative should review project excavations to verify removal of unsuitable material(s) and adequate bearing support of exposed soils. All such observations should occur prior to the placement of engineered fill, or construction of footings and floor slabs.

Where granular soils are present, we recommend that native soils within 12 inches of exposed grade (i.e. base of excavations) be compacted with a large vibratory roller until such materials achieve no less than 98% of the standard proctor maximum dry density (ASTM: D 698). However, where cohesive soils (silt and clay) are present at the base of excavations, you should not begin or implement this compactive effort without direct review and approval by the Geotechnical Engineer of Record or their designated representative.

While not mandatory, excessive disturbance of existing native soils and/or localized zones with weak soils may require placement of a geotextile separation fabric for stabilization of construction (engineered fill, footing and/or floor slab construction). The Geotechnical Engineer of Record or their designated representative should determine the need for geotextile placement after observation of completed excavations. Comment and recommendations for materials and placement of geotextile are presented within the appendices attachment.

Engineered fill for overall corrective earthwork and for support of project perimeter footings should consist of native, non-organic clay. Granular soil may be used as engineered fill below perimeter footings if exposed soils (base of excavation) consist of native sand and gravel. Engineered fill placed interior to and above the base of perimeter frost footings should consist of granular soils which comply with the material properties listed for granular fill placement below floor slab construction.

Unless otherwise directed by the report, you should temper engineered fill for correct moisture content and then place and compact individual lifts of engineered fill to criteria established within the appendices.

4.3 Foundations

The following bearing recommendations are based on our understanding of the project. You should notify us of any changes made to the project size, location, design, or site grades so we can assess how such changes impact our recommendations. We assume foundation elements will impose maximum vertical loads as previously noted within this report.

In our opinion, you may support the proposed Building by founding strip footings and interior column footings on competent, non-organic native soils, or engineered fill, providing such construction complies with the criteria established within this report. You should support exterior foundations at a common elevation within soils of the same strata layer. You may design footings using the Table 2 maximum net allowable soil bearing pressures.
Table 2: Recommended Maximum Net Allowable Soil Bearing Pressure

<table>
<thead>
<tr>
<th>Location</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perimeter Strip Footings, Perimeter Columns</strong></td>
<td>Maximum of 2,500 psf</td>
</tr>
<tr>
<td>Supported on natural soils or engineered fill below depth of frost penetration, and at an elevation as referenced within this report.</td>
<td></td>
</tr>
<tr>
<td><strong>Interior Strip Footings</strong>: Supported on natural, competent soils and/or engineered fill at a depth which provides no less than 6 inches of clearance between the top of footing and underside of floor slab (for sand cushion).</td>
<td>Maximum of 2,500 psf</td>
</tr>
<tr>
<td><strong>Interior Column Footings</strong>: Supported on natural, competent soils and/or engineered fill at a depth which provides no less than 6 inches of clearance between the top of footing and underside of floor slab (for sand cushion).</td>
<td>Maximum of 3,000 psf</td>
</tr>
</tbody>
</table>

1. Maximum net allowable soil bearing pressure recommendations predicated on footing design and construction complying with recommendations presented within this report. To minimize local failure of supporting soils, it is our opinion footing construction should comply with the International Building Code (IBC) requirements.

We estimate excavation per the above recommendations will place the base of frost footings at or near elevation 193.5 feet (NTI datum) assuming finished floor and exterior grade are established at elevation 198.5 feet. Similarly, we anticipate the base of interior strip and interior column footings (if any) will occur at or near elevation 195.5 feet. This should result in fouling of project footing construction on natural soils.

Construction should extend footing to sufficient depth below ground (exposed slab) surface as protection against frost action. For this project, you should extend at-grade footing construction within permanently heated areas (60° Fahrenheit or above) to no less than 5 feet below final grades as protection against frost action. Similarly, you should extend at-grade footings to a minimum of 7 feet below the exterior ground surface in areas lacking permanent heat. Intermediate fouling of footings between the two referenced depths may be necessary for construction within areas with moderate temperature and/or intermittent heating.

We previously noted clay soils have risk of swell with absorption of moisture. This is especially true when excess runoff, pooled within excavations is absorbed by clay soils. Partially constructed foundations, foundation of reduced confining load, and more importantly, lightly loaded on-grade floor construction may heave due to clay soil swell. You should maintain constant automated subsurface drainage of the construction site to reduce this risk of heaved foundations.

Foundation walls for areas of unbalanced earthen fill will experience lateral loading from retained soils. You may model this lateral loading as an equivalent earth pressure applied to the foundation wall providing site geometric and related conditions complies with the parameters supporting such modeling. We recommend use of the Table 3 “at-rest” equivalent fluid earth pressures for establishing lateral loading of foundations walls with unbalanced earthen fill.
Table 3: Estimate of Equivalent Fluid Weight of Retained Soils

<table>
<thead>
<tr>
<th>Type of Retained Soil</th>
<th>&quot;At Rest&quot; Condition (pcf)</th>
<th>&quot;Active&quot; Condition (pcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Weight of Equivalent Fluid *</td>
<td>Lean Clay (CL) 100</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Sand (SP, SP-SM) 65</td>
<td>45</td>
</tr>
</tbody>
</table>

* The recommendations for equivalent fluid weight are based solely on assumed conditions with respect to sloping ground and/or surcharge loads. Design professional is cautioned that actual loads imparted to the structure will be dependent on soil conditions, site geometric considerations and surcharge loads imparted to the structure.

4.4 Bearing Factor of Safety and Estimate of Settlement

We estimate native soils provide a nominal 3 factor of safety against localized bearing failure when construction complies with report criteria and recommendations, and you design structure footings using the Table 2 maximum net allowable soil bearing recommendation(s).

We also estimate that footings designed with the Table 2 maximum net allowable soil bearing pressure recommendations and loaded per report assumptions may experience long term, total settlement of approximately 1/2 to 1 inch with the upper estimate more probable. Likewise, project footings may experience differential settlement on the order of 25 to 50 percent of total settlement with greatest movement occurring between adjacent footings of greatest load variation.

Furthermore, total and differential movement of footings and floor slabs could be significantly greater than the above estimates if you support construction on frozen soils, the moisture content of the bearing soils significantly changes from insitu conditions, and snow or ice lenses are incorporated into site earthwork.

4.5 Slab-on-Grade Floors

Our borings indicate poor soils within the project interior and recommend removal of all unsuitable soils and materials as previously recommended for structure footings. We anticipate the finished floor will be set at or near the prior referenced elevation and, conclude construction of at-grade floors will require fill placement interior to the structure perimeter.

Fill placement for the floor slab should consist of granular fill, providing such fill has 100 percent material passing the 1 inch sieve opening, no more than 50 percent materials passing the No. 40 U.S. Sieve opening, and no more than 12 percent material passing the No. 200 U.S. Sieve opening. The granular fill should be tempered for moisture, should be placed and then compacted per the criteria established within the appendices.
The final 6 inches of fill below the concrete floor slab should consist of a "pit run" or processed sand (sand cushion) with 100 percent material passing the 1 inch sieve opening, no more than 50 percent material passing the No. 40 U.S. Sieve opening, and no more than 5 percent material passing the No. 200 U.S. Sieve opening. The moisture content of the sand cushion should be tempered to the same limiting values as for the interior granular fill. As placed, the sand cushion should be compacted until there is no more visually discernable settlement. We anticipate such compaction will be on the order or greater than 95 percent of the standard Proctor maximum dry density.

Design of the floor slab may be based on an estimated subgrade reaction modulus \( (k) \) of 150 lbs/in\(^3\) providing a minimum of 36 inches of granular fill supports floor construction. Otherwise, we recommend you use a subgrade reaction modulus of 75 lbs/in\(^3\) for design of at grade floor slab. While it is our opinion that you reinforce floor slab construction, such need should be determined by the Structural Engineer of Record.

All interior at-grade floors with impervious or near impervious surfacing such as, but not limited to, paint, hardening agent, vinyl tile, ceramic tile, or wood flooring, should include provision for installation of a vapor barrier system. Historically, vapor barrier systems can consist of many different types of synthetic membrane, and can be placed either below sand cushion materials or at the underside of the concrete floor. All such issues are contentious and have both positive and negative aspects associated with long term performance of floor. Overall, we recommend you install some form of vapor barrier below the project at-grade floor.

You should isolate floor slabs from other building components. It is our opinion such isolation should include installation of a ½ inch thick expansion joint between the floor and walls, and/or columns to minimize binding between construction materials. This construction should also include application of a compatible sealant after curing of the floor slab to reduce moisture penetration through the expansion joint. As a minimum, you should install bond breaker to isolate and reduce binding between building components.

We previously noted risk of heave of on-grade floor slab construction if exposed clay soils are allowed to absorb moisture (from runoff or precipitation). We direct your attention to the appendices for further discussion on the Swelling of Clay Soils.

