



*PUBLIC WORKS DEPARTMENT*

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**CITY OF WILLMAR  
BIDDERS PROPOSAL  
AND  
CONTRACT SPECIFICATIONS  
2013 SALT STORAGE SHED**

**Foundation, Truss Arch Fabric-  
Covered Steel Framed Building &  
Concrete Precast T-Panels**

**Request for Bids  
2013 Salt Storage Shed Project**

**City of Willmar, Minnesota**

**Bids Close: September 3, 2013 at 1:00 p.m.**

Sealed proposals marked “**BID ON SALT STORAGE SHED**” will be received by the City Clerk-Treasurer, City Hall, 333 SW Sixth Street, Willmar, MN, no later than 1:00 p.m., September 3, 2013 in City Hall, 333, SW Sixth Street, Willmar, MN.

Specifications and proposals may be obtained at the office of the City Clerk-Treasurer, City Hall, Willmar, MN. Digital contract documents may be obtained and are available at [www.questcdn.com](http://www.questcdn.com). by entering eBidDoc tm #2863178 on the “search Projects” page. A cash deposit, bidder`s bond, cashier`s or certified check in an amount equal to at least five percent (5%) of the bid shall accompany each proposal made payable to the City of Willmar, MN, which shall be forfeited to the City in event the successful bidder fails to enter into a contract.

The City reserves the right to reject any and all bids, to waive informalities and to accept any bid deemed to be most favorable to the interests of the City of Willmar.

Dated: August 6, 2013

Kevin J. Halliday  
City Clerk-Treasurer

## General Instructions for Bidding

1. All bids shall be submitted on this form
2. The bid must be made out in ink (printed only) or typewritten. No pencil bids will be accepted.
3. DO NOT MAKE ERASURES. In event you make an error, line out the incorrect entry and initial each correct entry.
4. No important deviation from terms of specification is acceptable. It is understood by the City of Willmar that the bidder is submitting proposals in strict compliance with the specifications. ANY EXCEPTIONS MUST BE CLEARLY OUTLINED in the proposal. Failure to list all exceptions will disqualify the bid.
5. A bid bond, cashier's check or certified check made payable to the City of Willmar in the amount of five percent (5%) of the bid must accompany all bids.
6. The City of Willmar Administrator reserves the right to accept any or all bids and to waive any defects or technicalities therein and to award the contract to other than the lowest bidder if, in their judgment, the interests of the City will be better served.
7. If this bid is submitted by a corporation and signed by one other than a duly authorized corporate officer, a letter authorizing the person signing to act for said corporation shall accompany the bid form.

### **Electronic bids and fax bids will not be accepted.**

8. Each proposal shall be in an envelope and securely sealed therein. The envelope shall be address to :  
City of Willmar  
City Clerk-Treasurer, Kevin J. Halliday  
333 SW 6<sup>th</sup> St  
Willmar, Minnesota, 56201

The envelope shall also be marked as follows:

1. Name and address of bidder.
2. Name of bid item.
3. Date and time of letting.

Proposals received after 1.00 p.m. September 3, 2013 shall be returned unopened.

# **SPECIAL PROVISIONS**

**For**

**FOUNDATION, TRUSS ARCH FABRIC-COVERED STEEL FRAMED BUILDING &  
CONCRETE PRECAST T-PANELS  
SALT STORAGE SHED PROJECT  
CITY OF WILLMAR PUBLIC WORKS**

## PROPOSAL GUARANTY

No proposal shall be considered unless it is accompanied by a guaranty complying with these requirements and providing a penal sum at least equal to 5% of the amount of the bid.

## AWARD OF CONTRACT

The final award will be based on the City of Willmar approval of detailed plans and working drawings submitted by the apparent bidder.

## REQUIREMENTS OF CONTRACT BOND

At the time of the execution of the contract, the successful bidder shall furnish a payment bond equal to the Contract amount and a performance bond equal to the Contract Amount, with the aggregate liability of the bond(s) equal to twice the amount of Contract. The City will provide Contract, Payment Bond and Performance Bond forms to the successful bidder.

## INTENT OF CONTRACT

The scope of work for this project is to:

1. Engineer, design and build foundations for a nominal 72' X 96' Truss Arch Fabric Covered Steel Framed Building.
2. Engineer, design and build a nominal 72' X 96' Truss Arch Fabric Covered Steel Framed Building.
3. Engineer, design and build Precast T-Panel 12' walls for containment area in Truss Arch Fabric Covered Steel Framed Building.
4. Site preparations and bituminous by other.

#### PLANS AND WORKING DRAWINGS

The contractor will be responsible for providing complete plans and working drawings as needed for the project. A professional engineer's certificate prepared and signed by a professional engineer, legally authorized to practice in the jurisdiction where the project is located, verifying that the structural framing and covered panels meet indicated loading requirements and codes, of authorities having jurisdiction.

Contractor will provide complete certified Foundation, Truss Arch Fabric Covered Steel Framed Building plans and Concrete Precast T-Panel plans.

#### UTILITY PROPERTY AND SERVICE

The contractor shall be responsible for obtaining utility locates of all utilities. The utilities shall be notified by the contractor 72 hours prior to start of work at the site. Utility owners have existing facilities on the site.