4.6 **Exterior Backfill & Subsurface Drainage**

Exterior fill placement around the foundation and associated final grading adjacent to the building can significantly impact the performance of a structure. *We understand the project will not include basement construction or foundation walls which retain soils.*

While not necessarily required for this project, you should install subsurface drainage at the base of at-grade foundation walls to limit moisture accumulation within granular soils placed below interior floors. You should also consider placement of a separate subsurface drainage system exterior to perimeter foundation walls.
As a general guideline, such drainage consists of a geotextile and coarse drainage encased slotted or perforated pipe extending to sump basin(s). We recommend that exterior drainage be separated from interior drainage to reduce risk of cross flow and moisture infiltration below structure interior. The project Architect and/or Structural Engineer of Record should determine actual need for subsurface drainage.

Exterior backfill of at-grade foundations walls should consist of native, non-organic soils for at-grade construction. Placement of exterior backfill against at-grade foundation walls should be performed concurrent with interior backfill to minimize differential loading, rotation and/or movement of the wall system.

Exterior backfill for retaining walls should consist of a native, coarse alluvium or "pit run" granular soil with a fine content equal to or less than 12 percent passing the No. 200 US Sieve opening (i.e. fill extending to within 2 feet of final grade). The final one and one half to two feet of exterior backfill within lawn areas should consist of clay and topsoil. Exterior backfill below sidewalks and pavements should consist of a free draining aggregate base as recommended for the respective construction. You should temper all backfill for correct moisture content and then place and compact individual lifts of exterior backfill per criteria presented within the report appendices.

You should limit placement of exterior backfill against below grade foundations until lateral restraint of the foundation walls has been installed to the satisfaction of the Structural Engineer. Final grading of exterior backfill should provide sufficient grade for positive drainage from structure. We presented within other report section recommendations for final grading.

4.7 Surface Drainage

You should maintain positive drainage during and after construction of project and eliminate ponding of water on site soils. We recommend you include provisions within construction documents for positive drainage of site. You should install sumps at critical areas around project to assist in removal of seepage and runoff from site. We present recommendations for sump construction within the appendices.

You should maintain the moisture content of site clays as close to existing as possible as excessive changes can cause shrinkage or expansion of the soil, and lead to distress of construction.

We understand sidewalks, curbing, pavements, and lawn will direct drainage from structure. You should grade exterior to slope from building(s). We recommend that you provide a 5 percent gradient within 10 feet of building for drainage from lawn, and 2 percent minimum gradient from building for drainage of sidewalks / pavements. All pavements should drain to on-site storm collection, municipal collection system, or roadside ditching.

You should direct roof runoff from building by a system of interior roof and scupper drains, or rain gutters, down spouts and splash pads. It is our opinion interior roof drains plumbed directly to the storm water piping system provide the most favorable method of conveying drainage from the roof as interior drains do not freeze or discharge runoff onto exterior sidewalks and pavements.
4.8 Utilities

Placement of underground utilities typically includes granular bedding for support of piped systems. Placement of granular soils within underground utility construction promotes migration of subsurface moisture towards and below the bearing stratum of footing construction. This, in turn, can lead to moisture uptake by native clays producing heave of construction, loss of shear strength and/or differential settlement of footing and floors.

Therefore, we recommend that you eliminate placement of all granular bedding soils within 10 feet of project excavations creating a zone where cohesive soils or lean concrete (i.e. controlled density fill) is used for all soil replacement within utility trenches. This “zone of control” should significantly reduce moisture migration below the project foundations. All clay bedding fill within this zone should be placed and compacted as recommended for utility trench backfill.

In lieu of placing clay soils within the above referenced “zone of control”, alternate means of interception and blockage of drainage along site utilities may be provided to minimize moisture migration into and below structure foundation and floors.

Wetter soils from depth should be placed in the lower portion of utility trench construction while dryer soils from near ground surface should be placed in upper most portion of trench fill. You should temper the utility trench fill for correct moisture content and then place and compact individual lifts of trench fill to criteria established within the report appendices.

There is a high probability that fine and coarse alluvium laminations occur within site soils and may be present along utility trench excavations. Such formations and other regional dependent soil conditions may be water bearing. While it is our opinion small pumps should handle seepage resulting from utility construction, we caution that interception of a major water bearing stratum may result in significantly greater seepage into utility excavations. Therefore, we recommend that you include provisions within construction document for pumping of seepage from utility excavations.

4.9 Vegetation

Vegetation planting near structures can result in a change in soil moisture content from moisture uptake by the plants or excessive watering of plantings. The resulting change in soil moisture contributes to lateral earth pressure development and frost related heave of local soils. You should eliminate planting of trees or shrubs within 10 feet of the structures as a cautionary measure to reduce the seasonal fluctuation of soil moisture. As a minimum, we recommend that you establish a plan to control and limit watering of planting within 10 feet of the structures. Such review and control is necessary to minimize the moisture change of the native clays.
4.10 Pavement Subgrade Stabilization

We understand project grading will include mass earthwork activities to establish the final grade of site and expect preparation of the pavement subgrade will occur with corrective earthwork for site. Subgrade preparation will need to establish a stable base for construction of project sidewalks and pavements. The native soils and fill can lose structural capacity with uptake of moisture, are easily disturbed, and may rut with excessive movement of construction equipment across bare ground. We recommend that you scarify, temper for moisture, and re-compact no less than 12 inches of the exposed subgrade prior to placement of engineered fill or aggregate base. You should install geotextile separation fabric between the exposed cohesive soils and aggregate base section to limit displacement and distress. It is our opinion this geotextile should consist of a fabric with a machine and cross direction wide width tensile strength equal to or greater than 110 lbs/in minimum average roll value (MARV).

The pavement contractor should provide you with a detailed layout diagram showing how they intend to place the geotextile. Geotextile panels should be oriented parallel with aggregate placement, and occur in such a manner that the overall number of individual panels are kept to a minimum. As placed, individual panels of geotextile should have a width equal to or greater than 12 feet. The paving contractor should overlap longitudinal and butt seams of adjacent panels a minimum of 18 inches with such joints oriented to follow traffic movement (shingled profile with traffic). We recommend anchoring individual panels of geotextile to ground with systems designed to maintain position of the panels.

Design must consider load and movement of traffic across pavement subgrade structure. With moving traffic, design must provide sufficient paving materials to resist deflection and reflective loading imparted by vehicle wheels. Static vehicles convey loads downward into the lower section of the pavement and subgrade soils. Pavement design for parked vehicles must also consider and provide adequate bearing strength to resist soil compression and displacement.

All pavement recommendations assume the subgrade soils and aggregate section below paved surfaces, if any, drain to subsurface piping for eventual discharge into storm sewer, above grade to ditching, or similar acceptable systems. Lack of drainage from both the surface of the pavement and subsurface will significantly reduce the capacity and longevity of the pavements.

We recommend pavements receive annual maintenance, as a minimum, to correct damages to the pavement structure, clean and infill cracks which develop, and repair or resurface areas which exhibit reduced subgrade performance. The lack of maintenance can lead to moisture infiltration of the pavement structure and softening of the subgrade soils. This, in turn, can degrade and result in poorly performing pavements with shortened life expectancy.
5.0 CONSTRUCTION CONSIDERATIONS

5.1 Excavation Stability

Excavation depth and sidewall inclination should not exceed those specified in local, state or federal regulations. Excavations may need to be widened and sloped, or temporarily braced, to maintain or develop a safe work environment. Also, contractors should comply with local, state, and federal safety regulations including current OSHA excavation and trench safety standards. Temporary shoring must be designed in accordance with applicable regulatory requirements.

5.2 Engineered Fill & Winter Construction

The Geotechnical Engineer of Record or their designated representative should observe and evaluate excavations to verify removal of uncontrolled fills, topsoil and/or unsuitable material(s), and adequacy of bearing support of exposed soils. Such observation should occur prior to construction of foundations or placement of engineered fill supporting excavations.

Engineered fill should be evaluated by above designated representative for moisture content, mechanical analysis and/or Atterberg limits prior to placement. You should temper engineered fill for correct moisture content and then place and compact individual lifts of engineered fill to criteria established within the appendices.

Frozen soil should never be used as engineered fill or backfill nor should you support foundations on frozen soils. Moisture freezing within the soil matrix of fine grained and/or cohesive soils produces ice lenses. Such soils gain moisture from capillary action and, with continued growth, heave with formation of ice lenses within the soil matrix. Foundations constructed on frozen soils settle at or after thaw of ice lenses.

You should protect excavations and foundations from freezing conditions or accumulation of snow, and remove frozen soils, snow, and ice from within excavations, fill section or from below proposed foundations. Replacement soils should consist of similar materials as those removed from the excavation with moisture content, placement and compaction conforming to report criteria.

5.3 Operation of Project Sumps

We previously noted the importance of removal of seepage and runoff from project excavations. You should install and continuously operate sumps, temporary subsurface drainage pipe, and/or collection manifold and vacuum wells for removal of seepage and runoff from project. We present recommendations for project sumps in the appendices.
6.0 CLOSURE

Our conclusions and recommendations are predicated on observation and testing of the earthwork directed by Geotechnical Engineer of Record. Our opinions are based on data assumed representative of the site. However, the area coverage of borings in relation to the entire project is very small. For this and other reasons, we do not warrant conditions below the depth of our borings, or that the strata logged from our borings are necessarily typical of the site. Deviations from our recommendations by plans, written specifications, or field applications shall relieve us of responsibility unless our written concurrence with such deviations has been established.

This report has been prepared for the exclusive use of Becker County Environmental Services Department for specific application to the proposed Becker County Recycling Building in Detroit Lakes, Minnesota. Northern Technologies, LLC has endeavored to comply with generally accepted geotechnical engineering practice common to the local area. Northern Technologies, LLC makes no other warranty, expressed or implied.

Northern Technologies, LLC

[Signatures]

Josh Holmes, P.E.
Project Engineer

Dan Gibson, P.E.
Senior Engineer

JH:dg

Attachments

F:\PROJECTS\Geo\GEDREP 2017\Becker County Recycling Building - Detroit Lakes, MN\Becker County Recycling Building.docx
GEOTECHNICAL EVALUATION OF RECOVERED SOIL SAMPLES

We visually examined recovered soil samples to estimate distribution of grain sizes, plasticity, consistency, moisture condition, color, presence of lenses and seams, and apparent geologic origin. We then classified the soils according to the Unified Soil Classification System (ASTM D2488). A chart describing this classification system and general notes explaining soil sampling procedures are presented within the appendices.

The stratification depth lines between soil types on the logs are estimated based on the available data. In situ, the transition between type(s) may be distinct or gradual in either the horizontal or vertical directions. The soil conditions have been established at our specific boring locations only. Variations in the soil stratigraphy may occur between and around the borings, with the nature and extent of such change not readily evident until exposed by excavation. These variations must be properly assessed when utilizing information presented on the boring logs.

We request that you, your design team or contractors contact NTI immediately if local conditions differ from those assumed by this report, as we would need to review how such changes impact our recommendations. Such contact would also allow us to revise our recommendations as necessary to account for the changed site conditions.

FIELD EXPLORATION PROCEDURES

Soil Sampling – Standard Penetration Boring:

Soil sampling was performed according to the procedures described by ASTM D-1586. Using this procedure, a 2 inch O.D. split barrel sampler is driven into the soil by a 140 pound weight falling 30 inches. After an initial set of six inches, the number of blows required to drive the sampler an additional 12 inches is recorded (known as the penetration resistance i.e. “N-value”) of the soil at the point of sampling. The N-value is an index of the relative density of cohesionless soils and an approximation of the consistency of cohesive soils.

Soil Sampling – Power Auger Boring:

The boring(s) was/were advanced with a 6 inch nominal diameter continuous flight auger. As a result, samples recovered from the boring are disturbed, and our determination of the depth, extend of various stratum and layers, and relative density or consistency of the soils is approximate.

Soil Classification:

Soil samples were visually and manually classified in general conformance with ASTM D-2488 as they were removed from the sampler(s). Representative fractions of soil samples were then sealed within respective containers and returned to the laboratory for further examination and verification of the field classification. In addition, select samples were submitted for laboratory tests. Individual sample information, identification of sampling methods, method of advancement of the samples and other pertinent information concerning the soil samples are presented on boring logs and related report attachments.
General Notes

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DRILLING &amp; SAMPLING SYMBOLS DEFINITION</th>
<th>SYMBOL</th>
<th>LABORATORY TEST SYMBOLS DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.S.</td>
<td>Continuous Sampling</td>
<td>W</td>
<td>Moisture content-percent of dry weight</td>
</tr>
<tr>
<td>P.D.</td>
<td>2-3/8&quot; Pipe Drill</td>
<td>D</td>
<td>Dry Density-pounds per cubic foot</td>
</tr>
<tr>
<td>C.O.</td>
<td>Cleanout Tube</td>
<td>LL, PL</td>
<td>Liquid and plastic limits determined in accordance with ASTM D 423 and D 424</td>
</tr>
<tr>
<td>3 HSA</td>
<td>3 ¾&quot; I.D. Hollow Stem Auger</td>
<td>Q_u</td>
<td>Unconfined compressive strength-pounds per square foot In accordance with ASTM D 2365-66</td>
</tr>
</tbody>
</table>

4 FA  4" Diameter Flight Auger
6 FA  6" Diameter Flight Auger
2 ½ C 2 ½" Casing
4 C   4" Casing
D.M.  Drilling Mud
J.W.  Jet Water
H.A.  Hand Auger
NXC  Size NX Casing
BXC  Size BX Casing
AXC  Size AX casing
S5   2" O.D. Split Spoon Sample
2T   2" Thin Wall Tube Sample
3T   3" Thin Wall Tube Sample

Additional Insertions in Qu Column
Pq  Penetrometer reading-tons/square foot
S  Torvane reading-tons/square foot
G  Specific Gravity - ASTM D 854-58
SL Shrinkage limit - ASTM 427-61
pH  Hydrogen ion content-meter method
O  Organic content-combustion method
M.A.* Grain size analysis
C* One dimensional consolidation
Q_o Triaxial Compression
* See attached data Sheet and/or graph

Water Level Symbol
Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels can be considered reliable ground water levels. In clay soils, it is not possible to determine the ground water level within the normal scope of a test boring investigation, except where lenses or layers of more pervious water bearing soil is present and then a long period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed soils may not indicate the true level of the ground water table. The available water level information is given at the bottom of the log sheet.

Descriptive Terminology

<table>
<thead>
<tr>
<th>DENSITY</th>
<th>&quot;N&quot; VALUE</th>
<th>CONSISTENCY</th>
<th>&quot;N&quot; VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Loose</td>
<td>0-4</td>
<td>Soft</td>
<td>0-4</td>
</tr>
<tr>
<td>Loose</td>
<td>5-8</td>
<td>Medium</td>
<td>5-8</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>9 - 15</td>
<td>Rather Stiff</td>
<td>9 - 15</td>
</tr>
<tr>
<td>Dense</td>
<td>16 - 30</td>
<td>Stiff</td>
<td>16 - 30</td>
</tr>
<tr>
<td>Very Dense</td>
<td>Over 30</td>
<td>Very Stiff</td>
<td>Over 30</td>
</tr>
</tbody>
</table>

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon.

Relative Proportions

<table>
<thead>
<tr>
<th>TERMS</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>0-5%</td>
</tr>
<tr>
<td>A little</td>
<td>5-15%</td>
</tr>
<tr>
<td>Some</td>
<td>15-30%</td>
</tr>
<tr>
<td>With</td>
<td>30-50%</td>
</tr>
</tbody>
</table>

Particle Sizes

<table>
<thead>
<tr>
<th>Boulders</th>
<th>Over 3&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel - Coarse</td>
<td>3/8&quot; - 3&quot;</td>
</tr>
<tr>
<td>Medium</td>
<td>#4 - #10</td>
</tr>
<tr>
<td>Sand - Coarse</td>
<td>#4 - #10</td>
</tr>
<tr>
<td>Medium</td>
<td>#10 - #40</td>
</tr>
<tr>
<td>Fine</td>
<td>#40 - #200</td>
</tr>
</tbody>
</table>

Silt and Clay Determined by plasticity characteristics.

Note: Sieve sizes are U.S. Standard.
### Classification of Soils for Engineering Purposes

**ASTM Designation D-2487 and D 2488 (Unified Soil Classification System)**

<table>
<thead>
<tr>
<th>Major Divisions</th>
<th>Group Symbols</th>
<th>Typical Names</th>
<th>Classification Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Grained Soils</td>
<td>GW</td>
<td>Well-graded gravels and gravel-sand mixtures, little or no fines.</td>
<td>( C_u = \frac{D_{10}}{D_{60}} ) greater than 4. ( C_i = \frac{(D_{60})^2}{(D_{10} \times D_{60})} ) between 1 &amp; 3.</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>Poorly graded gravels and gravel-sand mixtures, little or no fines.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GM</td>
<td>Silty gravels, gravel-sand-silt mixtures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GC</td>
<td>Clayey gravels, gravel-sand-clay mixtures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SW</td>
<td>Wellgraded sands and gravelly sands, little or no fines.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>Poorly graded sands and gravelly sands, little or no fines.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM</td>
<td>Silty sands, sand-silt mixtures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SC</td>
<td>Clayey sands, sand-clay mixtures.</td>
<td></td>
</tr>
</tbody>
</table>

### Plasticity Index Chart

- **ML** Inorganic silts, very fine sands, rock flour, silty or clayey fine sands.
- **CL** Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
- **OL** Organic silt and organic silty clays of low plasticity.
- **MH** Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts.
- **CH** Inorganic clays of high plasticity, fat clays.
- **OH** Organic clays of medium to high plasticity.

**Plasticity Index Chart**

- Location of plasticity index and liquid limit for coarse-grained soils.
- Location of classification of the plasticity index and the high plasticity of coarse-grained soils.
- Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols.
Excavation Oversize

Excavation oversize facilitates distribution of load induced stress within supporting soils. Unless otherwise superseded by report specific requirements, all construction should conform to the minimum oversize and horizontal offset requirements as presented within the diagram and associated chart.