#### DETERMINATION AND EXTENSION OF CONTRACT TIME

All work under this contract shall be completed on or before **November 15, 2013.**

#### FINAL PAYMENT

Before final payment is made, the City shall receive from the Minnesota Department of Revenue the completed IC-134 form, Affidavit for obtaining Final Settlement of contract with the State of Minnesota and any Political or Governmental Subdivision thereof. This Form shall be submitted to the Department of Revenue by the Contractor and his/her subcontractor(s) to verify proper withholding of income tax on wages that have been paid.

#### MINOR CONCRETE STRUCTURES

Attached is a Soils Report for this project prepared by Independent Testing Technologies Inc. The contractor shall engineer, design and build foundations for the 72' X 96' Truss Arch Fabric Covered Steel Framed Building. Footing shall extend 2 feet above the base of the Precast T-Panels. The contractor shall submit drawings indicating complete information on the proposed foundation design to the City of Willmar for approval.

#### STRUCTURAL EXCAVATIONS AND BACKFILLS

The site will be graded to an elevation by City of Willmar Public Works Department. The Public Works Department will remove excess excavated material that is not required for backfill by contractor.

The contractor will be required to do fine grading of the aggregate prior to placing Concrete Precast T-Panels to an elevation provided by the City.

The Contractor shall provide the City one week notice prior to commencement of pier excavation.

The City will provide a testing agency to be on site at the commencement of all pier excavations.

The testing agency will determine if soil from the excavation is consistent with soil boring information in the Specifications. In the event that the soil boring results are not consistent with the attached soil boring, the testing agency shall evaluate the piers as shown in the Drawing for the Truss Arch Fabric Covered Steel Framed Building reaction loads defined in the Drawings along with loading conditions from adjacent salt containing Tee-Wall Structure for the condition determined in the new borings, and shall adjust the depth and/or diameter necessary to resist the loading conditions.

Any differing site conditions identified prior to or during construction will be addressed to the City of Willmar Public Works for resolution.

Foundation excavation shall be performed so the reinforcing steel and concrete placement is a continuous operation performed the same day that the excavation is completed.

Contractor shall keep accurate records of all foundation installations, as built records, corrective action taken and submit them to the City.

#### CONCRETE PRECAST T-PANELS

See the attached specifications for Precast T-Panels.

#### TRUSS ARCH FABRIC COVERED STEEL FRAMED BUILDINGS

See the attached specifications for Truss Arch Fabric Covered Steel Framed Buildings.

The Truss Arch Fabric Covered Steel Framed Building shall have a nominal size of 72' X 96' with sufficient height for the arches to clear the 12' Concrete Precast T-Panel placed 4' from the inside of the building. Center clearance height of not less than 30' with a 30 degree roof slope.

The Truss Arch Fabric Covered Steel Framed Building shall be of one of the following:

72' X 96' Natural Light Truss Arch by Natural Light Fabric Structures – “DP Series” or an approved equal. The burden of proof for equivalency is on the proposer.

#### PERMITS AND BUILDERS RISK INSURANCE

The Contractor will pay for the building permit, other permits and government fees for the project.

The Contractor remains responsible for regulatory requirement, license and inspections.

#### WORKER'S COMPESATION INSURANCE COVERAGE

The successful bidder shall provide evidence of workers' compensation insurance meeting Minnesota statutory requirements on all employees.

#### GENERAL AND VEHICLE LIABILITY INSURANCE COVERAGE

Both insurance coverage shall be at least \$1,000,000.00 and shall name **City of Willmar as "additionally insured" for the project under this contract.** The City of Willmar shall be held harmless from and claim for damages as a result of any operation conducted under this Contract for either personal injury or property damage on or outside the City property. **A copy of the Certificate of Insurance and policy endorsement for additionally insured shall be provided to the Public Works Director's Office prior to commencement of operations.**

Lower basic general liability limits with existence of umbrella liability will be accepted.

#### SAFETY PROGRAM

The Contractor shall supply a copy of their company's Safety Program to the City of Willmar

#### EROSION CONTROL

The Contractor will supply both temporary and permanent erosion control for the project.

# CITY OF WILLMAR

## 2013 SALT STORAGE SHED PROJECT

### SPECIFICATIONS

*Furnish and install fabric membrane structure 72' x 96', 30' minimum clear height, Natural Light Fabric Structure or equal*

#### **GOVERNING SPECIFICATIONS**

The Minnesota Department of Transportation "STANDARD SPECIFICATIONS FOR CONSTRUCTION" 2005 or current Edition shall apply on this Contract except as modified or altered in the following Special Provisions.

#### **GENERAL SALT STORAGE EXCLUSIONS**

For the purpose of this contract, the contractor will be required to furnish all labor, equipment and materials specified for the construction of the salt storage building located at Willmar Public Works Garage as indicated in the plans, except that the following items will be provided by the City of Willmar: Site preparation, furnishing soil bearing tests, gravel base for T-panels, aggregate base and bituminous surfacing inside and around the salt storage building, and standard exclusions.

#### **PRECAST CONCRETE BUNKER PANELS (12' HIGH)**

1. SCOPE:

Furnish and install pre-cast concrete bunker panels (T-panels) as indicated on the drawings and hereinafter specified. Includes bunker panels, shipping, placement, installation of strap ties and base screw anchors.