Definitions

Oversize Ratio H: The ratio of the horizontal distance divided by the engineered fill depth (i.e. # Horizontal / Depth D). Refer to Chart for specific requirements.

Horizontal Offset A: The horizontal distance between the outside edge of footing or critical position and the crest of the engineered fill section. Refer to Chart for specific requirements.

Note 1: Excavation depth and sidewall inclination should not exceed those specified in local, state or federal regulations including those defined by Subpart P of Chapter 27, 29 CFR Part 1926 (of Federal Register). Excavations may need to be widened and sloped, or temporarily braced, to maintain or develop a safe work environment.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Unsuitable Soil Type</th>
<th>Horizontal Offset A</th>
<th>Oversize Ratio H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Unit Load equal to or less than 3,000 psf</td>
<td>SP, SM soils, CL &amp; CH soils with cohesion greater than 1,000 psf</td>
<td>2 feet or width of footing, whichever is greater</td>
<td>Equal to or greater than Depth D</td>
</tr>
<tr>
<td>Foundation Unit Load greater than 3,000 psf</td>
<td>SP, SM soils, CL &amp; CH soils with cohesion less than 1,000 psf</td>
<td>5 feet or width of footing, whichever is greater</td>
<td>Equal to or greater than Depth D</td>
</tr>
<tr>
<td>Foundation Unit Load equal to or less than 3,000 psf</td>
<td>Topsoil or Peat</td>
<td>2 feet or width of footing, whichever is greater</td>
<td>Equal to or greater than two (2) time Depth D</td>
</tr>
<tr>
<td>Foundation Unit Load greater than 3,000 psf</td>
<td>Topsoil or Peat</td>
<td>5 feet or width of footing, whichever is greater</td>
<td>Equal to or greater than two (2) time Depth D</td>
</tr>
</tbody>
</table>
GROUND WATER ISSUES

The following presents additional comment and soil specific issues related to measurement of ground water conditions at your project site.

Note that our ground water measurements, or lack thereof, will vary depending on the time allowed for equilibrium to occur in the borings. Extended observation time was not available during the scope of the field exploration program and, therefore, ground water measurements as noted on the borings logs may or may not accurately reflect actual conditions at your site.

Seasonal and yearly fluctuations of the ground water level, if any, occur. Perched ground water may be present within sand and silt lenses bedded within cohesive soil formations. Groundwater typically exists at depth within cohesive and cohesionless soils.

Documentation of the local ground water surface and any perched ground water conditions at the project site would require installation of temporary piezometers and extended monitoring due to the relatively low permeability exhibited by the site soils. We have not performed such ground water evaluation due to the scope of services authorized for this project.

We anticipate pumps installed within temporary sumps should control subsurface seepage from perched conditions. However, we caution such seepage from such formations and any water entry from excavations below the ground water table may be heavy and will vary based on seasonal and annual precipitation, and ground related impacts in the vicinity of the project.

GEOTEXTILE FABRIC

We occasionally recommend installation of a geotextile separation fabric between the native soils and the engineered fill section below project foundations, floors and/or between the clay subgrade and aggregate base of pavement construction within the body of the report. If recommended within the body of the report, it is our opinion this geotextile should consist of a non-woven, needle punched, fabric with a minimum grab tensile strength in both directions equal to or greater than 200 lbs minimum average roll value (MARV, ASTM D 4632).

We recommend that the geotextile panels be oriented parallel with proposed aggregate placement activities, and occur in such a manner that the overall number of individual panels are kept to a minimum. As placed, individual panels of geotextile should have a width equal to or greater than 12 feet. We recommend that the Contractor overlap longitudinal and butt seams of adjacent panels a minimum of 18 inches with such joints oriented to follow initial construction traffic (shingles profile with traffic).
PLACEMENT and COMPACTION OF ENGINEERED FILL

Unless otherwise superseded within the body of the Geotechnical Exploration Report, the following criteria shall be utilized for placement of engineered fill on project. This includes, but is not limited to earthen fill placement to improve site grades, fill placed below structural footings, fill placed interior of structure, and fill placed as backfill of foundations.

Engineered fill placed for construction, if necessary should consist of natural, non-organic, competent soils native to the project area. Such soils may include, but are not limited to gravel, sand, or clays with Unified Soil Classification System (ASTM D2488) classifications of GW, SP, SM, CL or CH. Use of silt or clayey silt as project fill will require additional review and approval of project Geotechnical Engineer of Record. Such soils have USCS classifications of ML, MH, ML-CL, MH-CH. Use of topsoil, marl, peat, other organic soils construction debris and/or other unsuitable materials as fill is not allowed. Such soils have USCS classifications of OL, OH, Pt.

Engineered fill, classified as clay, should be tempered such that the moisture content at the time of placement is equal to and no more than 3 percent above the optimum content for as defined by the appropriate proctor test. Likewise, engineered fill classified as gravel or sand should be tempered such that the moisture content at the time of placement is within 3 percent of the optimum content.

All engineered fill for construction should be placed in individual 8 inch maximum depth lifts. Each lift of fill should be compacted by large vibratory equipment until the in-place soil density is equal to or greater than the criteria established within the following tabulation.

<table>
<thead>
<tr>
<th>Type of Construction</th>
<th>Compaction Criteria (% respective Proctor) ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Embankment Fill</td>
<td>Clay: 95 to 100</td>
</tr>
<tr>
<td></td>
<td>Sand or Gravel: Min. 95</td>
</tr>
<tr>
<td>Engineered Fill below Foundations</td>
<td>Min. 95</td>
</tr>
<tr>
<td>Engineered Fill below Floor Slabs</td>
<td>Min. 95</td>
</tr>
<tr>
<td>Engineered Fill placed against Foundation Walls</td>
<td>95 to 98</td>
</tr>
<tr>
<td>Engineered Fill placed as Pavement Subgrade</td>
<td>95 to 98</td>
</tr>
<tr>
<td></td>
<td>Min. 100</td>
</tr>
<tr>
<td>Engineered Fill placed as Pavement Aggregate Base</td>
<td>Min. 95</td>
</tr>
<tr>
<td></td>
<td>Min. 95</td>
</tr>
<tr>
<td>Engineered Fill placed within Utility Trench (to</td>
<td>Min. 95</td>
</tr>
<tr>
<td>within 3 feet of pavement aggregate base or final</td>
<td></td>
</tr>
<tr>
<td>grade</td>
<td></td>
</tr>
<tr>
<td>Engineered Fill placed as Utility Trench Fill</td>
<td>Min. 98</td>
</tr>
<tr>
<td>(within 3 feet of pavement aggregate base or final grade)</td>
<td>Min. 98</td>
</tr>
</tbody>
</table>

¹ Note 1 Unless otherwise required, compaction criteria shall be based on the Standard Proctor Test (ASTM D698).

Density tests should be taken during engineered fill placement to document earthwork has achieved necessary compaction of the material(s). Recommendations for interior fill placement and backfill of foundation walls are presented within other sections of this report.
SWELLING of CLAY SOILS

Swell of clay soil occurs when moderate to highly desiccated, "over consolidated", moderate to highly plastic clay absorbs moisture concurrent within removal of overburden pressure. The fat clay soils comprising the Glacial Lake Agassiz formation are generally known to have "moderate" to "high risk" of swelling when conditions favorable for heave occur.

Clay minerals are generally elongated bipolar charged particles aligned in plate-like structures. Absorption of water by the clay minerals is driven, in part, by the electrical attraction between the bipolar mineral and the electrical charged water molecule. The electrical attraction at the molecular level is a fairly strong bond which forces separation of the clay particle into a stratified system of bonded clay and water. The resulting composite system has greatly increased volume as compared to the original clay minerals.

Major clay minerals include Kaolinite, Halloysite, Illite, Calcium Montmorillonite, Sodium Montmorillonite, and Sodium Hectorite. Mielenz and King (1955) have noted that absorption of water by clays leads to expansion or swelling and that the magnitude of swelling varied widely depending upon the type and quantity of clay mineral present, their exchangeable ions, electrolyte content of the aqueous phase, particle-size distribution, void size and distribution, the internal structure, water content, superimposed load, and possibly other factors. Research geology professor Mr. Ralph Grim [University of Illinois] collaborates free swelling of clay minerals varied widely [referenced Table 5-10].

<table>
<thead>
<tr>
<th>Table 5-10</th>
<th>Free Swelling Data for Clay Minerals (in per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calcium Montmorillonite:</strong></td>
<td>(After Mielenz and King, 1955) 1</td>
</tr>
<tr>
<td>Forest, Mississippi</td>
<td>145</td>
</tr>
<tr>
<td>Wilson Creek Dam, Colorado</td>
<td>95</td>
</tr>
<tr>
<td>Davis Dam, Arizona</td>
<td>45 - 85</td>
</tr>
<tr>
<td>Osage, Wyoming (prepared from Na-Mont.)</td>
<td>125</td>
</tr>
<tr>
<td><strong>Sodium Montmorillonite - Osage, Wyoming</strong></td>
<td>1,400 - 1,600</td>
</tr>
<tr>
<td>Sodium Hectorite - Hector, California</td>
<td>1,600 - 2,000</td>
</tr>
<tr>
<td><strong>Illite:</strong></td>
<td></td>
</tr>
<tr>
<td>Fithian, Illinois</td>
<td>115 - 120</td>
</tr>
<tr>
<td>Morris, Illinois</td>
<td>60</td>
</tr>
<tr>
<td>Tazewell, Virginia</td>
<td>15</td>
</tr>
<tr>
<td><strong>Kaolinite:</strong></td>
<td></td>
</tr>
<tr>
<td>Mesa Alta, New Mexico</td>
<td>5</td>
</tr>
<tr>
<td>Macon, Georgia</td>
<td>60</td>
</tr>
<tr>
<td>Langley, North Carolina</td>
<td>20</td>
</tr>
<tr>
<td>Halloysite - Santa Rita, New Mexico</td>
<td>70</td>
</tr>
</tbody>
</table>

As shown in referenced Table 5-10, the effective range of swell in percent varies widely from as little as 5% with Kaolinite to 2,000% with Sodium Hectorite. Of major concern, regional clay soils typically include varying concentration of montmorillonite mineral [commonly defined as smectite]. Note that defining the percent content and mineral type of clay soils calls for very costly and time intensive laboratory analysis. Such determination cannot be made through visual classification.

Historically, a majority of clay soils across the Red River Valley (i.e. Sherack Deposition of Glacial Lake Agassiz Formation) have extreme low permeability on the order of $1 \times 10^{-8}$ or lower cm/sec. However, this low permeability for water flow is moderated by silt and very fine sand lens bedded within the Sherack formation. Such lenses become wet to saturated allowing movement of ground water during periods of prolonged wet cycles [nominal 10 to 50 year cycles], allowing limited transport of aqueous minerals through the Sherack clays. This can lead to varied extent of sodium and calcium mineral exchange within the clay soil structure [through presence of gypsum].

Past observation of other projects in south Fargo suggest the most prevalent risk of heave occurs when new, lightly loaded construction occurs over a prior shelter belt [previously forested with mature cotton wood or oaks], or farm fields previously planted in alfalfa or similar deep rooting plants. Clay soils within nominal 10 to 30 feet of ground surface at such locations typically are desiccated to varying degree from moisture uptake by plant cover.

Outside of above anomalies [excluding areas desiccated during seasonal construction exposure and areas immediately adjacent to silt or sand lens], Red River Valley clay soils below nominal depth 12 to 25 feet generally experience extreme slow change in moisture content seasonally, with long term [i.e. decade level event] slight to moderate change in moisture content following cyclical drought or wet cycles common to the northern prairie.

The extreme depth of clay deposit within the Red River Valley precludes construction of conventional frost foundations on other than soil having heave potential. Thus, the major means of reducing risk of heave to construction includes; isolation of lightly loaded floor slabs from more heavily loaded foundation element, allowing unhindered movement between walls / floor and any piped penetrations and, most importantly, providing continuous automated drainage of site during construction and permanent subsurface drainage of foundations and at-grade floors long term. Lacking access to moisture, heave prone clay soils will have minimal if any volume change.
PROJECT SUMPS

The collection, control and removal of seepage and runoff from within project excavations is critical in maintaining the bearing capacity of native soils, in-place density of engineered fill and stability of embankments at project excavations.

As constructed, it is our opinion all sumps should consist of a 2 foot by 2 foot or larger plan dimension excavation(s) located adjacent to and directly exterior to the excavation oversize limit for structural engineered fill. Sump excavations should extend a minimum of 2 feet below the base of the excavation for collection of seepage and runoff.

All sumps should be lined with a non-woven, needle-punched, geotextile having a grab tensile strength equal to or greater than 70 pounds per square inch (psi). A standpipe of 12 inches in diameter or larger should be centered within the sump excavation. This pipe should include sufficient openings for entry of seepage. We recommend that the standpipe extend to the ground surface to facilitate pumping during project construction. Infill within the sump area should consist of a 1½ to ¾ inch clear rock placed between the standpipe and walls of the sump excavation.

Pumping of sump(s) should continue until completion of the construction or until the Geotechnical Engineer of Record indicates such pumping is no longer necessary for stability of the project footings and related construction. Sumps should be abandoned per methods required by the Geotechnical Engineer of Record and per Federal, State and local governmental statutes.

Discharge from sumps should be directed away from site and be disposed within storm water systems or other systems which comply with Federal, State and local governmental statute. As constructed and operated, the General Contractor should be responsible for all permits, operation and abandonment of sumps or other temporary dewatering systems.
APPENDIX C
# BORING NUMBER SB-1

**CLIENT** Backer County Env. Services Dept.

**PROJECT NUMBER** 17.13979.100

**DATE STARTED** 4/24/17

**COMPLETED** 4/24/17

**DRILLING CONTRACTOR** NTI

**DRILLING METHOD** 3 1/4 in. H.S.A.

**LOGGED BY** Chris Nelson

**CHECKED BY** Josh Holmes

**CAVE IN (ft)** 11

**FROST DEPTH (ft)** NA

**PROJECT NAME** Backer County Recycling Building

**PROJECT LOCATION** Detroit Lakes, Minnesota

**GROUND ELEVATION** 198.3 ft

**HOLE SIZE** 6 1/2 in.

**GROUND WATER LEVELS:**

- **AT TIME OF DRILLING** --- No Groundwater Encountered
- **AT END OF DRILLING** ---
- **AFTER DRILLING** ---

### Notes

- Bottom of borehole at 26.0 feet.
- Borehole backfilled with auger cuttings.

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Graphic Log</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>Recovery (%)</th>
<th>Blown Count (in value)</th>
<th>Pocket Pen. (ft)</th>
<th>Dry Unit Wt.</th>
<th>Moisture Content (%)</th>
<th>Plasticity Index</th>
<th>Atterberg Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td></td>
<td>FILL, SANDY SILT, brown, trace gravel</td>
<td>DU</td>
<td>100</td>
<td>4-5-6 (12)</td>
<td>3.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td>LEAN CLAY, (CL) brown, rather stiff, trace sand, trace gravel</td>
<td>SS</td>
<td>3</td>
<td>4-5-8 (13)</td>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.5</td>
<td></td>
<td>LEAN CLAY, (CL) brown, rather stiff, trace sand, trace gravel, trace shale</td>
<td>SS</td>
<td>3</td>
<td>6-10-12 (22)</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td></td>
<td>POORLY GRADED SAND WITH SILT, (SP-SM) brown, fine to coarse grained, dense, trace gravel</td>
<td>SS</td>
<td>122</td>
<td>19-14-16 (30)</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.5</td>
<td></td>
<td>LEAN CLAY, (CL) brown, stiff, trace sand, trace gravel</td>
<td>SS</td>
<td>167</td>
<td>6-7-6 (13)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.0</td>
<td></td>
<td>POORLY GRADED SAND WITH SILT, (SP-SM) brown, fine to coarse grained, medium dense, trace gravel</td>
<td>SS</td>
<td>72</td>
<td>6-7-9 (16)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.0</td>
<td></td>
<td>SILTY GRAVEL WITH SAND, (GM) brown, dense to very dense, with cobbles &amp; boulders</td>
<td>SS</td>
<td>89</td>
<td>6-7-9 (16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Atterberg Limits:**

- 6

---

### Sample Analysis

- **Sample Type**: AU, SS
- **Blown Count (in value)**
  - 4-5-6 (12)
  - 4-5-8 (13)
  - 6-10-12 (22)
  - 19-14-16 (30)
  - 6-7-6 (13)
  - 6-7-9 (16)

---

**Bottom of Borehole**: 26.0 feet

**Borehole Condition**: Backfilled with auger cuttings.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>Recovery % (RQD)</th>
<th>Blow Counts (N Values)</th>
<th>Pocket Pen. (ft)</th>
<th>DRY UNIT WT. (lb/ft³)</th>
<th>MOISTURE CONTENT (%)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>ATTERBERG LIMITS</th>
<th>PLASTICITY INDEX</th>
<th>FINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>FILL, SILTY SAND, brown, with gravel</td>
<td>SS 2</td>
<td>100</td>
<td>5-5-7 (12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LEAN CLAY, (CL) brown to light gray, rather stiff to stiff, trace sand, trace gravel</td>
<td>SS 3</td>
<td>100</td>
<td>4-6-10 (16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>SILTY SAND WITH GRAVEL, (SM) light brown, fine to coarse grained, dense, with cobbles &amp; boulders</td>
<td>SS 4</td>
<td>56</td>
<td>11-11-12 (23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.0</td>
<td>POORLY GRADED SAND WITH GRAVEL, (SP) brown, medium to coarse grained, medium dense, trace gravel</td>
<td>SS 5</td>
<td>12-12-12 (24)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>18.0</td>
<td></td>
<td>SS 6</td>
<td>33</td>
<td>10-10-10 (20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.0</td>
<td>POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) brown, fine to coarse grained, very dense</td>
<td>SS 7</td>
<td>44</td>
<td>3-4-7 (11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.0</td>
<td></td>
<td>SS 8</td>
<td>100</td>
<td>4-5-7 (12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SS 9</td>
<td>100</td>
<td>4-5-7 (12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.0</td>
<td></td>
<td>SS 10</td>
<td>56</td>
<td>22-22-50 (72)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Bottom of borehole at 26.0 feet.
Borehole backfilled with auger cuttings.
### BORING NUMBER SB-3

**CLIENT**: Backer County Env. Services Dept.

**PROJECT NUMBER**: 17.13978.100

**DATE STARTED**: 4/24/17  
**COMPLETED**: 4/24/17

**DRILLING CONTRACTOR**: NTI

**DRILLING METHOD**: 3 1/4 in H.S.A

**LOGGED BY**: Chris Nelson  
**CHECKED BY**: Josh Holmes

**CAVE IN (ft)**: 10.5  
**FROST DEPTH (ft)**: NA

---

**NOTES**

- Bottom of borehole at 26.0 feet.
- Borehole backfilled with auger cuttings.