A. Work by others.

Asphalt pavement repairs and back filling around panel by owner.

2. SUBMITTALS:

The contractor shall submit shop drawings of the T-panels to the City of Willmar Public Works Department prior to fabrication of the panels.

3. MATERIALS:

- A. T-panels shall be reinforced cast concrete as manufactured by the Hanson Silo Co., Lake Lillian, Minnesota, or approved equivalent. Units shall conform to size, layout, and jointing as detailed on the Plan sheets. Units shall be neat, straight, and precisely formed in the best possible manner. Concrete shall have a minimum compressive stress of 5,500 psi, air entraining of 5%, allowable slump of 2 inches, and type 3A cement.
- B. Panels shall be provided with #5 grade 60 rebar reinforcing as well as 4" x 4" x ¼" welded wire fabric reinforcing. Reinforcing layout shall be Hanson Co. standard detail. Panels shall be provided with bent rod lifting hooks for installation maneuverability.

4. ANCHORAGE:

Connector threaded rods, washers and bolts, etc. provide the necessary anchors, as required for a first class installation.

5. CURING:

Curing of the present concrete bunker panels shall be under controlled moisture conditions for a minimum of seven days.

6. ADMIXTURES:

- A. Provide corrosion inhibitor concrete panel mix. Corrosion inhibitor shall be "WR Grace DCI corrosion inhibitor ASTM C494 Type C" or approved equivalent.
- B. Corrosion inhibitor admixture shall be mixed at a ratio which is compliant with manufacturer's instructions.

7. PREPARATION:

- A. The general contractor shall coordinate delivery and erection of precast bunker panels, provide clear site, provide and maintain access to roads to allow crane and trucks to reach work areas under their own power.
- B. Care shall be taken to protect the work and material of other trades during installation of the bunker panels.

8. INSTALLATIONS:

- A. Precast bunker panels shall be installed according to drawings and details by workmen experienced in bunker panel erection.

- B. Units shall be erected tight and at right angles to bearing surfaces unless shown otherwise. Align and level precast concrete slabs using granular fill.
- C. Prior to caulking of joints between individual bunker panels, contractor shall clean joints. Caulk joints between units using silicone caulk as manufactured by G.E., DOW, or approved equivalent. (inside and out)
- D. After erection and caulking is complete the general contractor will be responsible for the protection of the bunker panels.

### **TRUSS ARCH FABRIC COVERED STEEL FRAME BUILDING**

#### 1. SCOPE:

- A. Furnish and install a complete clear span, truss arch fabric covered steel framed building of the nominal length, width, height, and configuration of the attached plan sheets. System to include one end wall assembly and gable end vents
- B. System to be installed upon contractor constructed concrete pier support system. 2' high engineered concrete pier foundation (based on 2000 + psf soils).

#### 2. SYSTEM PERFORMANCE REQUIREMENTS:

- A. General: Engineer, design, fabricate, and erect a truss arch fabric covered steel framed building system to withstand loads from winds, gravity structural movement, including movement thermally induced and to resist in-service use conditions that the building will experience, including exposure to the weather, without failure.
  - 1. Design each member to withstand stresses resulting from combinations of loads that produce the maximum allowable stresses in that matter.
  - 2. The industrial fabric cover system shall be capable of withstanding 90 mph wind loading.
- B. Design Loads: The following criteria shall be used in the design of the structural system.
  - 1. Roof snow and live load – IBC 2006, Ground Snow: 50 PSF
  - 2. Basic wind speed – 90 mph, Exposure Factor “C.”
  - 3. Load combinations shall be as required by the International Building Code, 2006 Edition.

C. Structural Framing: Design structural members, fastening system, and exterior covering materials for applicable loads and combinations of loads in accordance with applicable codes and regulations.

1. Structural Steel: Comply with the American Institute of Steel Construction's (AISC) "Specifications for the Design, Fabrications and Erection of Structural Steel for Buildings" for design requirements and allowable stresses.
2. Welded Connections: Comply with the American Welding Society's (AWS) "Standard Code for Arc and Gas Welding in Building Construction" for welded procedures.

3. SUBMITTALS:

A. Submit shop drawings indicating complete information on proposed system to the City of Willmar, 801 Industrial Drive SW, Willmar Minnesota, for approval. Such submittal shall include sufficient manufacturer information to determine if system is in accordance with this specification.

B. Product data consisting of building system manufacturer's product information for building components and accessories.

C. Shop drawings for building framing system, industrial fabric, fastening system panels, and other building system components and accessories that are not fully detailed or dimensioned in manufacturer's product data.

1. Structural Framing: Furnish complete erection drawings prepared by or under the supervision of a professional engineer legally authorized to practice in the jurisdiction of where the project is located. Include details showing fabrication and assembly of the building system. Show anchor bolts settings and sidewall, end wall and roof framing and transverse cross-sections.

2. Footings/Foundation Piers: Complete drawings and design calculations for concrete footings, and/or foundation piers certified by a Professional Engineer licensed by the State of Minnesota.

D. Professional engineer's certificate prepared and signed by a professional engineer, legally authorized to practice in the jurisdiction where the project is located, verifying that the structural framing and covering panels meet indicated loading requirements and codes and authorities having jurisdictions.

4. QUALITY ASSURANCE:

- A. Installer Qualifications: Engaged and experienced installer to erect the building who has specialized in the erection and installation of types of building systems similar to that required for this project and who is certified in writing by the building system manufacturer as qualified for erection of the manufacturer's products.
- B. Manufacturer's Qualifications: Provide pre-engineering building manufactured by a firm experienced in manufacturing truss arch fabric covered steel framed building systems that are similar to those indicated for this project and have a record of successful in-service performance.
- C. Single-Source Responsibility: Obtain the building system components including structural framing industrial covering, from one source.
- D. Design Criteria: The drawings indicate sizes, profiles, and dimensional requirements of the pre-engineered fabric covered building system.

5. DELIVERY STORAGE AND HANDLING:

- A. Deliver prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed. Industrial fabric cover shall be packaged for protection against transportation damage.
- B. Handling: Exercise care in unloading, storing, and erecting industrial fabric covering to prevent surface damage.
- C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable protection.

6. WARRANTY:

- A. Industrial Fabric Cover Finish Warranty: Furnish the polyethylene fabric manufacturer's written warranty, covering failure of the product within the warranty period.
- B. Manufacturers' Warranty period for industrial fabric cover is 15 years (pro-rata) after the date of completion of salt storage building.
- C. Manufacturers' Warranty period for steel truss arches structural integrity is 15 years after date of completion of salt storage building.

7. MANUFACTURERS:

- A. Manufacturer: Subject to compliance with specified requirements, provide truss arch fabric covered steel framed building systems provided by the following: Natural Light Fabric Structures
- B. Equal Fabric covered buildings will be considered. Provided the information necessary to confirm compliance with specifications and plans.

8. MATERIALS:

A. Steel Tubing Cross Members and Back Wall Framing Members:

- 1. Comply with ASTM A500, Grade B, ASTM A501, or ASTM A53 for tubes and ASTM A36, A53 Type E, Grade B for pipes.
- 2. Provide hot dipped galvanized exterior and interior finishes complying with ASTM A123.

B. Steel Members Fabricated from Plate or Bar Stock:

- 1. Provide 50,000 psi minimum yield strength.
- 2. Comply with ASTM A529, ASTM A570 or ASTM A572.

C. Bolts for Structural Framing:

- 1. Comply with ASTM A307 or ASTM A325, as necessary, for design loads and connection details.
- 2. Bolts, nuts, and washers shall be hot dipped galvanized to ASTM A153

9. STRUCTURAL FRAMING:

A. Cross Member Frames: Provide factory-welded, hot dipped galvanized, open-web- type frames.

- 1. Provide length of span and spacing of frames indicated.
- 2. Fabricate from steel tube shapes.
- 3. Furnish frames with attachment plates, bearing plates, and splice members.
- 4. Factory drill for field-bolted assembly.

- B. Primary End Wall Framing: Provide rigid frames at end walls where indicated, per manufacturer's standard detail:
1. Provide the following primary end wall framing members fabricated for field- bolted assembly:
    - a. End Wall Columns: Manufacturer's standard hot dip galvanized system, built-up factory-welded tube truss steel sections.
    - b. End Wall Cross Members: Manufacturer's standard hot dip galvanized protection tube-shape steel sections.
  2. Secondary end wall members, vent opening, framing, shall be the manufacturer's standard detail fabricated from galvanized steel.
- C. Bracing: Provide diagonal cable bracing in roof and sidewalls.
1. Movement-resisting frames may be used in lieu of sidewall cable bracing, to suit manufacturer's standards.
  2. Where diaphragm strength of roof or wall covering is adequate to resist wind forces, cable bracing will not be required.
  3. Steel secondary members/ purlins may be Allied Tube & Conduits "Gatorshield" where no welding is done.
- D. Framed Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to building structural frame.
- E. Bolts: Anchor bolts embedded in concrete base piers per foundation drawings.

#### 10. INDUSTRIAL FABRIC COVER SYSTEM:

- A. Fabric Cover: Woven High-density polyethylene tape with double stack weave-finish coated both sides.
- B. Cover fastening system: "Novashield II with ArmorKoat" RU88X-6 compatible system with zero stretch belting, welded fabric pockets, and 10,000 lb. capacity lashing winches.
- C. Accessories: Provide the following accessories:
1. 8 each- 3' X 4'1" end wall louvers at gable peak, gravity exhaust, no fan system, provide related opening framing. Louvers shall be fixed blade, aluminum waterproof design or mesh.

D. Color: (Beige)

11. FABRICATION:

A. General Design prefabricated components and necessary field connections required for erection to permit easy assembly and disassembly.

1. Fabricate components in such a manner that once assembled, they may be disassembled, repackaged and reassembled with a minimum amount of labor.
2. Clearly and legibly mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

B. Structural Framing: Shop-fabricate framing components to indicate size and section with base plates, bearing pads, and other plates required for erection, welded, in place. Provided holes for anchoring or connections shop-drilled or punched to template dimensions.

1. Shop Connections: Provide power riveted, bolted or welded shop connections.
2. Field Connections: Provide bolted field connections.