---

**GROUND WATER LEVELS**:

- **AT TIME OF DRILLING**: No Groundwater Encountered
- **AT END OF DRILLING**: ---
- **AFTER DRILLING**: ---

---

**GROUND ELEVATION**: 197 ft  
**HOLE SIZE**: 6.12 in.

---

**DEPT (ft)**

- 0
- 5
- 10
- 15
- 20
- 25
- 26

---

**GRAPHIC LOG**

- LEAN CLAY, (CL) brown, rather stiff to stiff, trace sand, trace gravel
- LEAN CLAY, (CL) brown, very stiff, trace sand, trace gravel, with cobbles & boulders
- POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) brown, dense, trace cobbles & boulders
- POORLY GRADED SAND WITH SILT, (SP-SM) light brown, fine to coarse grained, very dense, trace gravel

---

**MATERIAL DESCRIPTION**

- AU 1
- SS 2  
  - 100  
  - 2-4-5  
  - (9)  
  - 1.6
- SS 3  
  - 67  
  - 4-7-7  
  - (14)  
  - 2.2
- SS 4  
  - 100  
  - 4-7-9  
  - (16)  
  - 2.6
- SS 5  
  - 100  
  - 4-7-10  
  - (17)  
  - 3.0
- SS 6  
  - 17  
  - 50  
  - 1.2
- SS 7  
  - 56  
  - 11-17-15  
  - (32)
- SS 8  
  - 28  
  - 11-25-24  
  - (49)  
  - 2.6
- SS 9  
  - 83  
  - 12-13-17  
  - (30)
- SS 10  
  - 14-15-17  
  - (32)
### BORING NUMBER SB-4

**CLIENT** Backer County Env. Services Dept.  
**PROJECT NUMBER** 17.13979.100  
**DATE STARTED** 4/24/17  
**COMPLETED** 4/24/17  
**DRILLING CONTRACTOR** NTI  
**DRILLING METHOD** 3 1/4 in. H.S.A.  
**LOGGED BY** Chris Nelson  
**CHECKED BY** Josh Holmes  
**CAVE IN (ft)** 11  
**FROST DEPTH (ft)** NA  
**GROUND ELEVATION** 197.2 ft  
**HOLE SIZE** 6 1/2 in.  
**GROUND WATER LEVELS:**  
- AT TIME OF DRILLING: No Groundwater Encountered  
- AT END OF DRILLING:  
- AFTER DRILLING:  

### DEPTH (ft)  GRAPHIC LOG  MATERIAL DESCRIPTION  
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>Recovery (%)</th>
<th>Blow Counts (N-value)</th>
<th>Density Unit Wt. (g/cm³)</th>
<th>Moisture Content (%)</th>
<th>Plasticity Limit</th>
<th>Atterberg Limits</th>
<th>Fines</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>LEAN CLAY, (CL) brown</td>
<td>AU 1</td>
<td>100</td>
<td>3-4-5 (9)</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>LEAN CLAY, (CL) brown, rather stiff, trace sand, trace gravel</td>
<td>SS 2, SS 3</td>
<td>100</td>
<td>3-5-6 (11)</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.5</td>
<td>LEAN CLAY, (CL) brown, rather stiff to stiff, trace sand, trace gravel, trace lenses of silty sand</td>
<td>SS 4, SS 5</td>
<td>100</td>
<td>4-6-8 (14)</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.0</td>
<td>LEAN CLAY, (CL) dark gray, stiff to very stiff, trace sand, trace gravel</td>
<td>SS 6, SS 7, SS 8</td>
<td>100</td>
<td>4-10-12 (22)</td>
<td>4.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.0</td>
<td>POORLY GRADED SAND WITH SILT AND GRAVEL, (SP-SM) brown, fine to coarse grained, very dense, with cobbles &amp; boulders</td>
<td>SS 9, SS 10</td>
<td>56, 6</td>
<td>12-25-25 (50)</td>
<td>15-15-25 (40)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of borehole at 26.0 feet.  
Borehole backfilled with auger cuttings.
SECTION 31 2200
SITE GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Rough grading the site for site structures.
B. Finish grading.

1.02 RELATED REQUIREMENTS
A. Section 31 2323 - Fill and Backfill: Filling and compaction.

1.03 PROJECT CONDITIONS
A. Protect above- and below-grade utilities that remain.
B. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from grading equipment and vehicular traffic.

PART 2 PRODUCTS

2.01 MATERIALS
A. Topsoil: Topsoil excavated on-site.
   1. Graded.
   2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that survey bench mark and intended elevations for the work are as indicated.
B. Verify the absence of standing or ponding water.

3.02 PREPARATION
A. Identify required lines, levels, contours, and datum.
B. Stake and flag locations of known utilities.
C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
D. Notify utility company to remove and relocate utilities.
E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.03 ROUGH GRADING
A. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
B. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
C. When excavating through roots, perform work by hand and cut roots with sharp axe.
D. See Section 31 2323 for filling procedures.
E. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.
F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL
A. Stockpile topsoil to be re-used on site; remove remainder from site.
B. Stockpile subsoil to be re-used on site; remove remainder from site.
C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.
B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
C. Where topsoil is to be placed, scarify surface to depth of 6 inches.
D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 12 inches.
E. Place topsoil where required to level finish grade.
F. Place topsoil to nominal depth of 6 inches.
G. Place topsoil during dry weather.
H. Remove roots, weeds, rocks, and foreign material while spreading.
I. Near plants spread topsoil manually to prevent damage.
J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
K. Lightly compact placed topsoil.
L. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 DEWATERING

A. The water table can be high and often fluctuates seasonally. The Contractor shall take this fact into account when preparing their bid. All dewatering is considered incidental to the Project.
B. If the Contractor intends to dewater any construction area and discharge that water to a drain or stream, they must first obtain coverage under Minnesota's General Permit to discharge from temporary dewatering activities. To obtain coverage under the permit or for additional information, contact the Minnesota Pollution Control Agency. Any costs associated with the permit shall be paid for by the Contractor.
C. Dewatering or basin draining (e.g., pumped discharges, trench/ditch cuts for drainage) related to the construction activity that may have turbid or sediment laden discharge water must be discharged to a temporary or permanent sedimentation basin on the project site whenever possible. If the water cannot be discharged to a sedimentation basin prior to entering the surface water, it must be treated with the appropriate BMP's, such that the discharge does not adversely affect the receiving water or downstream landowners. The General Contractor must ensure that the discharge points are adequately protected from erosion and scour. The discharge must be dispersed over natural rock riprap, sand bags, plastic sheeting or other accepted energy dissipation measures. Adequate sedimentation control measures are required for discharge water that contains suspended solids.
D. All water from dewatering or basin draining activities must be discharged in a manner that does not cause nuisance conditions, erosion in receiving channels or on downslope properties, or inundations in wetlands causing significant adverse impact to the wetland.

3.07 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).
C. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.
D. Top Surface of Finish Grade: Plus or minus 1/2 inch.

3.08 REPAIR AND RESTORATION
   A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

3.09 FIELD QUALITY CONTROL
   A. See Section 01 4000 for compaction density testing.

3.10 CLEANING
   A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
   B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION
SECTION 31 2316.13
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS
A. Section 31 2200 - Site Grading.
B. Section 31 2323 - Fill and Backfill.
C. Section 33 1416 - Site Water Utility Distribution.

1.03 REFERENCE STANDARDS
A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop 2021, with Errata (2022).
B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2017a, with Editorial Revision (2021).

1.04 SUBMITTALS
A. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING
A. When necessary, store materials on site in advance of need.
B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.
C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

1.06 DEWATERING AND BASIN DRAINING
A. The water table can be high and often fluctuates seasonally. The Contractor shall take this fact into account when preparing their bid. All dewatering is considered incidental to the Project.
B. If the Contractor intends to dewater any construction area and discharge that water to a drain or stream, they must first obtain coverage under Minnesota's General Permit to discharge from temporary dewatering activities. To obtain coverage under the permit or for additional information, contact the Minnesota Pollution Control Agency. Any costs associated with the permit shall be paid for by the Contractor.