12. ERECTION:

A. Framing: Erect framing true to line, level, plumb, rigid and secure. Level base plates to a true even plane with full bearing to supporting structures, set with galvanized anchor bolts.

13. INSTALLATION:

A. General: Arrange and nest any lap joints so prevailing winds blow over, not into lapped joints. Apply fabric and associated fastening system for neat and weather tight enclosure. Protect factory finishes from damage.

B. Accessories: Install louvers and any accessories in accordance with manufacturer's recommendation for positive anchorage to building and weather tight mounting.

# PROPOSAL

TO: City of Willmar

\_\_\_\_\_, the undersigned as bidder does hereby propose and agree to enter into a contract with the City of Willmar, Minnesota to provide all materials, equipment, and labor according to these specifications and the following proposal:

**SALT SHED STORAGE BUILDING**

**GRAND TOTAL \$ \_\_\_\_\_**

**Bidder** \_\_\_\_\_

**By** \_\_\_\_\_

**Title** \_\_\_\_\_

**Address** \_\_\_\_\_

\_\_\_\_\_

I hereby acknowledge receipt of Addendum No.(s) \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,

\_\_\_\_\_

## **AWARD OF CONTRACT/PROJECT SCHEDULE**

### AWARD OF CONTRACT

Award to the lowest responsive, responsible or bidder meeting specifications. No bidder may withdraw the bid within thirty (30) days after the scheduled closing time and date for receipt of bids. The City reserves the right to reject any or all bids and to waive informalities and award to the best interest of the City of Willmar.

Bids received until 1:00 p.m., September 3, 2013, addressed to City of Willmar, 333 SW 6<sup>th</sup> Street, Willmar, MN 56201, Attn: Kevin Halliday, City Clerk-Treasurer, and marked "Bid on Salt Storage Shed".

### PROJECT SCHEDULE

Once the contractor is notified of bid award results and received "written notice to proceed" and work has begun it shall be completed without delay in its entirety.

Completion of all work shall be on or before November, 15, 2013



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Independent Testing Technologies, Inc.

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**JULY 9, 2013**

**PROJECT 13-166  
REPORT OF GEOTECHNICAL EXPLORATIONS**

**For**

**CITY OF WILLMAR  
SALT STORAGE BUILDING  
801 INDUSTRIAL DRIVE SOUTHWEST  
WILLMAR, MINNESOTA**

**Prepared For:**

**CITY OF WILLMAR**



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# Independent Testing Technologies, Inc.

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July 9, 2013

Mr. Lynden Wittman  
City of Willmar  
PO Box 755  
Willmar, MN 56201

RE: 13-166            Report of Geotechnical Exploration  
                             Salt Storage Building  
                             Public Works Facility- 801 Industrial Drive SW  
                             Willmar, Minnesota

Dear Mr. Wittman:

Independent Testing Technologies, Inc. is pleased to submit the results of our subsurface investigation program for this project in Willmar, Minnesota. It includes our recommendations regarding earthwork, fill and compaction, building suitability, foundation design, floor slab support and wall backfill. One electronic copy is provided.

The soils on this site are fairly suited for the proposed building and site improvements. The majority of the soils encountered were clayey sand (SC, SC-SM) fill and remnant topsoil overlying native sandy lean clays (CL). The soils at the surface are considered unsuitable for building and slab support. Some soil correction to depths of 4.5 to 5.0 feet will be needed for building support. Groundwater was observed in only two borings during drilling. But, we feel high perched water is likely to be a concern on this site. Soil samples obtained during our investigation will be stored at our office for thirty days after the date of this report. After that time, they will be disposed of unless you advise otherwise.

Mr. Wittman, it has been our pleasure to work with you on this project. Please contact Patrick Johnson if you have any questions regarding this report. Please contact Daryl Dhein if you would like a proposal for the materials testing services that will be needed during the construction phase.

Sincerely,

Patrick A. Johnson, P.E.  
MN Registration #22037

Kevin T Reller  
Vice President

**CERTIFICATION**

**I hereby certify that this report was prepared  
by me or under my direct supervision and that I am a  
duly Registered Engineer under the laws  
of the State of Minnesota.**



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**Patrick A. Johnson**

**Date: July 9, 2013 Registration No: 22037**

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**GEOTECHNICAL EXPLORATIONS  
SALT STORAGE BUILDING  
PUBLIC WORKS FACILITY, 801 INDUSTRIAL DRIVE SW  
WILLMAR, MINNESOTA  
PROJECT 13-166**

## **A. Introduction**

**This report is being prepared for use by our client on this specific project. We intend to present this report and our findings in the same logical manner that led us to arrive at our recommendations. This report is based on some general assumptions regarding the anticipated construction based on experience with similar projects. These assumptions and the entire report should be reviewed immediately upon receipt.**

### **Purpose:**

The purpose of our investigation was to evaluate the existing soil and water conditions on this site and provide a report of our findings and recommendations regarding design and construction of the proposed building. The project consists of the construction of a single-story, post-frame, slab-on-grade building on standard cast-in-place concrete spread footings. In accordance with your written authorization, we have conducted a subsurface exploration program for the proposed project.

### **Scope of Services:**

Our authorized scope of services included the following:

1. To investigate the subsurface soil and water conditions encountered at four (4) split-spoon soil boring locations on the lot as staked by you. The borings were planned to be twenty (20) feet deep.
2. To provide a report of our findings including the results of our subsurface investigation and recommendations regarding earthwork, fill and compaction, building suitability, foundation design, floor slab support and backfill.

**General Site Conditions:**

The building will be located in the parking lot southwest of the existing Public Works Building at 801 Industrial Drive Southwest in the City of Willmar, Minnesota. The site is currently an open, level gravel surfaced equipment and storage yard area. The site is relatively flat with slopes of 0 to 2 percent.

**Available Subsurface Information:**

According to the Geologic Map of Minnesota, Quaternary Geology, prepared by Howard C. Hobbs and Joseph E. Goebel (1982, Minnesota Geological Survey), this site lies within a ground moraine of the Altamont Moraine Association. It is associated with the Des Moines Lobe glaciation of Pleistocene, Late Wisconsinan age. The glacial drift is derived from sedimentary and metamorphic rocks of the Manitoba and eastern North Dakota.

According to the Soil Survey of Kandiyohi County prepared by the Soil Conservation Service, the site lies within the Normania- Canisteo- Harps soil association, which consists of nearly level to hilly, moderately well drained to very poorly drained, loamy soils that formed in glacial till on till plains. The individual soils mapped on the site are made up of mostly soil materials that have been graded for development purposes.

## **B. Exploration Program**

**Four (4) split-spoon soil borings were conducted on this project. The borings were advanced to 20 feet deep using a 3 1/4 inch I.D. hollow stem auger. Samples were obtained every 2 1/2 feet for the first 10 feet and every 5 feet thereafter using a 2-inch O.D. split spoon sampler in accordance with the American Society for Testing and Materials (ASTM D1586). Standard penetration values (N-values) were obtained at each sample interval by driving the sampler into the soil using a 140-pound hammer falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler 12 inches is known as the standard penetration resistance or N-value. Where the sampler can not be driven at least 6 inches by 50 blows of the hammer, the total number of blows as well as the distance driven is reported on the boring logs.**

**Groundwater levels were noted during drilling and immediately after completion. The holes were backfilled with the auger cuttings. Some settlement of the bore holes may be expected. All of the borings were conducted with a truck mounted drill rig. The boring locations were staked by you. The boring elevations are based on an assumed elevation of 100.0 for the top nut of the fire hydrant next to the Public Works Building.**

**Exploration Results:**

The borings were conducted in existing open yard areas. All of the borings encountered aggregate material at the surface to depths of 6 to 7 inches. Below the aggregate material, the borings generally encountered sandy lean clay (CL), clayey sand (SC) or silty-clayey sand (SC-SM) fill to depths of 2.5 to 5.0 feet. Below the fill, borings B-1, B-2 and B-4 encountered some dark to black remnant topsoil material to depths of 4.5 to 5.0 feet. Organic content tests were performed on these samples. The organic content was 2.4% in boring B-1, 2.0% in boring B-2 and 6.0% in boring B-4.

Below the remnant topsoil, boring B-1 encountered grey, native clayey sand (SC) to 6.0 feet, followed by native sandy clay (CL) to termination. Below the remnant topsoil, boring B-3 encountered grey, mottled clayey sand (SC) to 6.5 feet, followed by sandy lean clay (CL) to termination. Below the fill, boring B-3 encountered native, sandy lean clay (CL) to 14.0 feet, followed by silty clayey sand (SC-SM) to 16.0 feet, then sandy lean clay (CL) to termination. Below the remnant topsoil, boring B-4 encountered brown, mottled silty sand (SM) to 6.0 feet, followed by sandy lean clay (CL) to termination.

**Penetration Test Results:**

The standard penetration blow counts in the silty and clayey fill soils ranged from 5 to 10, which are low to moderate, indicating that they are in a soft to firm condition. The standard penetration blow counts in the native clay soils ranged from 6 to 19, which are moderate to high, indicating that they are in a firm to hard condition. Refusal of the spoon or auger did not occur in the borings. Drilling was relatively easy in all of the borings.

**Water Level Observations:**

Observations of the subsurface water conditions were made during drilling operations. Groundwater was measured in boring B-1 at a depth of 6.0 feet and in boring B-3 at a depth of 14.0 feet at the end of the day. Groundwater was not encountered in the other borings during drilling or

immediately after completion. It should be noted that the water levels were observed over a very short period of time, and may not be a true representation of the water levels on this site. We suspect permanent groundwater levels would match the levels of the grey soils on this site at roughly 13 to 15 feet. However, the grayish brown soils just below the topsoil indicate that seasonally high perched water may be very shallow.

Any water that is encountered on this site will likely be perched water. Perched water is water trapped above or between an impervious layer, such as clay or bedrock. Perched water conditions can fluctuate a great deal over time and over short distances. They are very difficult to predict. We would expect perched water to be very shallow during wet periods of the year.

It should be noted that fluctuations in the level of the groundwater can occur due to variations in rainfall, temperature, spring thaw and other factors not evident at the time of our investigation. Mottled soils were observed. Mottled native soils are a historical indication of a temporarily or seasonally saturated soil condition. Grey soils were also observed. Grey native soils are an indication of a permanently saturated soil condition.