PART 2 PRODUCTS

2.01 FILL MATERIALS
A. General Fill: Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
B. Granular Fill: Coarse Aggregate, See Section 32 1123 - Aggregate Base Course.

C. Topsoil: Topsoil excavated on-site.
   1. Graded.
   2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

2.02 SOURCE QUALITY CONTROL
   A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
   B. If tests indicate materials do not meet specified requirements, change material and retest.
   C. Provide materials of each type from same source throughout the work.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 TRENCHING
   A. Notify Owner's Representative of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
   B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
   C. Do not interfere with 45 degree bearing splay of foundations.
   D. Cut trenches wide enough to allow inspection of installed utilities.
   E. Hand trim excavations. Remove loose matter.
   F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
   G. Remove excavated material that is unsuitable for re-use from site.
   H. Stockpile excavated material to be re-used in area designated in Section 31 2200.
   I. Remove excess excavated material from site.
   J. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Owner's Representative. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
   K. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Owner's Representative.

3.03 PREPARATION FOR UTILITY PLACEMENT
   A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
   B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
   C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.04 BACKFILLING
   A. Backfill to contours and elevations indicated using unfrozen materials.
   B. Fill up to subgrade elevations unless otherwise indicated.
   C. Employ a placement method that does not disturb or damage other work.
   D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
   E. Maintain optimum moisture content of fill materials to attain required compaction density.
   F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

J. Compaction Density Unless Otherwise Specified or Indicated:
   1. 95 percent of maximum dry density.

K. Reshape and re-compact fills subjected to vehicular traffic.

3.05 BEDDING AND FILL AT SPECIFIC LOCATIONS
A. Use general fill unless otherwise specified or indicated.

B. Utility Piping
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.

3.06 TOLERANCES
A. Top Surface of General Backfilling: Plus or minus 1/2 inch from required elevations.
B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

3.07 FIELD QUALITY CONTROL
A. See Section 01 4000 for general requirements for field inspection and testing.
B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").
D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no additional cost to the Owner.

3.08 CLEANING
A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Filling, backfilling, and compacting for paving and site structures.
   B. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS
   A. Section 31 2200 - Site Grading.

1.03 REFERENCE STANDARDS
   A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN·m/m³)) 2012 (Reapproved 2021).

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. When necessary, store materials on site in advance of need.
   B. When fill materials need to be stored on site, locate stockpiles where designated.
      1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
      2. Prevent contamination.
      3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS
   A. General Fill: Subsoil excavated on-site.
      1. Graded.
      2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   B. Granular Fill: Coarse Aggregate, See Section 32 1123 - Aggregate Base Course.
   C. Topsoil: Topsoil excavated on-site.
      1. Graded.
      2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

2.02 SOURCE QUALITY CONTROL
   A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
   B. If tests indicate materials do not meet specified requirements, change material and retest.
   C. Provide materials of each type from same source throughout the work.
PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that survey bench marks and intended elevations for the Work are as indicated.
B. Identify required lines, levels, contours, and datum locations.
C. See Section 31 2200 for additional requirements.
D. Verify structural ability of unsupported walls to support imposed loads by the fill.
E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION
A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING
A. Fill to contours and elevations indicated using unfrozen materials.
B. Fill up to subgrade elevations unless otherwise indicated.
C. Employ a placement method that does not disturb or damage other work.
D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
E. Maintain optimum moisture content of fill materials to attain required compaction density.
F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth. Compact to 95 percent of maximum dry density.
G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
H. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
I. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
J. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
      a. Moisture Range: +5/-5 percent of optimum moisture.
   2. At other locations: 90 percent of maximum dry density.
K. Reshape and re-compact fills subjected to vehicular traffic.
L. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Owner's Representative. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS
A. Use general fill unless otherwise specified or indicated.
B. Over Buried Utility Piping in Trenches:
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.
a. Moisture Range: +5/-5 percent of optimum moisture.

C. At Lawn Areas:
   1. Use general fill.
   2. Fill up to subgrade elevations.
   3. Compact to 90 percent of maximum dry density.
   4. See Section 31 2200 for topsoil placement.

D. Under Monolithic Paving:
   1. Compact subsoil to 95 percent of its maximum dry density before placing fill.
      a. Moisture Range: +5/-5 percent of optimum moisture.
   2. Use general fill.
   3. Fill up to subgrade elevation.
   4. Compact to 95 percent of maximum dry density.
      a. Moisture Range: +5/-5 percent of optimum moisture.
   5. See Section 32 1123 for aggregate base course placed over fill.

3.05 TOLERANCES
   A. Top Surface of General Filling: Plus or minus 1/2 inch from required elevations.
   B. Top Surface of Filling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

3.06 FIELD QUALITY CONTROL
   A. See Section 01 4000 for general requirements for field inspection and testing.
   B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
   C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D1557 ("modified Proctor"), or ASTM D698 ("standard Proctor").
   D. If tests indicate work does not meet specified requirements remove work, replace and retest at no additional cost to the Owner.
   E. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

3.07 CLEANING
   A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
   B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION
SECTION 32 1123
AGGREGATE BASE COURSE

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Aggregate Bedding.

1.02 RELATED REQUIREMENTS
A. Section 31 2316.13 - Trenching: Compacted fill over utility trenches under base course.

1.03 REFERENCE STANDARDS
A. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop 2021, with Errata (2022).
C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).

1.04 SUBMITTALS
A. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING
A. When necessary, store materials on site in advance of need.
B. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.
C. Verify that survey bench marks and intended elevations for the work are as indicated.

PART 2 PRODUCTS
2.01 MATERIALS
A. Coarse Aggregate Class 3: Coarse aggregate, conforming to State of MN Highway Department Class 3 standard.

2.02 SOURCE QUALITY CONTROL
A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.
B. If tests indicate materials do not meet specified requirements, change material and retest.
C. Provide materials of each type from same source throughout the work.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that survey bench marks and intended elevations for the work are as indicated.
B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION
A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION
A. Place aggregate in maximum 6 inch layers, roller compact to 95 percent of maximum dry density.
B. Level and contour surfaces to elevations and gradients indicated.
C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES
A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
B. Scheduled Compacted Thickness: Within 1/4 inch.
C. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL
A. See Section 01 4000 for general requirements for field inspection and testing.
B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with AASHTO T 180, ASTM D698 ("standard Proctor"), or ASTM D1557 ("modified Proctor").
D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no additional cost to the Owner.
E. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.06 CLEANING
A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION
PART 1  GENERAL

1.01  SECTION INCLUDES
A. Disinfection of site fire water lines specified in Section 33 1416.
B. Testing and reporting results.

1.02  RELATED REQUIREMENTS
A. Section 33 1416 - Site Water Utility Distribution Piping.

1.03  REFERENCE STANDARDS
A. AWWA B300 - Hypochlorites 2018.
B. AWWA B301 - Liquid Chlorine 2018.
D. AWWA B303 - Sodium Chlorite 2018.
E. AWWA C651 - Disinfecting Water Mains 2014, with Addendum (2020).

1.04  SUBMITTALS
A. Test Reports: Indicate results comparative to specified requirements.
B. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.
C. Bacteriological report:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water conforms, or fails to conform, to bacterial standards of the Minnesota Department of Health and local standards.

1.05  QUALITY ASSURANCE
A. Perform Work in accordance with AWWA C651.

1.06  REGULATORY REQUIREMENTS
A. Conform to applicable code or regulation for performing the work of this Section.

PART 2  PRODUCTS

2.01  DISINFECTION CHEMICALS

PART 3  EXECUTION

3.01  EXAMINATION
A. Verify that piping system has been cleaned, inspected, and pressure tested.
B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

3.02 DISINFECTION

A. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction, or in the absence of any of these follow AWWA C651.
B. Provide and attach equipment required to perform the work.
C. All water mains shall be chlorinated as set forth by the latest revision of AWWA C601. Sufficient chlorine tablets or powder shall be placed in each pipe to furnish a resultant solution of 50 to 100 parts per million of available chlorine. Generally required dosage to meet this standard is as follows:

<table>
<thead>
<tr>
<th>WATERMAIN SIZE</th>
<th>REQUIRED DOSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>1 LB PER 10,000 FEET</td>
</tr>
<tr>
<td>4”</td>
<td>1 LB PER 2,500 FEET</td>
</tr>
<tr>
<td>6”</td>
<td>1 LB PER 1,100 FEET</td>
</tr>
<tr>
<td>8”</td>
<td>1 LB PER 700 FEET</td>
</tr>
<tr>
<td>10”</td>
<td>1 LB PER 350 FEET</td>
</tr>
<tr>
<td>12”</td>
<td>1 LB PER 280 FEET</td>
</tr>
<tr>
<td>16”</td>
<td>1 LB PER 160 FEET</td>
</tr>
</tbody>
</table>

D. Introduce treatment into piping system.
E. The chlorinated water shall remain in the pipeline for at least 24 hours and shall have a residual chlorine content of at least 5 parts per million at that time.
F. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
G. Replace permanent system devices removed for disinfection.
H. Pressure test system to 125 psi. Repair leaks and re-test.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 4000.
B. Testing shall be performed by the Contractor and paid by the Owner.
C. If tests indicate that work does not meet specified requirements, remove work, replace and retest at no cost to the Owner.
D. Test samples in accordance with AWWA C651.