## **C. Engineering Review**

### **Discussion:**

Based on our findings, the site appears to be fairly suited for the proposed building improvements. The building is expected to be a post framed, slab-on-grade structure on standard spread footings. We assume column footings will be placed at 2 to 4 feet below existing ground level. Maximum foundation loads could be expected to be in the range of 80-160 kips for column loads. The fill soils on this site appear to be soft and may not be suitable for support of the proposed building without some corrective action.

Generally, we recommend that foundations and slab-on-grade be placed on soil having less than 3% organic material. The remnant topsoil material in boring B-4 contained 6.0% organic material. We recommend that the remnant topsoil and fill be completely removed from beneath the building area.

We estimate this will require an excavation of 4.5 to 5.0 feet over the entire area.

## **D. Recommendations**

**The following recommendations are based on our understanding of the proposed project. If our understanding of the project is not accurate, or if changes are made to the project scope, please inform us so that our recommendations can be amended, if necessary. We have included recommendations regarding earthwork and construction that may help in cost estimates and aid in design. We should be allowed to review the proposed construction plans to provide further detailed recommendations, if necessary. Without the opportunity to review the final construction plans, the recommendations made in this report may no longer be valid.**

### **Site Grading:**

We recommend that the existing fill and topsoil material be removed from the construction area prior to filling. We estimate that this will require an excavation of approximately 4.5 to 5.0 feet across the site. The topsoil should be removed from the site or it could be stockpiled and used for landscaping. In addition, any existing soft soils should be removed from below the building area and replaced with compacted, structural fill.

We recommend the bottom of the excavation be observed by a soils engineer or a qualified technician to verify that native, competent material has been reached. We recommend the excavation be oversized one foot for every foot of fill required to reach planned grade (1:1 oversizing). Soils can change dramatically over short horizontal distances; therefore these depths should be used as a guide. After removal of the topsoil and any unsuitable soils, we recommend clean, mineral fill, meeting the requirements of structural fill, be placed and compacted to bring the building and pavement areas to grade.

### **Structural Fill:**

The on-site soils consisting of sandy lean clays (CL) clayey sands (SC, SC-SM) and silty sands (SM) are considered marginal material for use as structural fill. These soils will be wet. They will have moisture contents above optimum for compaction and will require drying or mixing to reach optimum moisture for compaction. Even if the soils are dry at the time of excavation, they are susceptible to moisture variations and may be difficult to work with if they become wet prior to compaction.

We recommend that any imported fill consist of mineral soils meeting the following requirements. No organic soils, roots, stumps, logs, brush, etc. should be used as structural fill below any foundation or pavement section. We recommend that all fill material be free of soft, wet or frozen soils, highly expansive soils, rubble, debris and rocks in excess of 6 inches in diameter. The fill should be as uniform as possible both in composition and moisture content.

We recommend all fill be compacted to the minimum relative density levels shown in the table below:

Location	Recommended Compaction Level (percent of Std. Proctor ASTM D698)
Below Foundations	98 %
Below Slabs, including interior and exterior wall backfill	98%
Below Pavements, deeper than 3 feet from finished subgrade	95%
Below Pavements within 3 feet of finished subgrade	100%
Landscape Areas	90%

We recommend all fill placed in the building and pavement areas be compacted in 8-inch loose lifts. All fill should be compacted at a moisture content within plus or minus 2% of the optimum moisture as determined by a standard proctor. We recommend compaction tests be taken on any fill in the building and pavement areas at a rate of one test per vertical foot per 2,500 square foot area, with a minimum of two tests per fill area.

**Foundations:**

The N-values recorded in the penetration borings indicate that the existing native soils below the fill and remnant topsoil on this site are in a firm condition capable of supporting the proposed structure. If any soft material is observed during construction, it should be removed down to soil of suitable bearing capacity and replaced with crushed rock. The rock should extend beyond the edges of the footings at a 1:1 ratio to the depth of crushed rock placed or a minimum of 12 inches outside the edge of footing.

We recommend all exterior footings be placed at a minimum depth of 42 inches below proposed final grade to provide protection from frost damage.

Any footings placed on the native soils or on properly compacted fill should be proportioned for a maximum net allowable soil bearing pressure of 2500 psf. We recommend compaction tests be taken on any fill below the footings at a rate of one test per 50 linear feet for wall footings and one test per column footing. We recommend compaction tests be taken immediately prior to pouring the footings. Compaction tests are not required on crushed rock.

The recommended bearing pressure is a net value and represents the actual loads that may be transmitted to the soil independent of overburden pressures. We estimate total settlement to be less than 1/2 inch with differential settlement about half of this if the recommendations in this report are followed.

### **Floor Slab**

We recommend a minimum of 12 inches of clean, free draining washed sand with less than 5% passing a No. 200 sieve be placed beneath the floor slabs. This will provide a capillary break and a uniform level subgrade for the floor slabs. We recommend floor slabs be designed using a modulus of subgrade reaction of 150 pounds per cubic inch.