END OF SECTION
SECTION 33 1416
SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Water pipe for site conveyance lines.

1.02 RELATED REQUIREMENTS
A. Section 33 0110.58 - Disinfection of Water System: Disinfection of site service utility water piping.
B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS
B. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm) 2016, with Errata (2018).

1.04 SUBMITTALS
A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

PART 2 PRODUCTS

2.01 WATER PIPE
A. Polyvinyl Chloride (PVC) Pipe
   1. Manufacture: shall be marked to indicate compliance with NSF 61, Factory Mutual (FM) and either be marked or tagged with Underwriter Laboratory (UL) approval. 12" and smaller PVC pressure pipe shall be manufactured in accordance with the latest revision of AWWA Standard C900. The pipe shall be Class 150, DR 18.
   2. Joints: shall be rubber gasketed conforming to the requirements of ASTM D-3139-98 or the latest revision.
   3. Fittings: Shall conform to the requirements of AWWA C-907 and carry a working pressure of 150 psi. The PVC fittings shall be of the slip joint type.

2.02 COUPLINGS
A. All pipe couplings up to and including 12" in diameter shall be epoxy coated ductile iron meeting or exceeding the requirements of ASTM A 536, grade 65-45-12. Couplings shall meet the requirements of AWWA C219. The coupling shall carry a minimum working pressure of 150 psi, have end rings that are segmented and joined with a pinless hinge, gaskets formed from virgin Nitrile Butadiene Rubber (NBR) compounded for water and sewer service in accordance with ASTM D2000, and 304 stainless steel armor. Fasteners shall be 304 stainless steel.

2.03 BEDDING AND COVER MATERIALS
A. Bedding: As specified in Section 31 2316.13.
B. Cover: As specified in Section 31 2316.13.

2.04 ACCESSORIES
A. Concrete for Thrust Restraints.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION
A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
B. Remove scale and dirt on inside and outside before assembly.
C. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING
A. See the sections on excavation and fill for additional requirements.
B. See Section 31 2316.13 for additional requirements.
C. Hand trim excavation for accurate placement of pipe to elevations indicated.
D. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories. Provide thrust restraint bearing on subsoil as indicated in drawings.

3.04 INSTALLATION - PIPE
A. Maintain 10’ separation of water main from sewer piping.
B. Group piping with other site piping work whenever practical.
C. Establish elevations of buried piping to ensure not less than 8.0 feet of cover.
D. Install pipe to indicated elevation to within tolerance of 5/8 inches.
E. Install ductile iron piping and fittings to AWWA C600.
F. Route pipe in straight line.
G. Install pipe to allow for expansion and contraction without stressing pipe or joints.
H. Slope water pipe and position drains at low points.

3.05 THRUST BLOCKING
A. All fittings shall be braced by means of poured concrete or concrete thrust blocks. No wood thrust blocks will be allowed. Poured concrete shall be 3000 psi concrete poured against undisturbed earth. Care shall be taken not to cover up joints, bolts, flanges, and the fittings with concrete.
B. Thrust restraint at the joints may be used in lieu of concrete thrust blocking with the permission of the Engineer. Restraint devices for PVC pipe shall meet or exceed the requirements of ASTM F 1674-96 or the latest revision, Standard Test Method for Joint Restraint Products for Use with PVC Pipe.

3.06 TEMPORARY WATER SERVICES
A. If the water to a property is to be out for more than 12 hours, the Contractor will be responsible for providing a temporary water service to the affected water users. The method of providing the temporary water service shall be an option of the Contractor subject to the approval of the Engineer.
B. All temporary water mains and services shall be disinfected in accordance with Disinfection of Water Utility Distribution. One water sample at the end of a service connection will be taken after the temporary water line is flushed. The sample shall show the absence of bacteria before connections are allowed.

3.07 FIELD QUALITY CONTROL
A. See Section 01 4000 - Quality Requirements, for additional requirements.
B. Perform field inspection and testing in accordance with Section 01 4000.
C. Hydrostatic Testing will be provided by the Contractor and paid by the Owner.
D. NSF Declaration: All products (treatment chemicals and materials) that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI) /National Sanitation Foundation (NSF) International Standards 60 & 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organizations accredited by ANSI to test and certify such products.
E. Hydrostatic Test:
   1. Watermain shall be subjected to a hydrostatic test of 125 psi for a period of one hour and shall be held within 2 psi of the test pressure for the entire duration.
F. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Drilling and casing water well.
   B. Pump and controller.
   C. Water and system testing and certification.

1.02 REFERENCE STANDARDS
   A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for
      Construction of Pressure Vessels; 2015.
   B. AWWA A100 - Water Wells; 2006.
   C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Scheduling: Install well in time to have permanent water supply available for testing building
      water distribution piping on or before Substantial Completion.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Include data indicating rated capacities, weights, accessories, electrical
      nameplate data, and wiring diagrams.
   C. Certificate: From Authority Having Jurisdiction indicating suitability of water for human
      consumption.
   D. Submit executed certification of well pump after performance testing.
   E. Manufacturer's Installation Instructions: Indicate rigging, assembly, and installation instructions.
   F. Accurately record actual locations of well, depth, subsoil strata, and drilling difficulties
      encountered.
   G. Submit signed copy of driller's log book statements.

1.05 QUALITY ASSURANCE
   A. Drilling Firm: Company specializing in performing the work of this Section. Submit proof of state
      license to perform this work.
   B. The well shall meet all standards and requirements of the Minnesota Department of Health.

PART 2 PRODUCTS

2.01 WATER WELL
   A. Water Well: Provide a water well complying with AWWA A100 and having the following
      characteristics:
      1. Comply with all applicable regulatory and utility requirements.
      2. Capacity: Capable of producing a minimum 500 gallons of water per minute.
      3. Diameter: 8" minimum, and sufficient to meet the flow and pressure requirements listed in
         this section. To be verified by well installer.

2.02 MATERIALS
   A. Well Casing: Must meet all requirements of the State of Minnesota Department of Health.
      1. Steel: ASTM A53/A53M, verify internal diameter, Schedule 40 galvanized pipe with pitless
         adaptor and ventilated well cap.
      2. PVC: verify internal diameter, Schedule 80 drop pipe with solvent weld joints, with pitless
         adaptor and ventilated well cap.
      3. Approved equal.
B. Grout: Must meet all requirements of the State of Minnesota Department of Health.
   1. Bentonite grout: minimum 15% by weight of bentonite, no admixtures, meeting ANSI/NSF Standard 60.
   3. Approved equal.

2.03 Pump
A. Type: Vertical shaft, multiple stage, close coupled, for insertion with well casing pipe.
B. Pump: Submersible type deep well pump, water lubricated:
   1. Pump Capacity (Base Bid Criteria): minimum 500 gpm; 480 volt, three phase motor.
C. Pump Controller: NEMA 3R enclosure with main disconnect interlocked with door, containing soft-start variable speed starting panel, across-the-line electric motor starter with starting relay and ambient compensate quick trip overloads in each phase with manual trip button and reset button; circuit breaker, control transformer, hand-off-automatic selector switches, pilot light.
   1. Controller Cabinet: Locate controller next to pump in cabinet with heater strips to maintain interior temperature at 50 degrees, with integral cabinet stat. Enclosure to be rated 35k AIC.
D. Pressure Sensing Switch: Low voltage relay type, fixed adjustable settings to start at 60 psig and shut-off at 70 psig and low pressure cutoff set at 60 psig.
E. Pump Lift Cable: Stainless steel, multi-stranded aircraft cable, high tensile strength; cable ends fitted with closed loop fittings; length of cable equals depth of shaft plus 20 feet.
F. Screens: Stainless steel type.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that site conditions will support equipment for performing drilling operations and testing.

3.02 PREPARATION
A. Protect structures near the well from damage.

3.03 DRILLING
A. Drill concentric well shaft to diameters and depths required.
B. Place well casing immediately after drilling. Set firmly in place.
C. Clean shaft bottom of loose material.
D. Allow inspection of casing prior to placement of grout.
E. Place grout tight to surrounding work in accordance with regulatory requirements.
F. Maintain well opening and casing free of contaminating materials.
G. Disinfect well according to Minnesota Department of Health requirements.

3.04 INSTALLATION - PUMP
A. Install pump and accessories in accordance with manufacturer's instructions.

3.05 FIELD QUALITY CONTROL
A. Notify Authority Having Jurisdiction, 3 days prior to flow rate testing.
B. Test flow rate and certify.

3.06 CLEANING
A. Clean piping in preparation for disinfecting and testing.

END OF SECTION