We recommend a vapor moisture barrier consisting of minimum 6-mil polyethylene sheeting. A vapor barrier should be placed under all concrete floors on ground that are likely to receive an impermeable floor finish or be used for any purpose where the passage of water vapor through the floor is undesirable. Floor coverings such as linoleum, vinyl tile, carpeting, wood, and synthetic surfacing effectively seal the moisture within the slab where it eventually may loosen, buckle, or blister the floor covering.

In order to lessen the moisture post-construction, we recommend using a low water-cement ratio concrete, less than .45. We recommend allowing the slab a 2-month drying period and testing the

slab moisture condition before installing any floor covering.

### **Wall Backfill**

We assume the foundation walls will be backfilled with on-site clayey materials. We recommend all wall backfill be compacted to at least 95% of standard proctor maximum density. We recommend below grade walls be designed using a coefficient of active pressure ( $K_a$ ) of 0.36, an at-rest coefficient ( $K_o$ ) of 0.55, and a passive coefficient ( $K_p$ ) of 2.8. We recommend below grade walls be designed using the bulk unit weight of 115 pounds per cubic foot.

## **E. Closing**

Our work was performed for geotechnical purposes only and not to document the presence or extent of any contamination on the site. We can note that our crew did not detect any obvious contamination by sight or smell during drilling operations. However, human senses are limited in terms of contamination detection and, therefore, the lack of detection through human sensing does not preclude the possibility of the presence of contamination of the site.

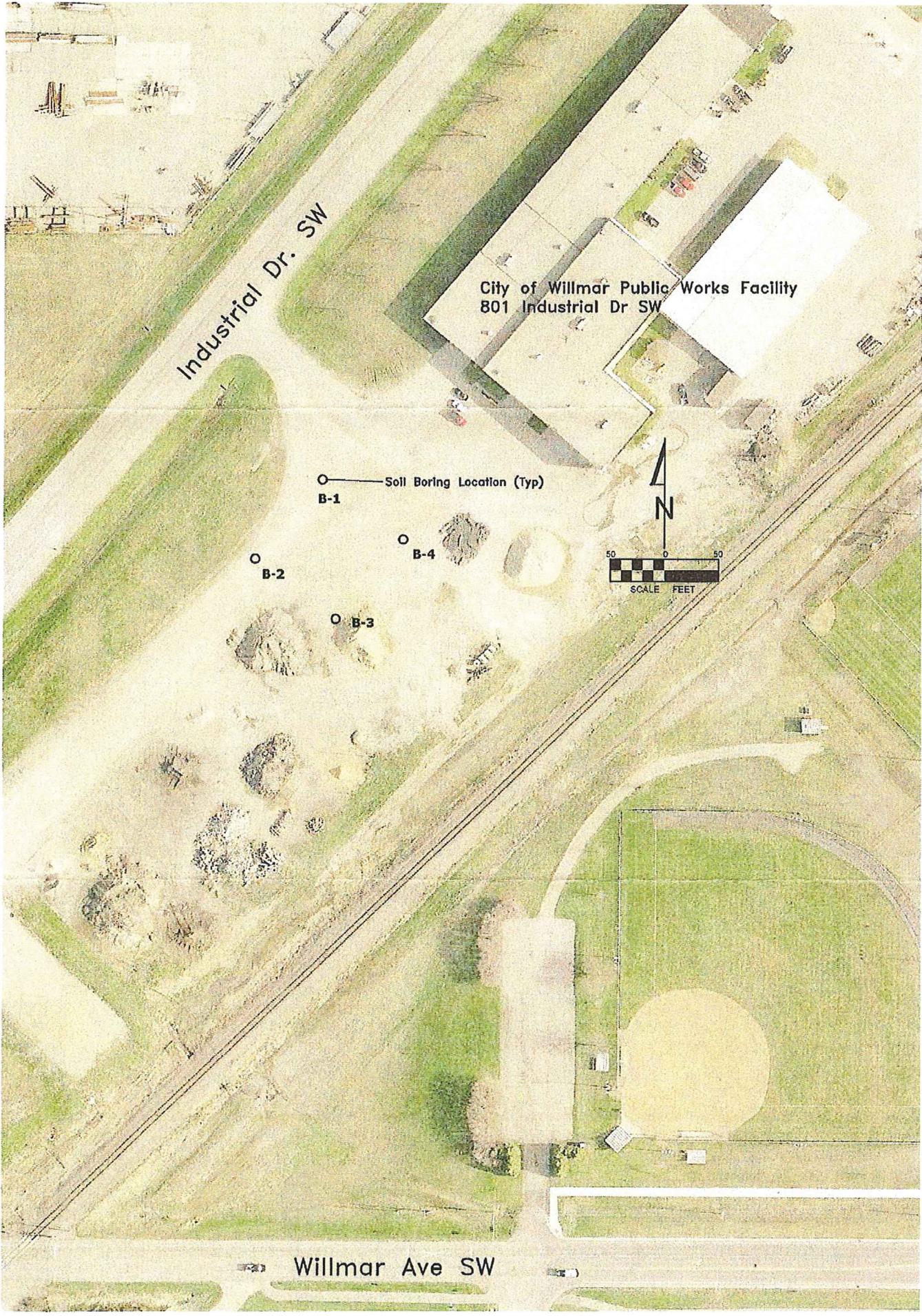
This report represents the result of our subsurface investigation and is based on information gathered at specific locations. Subsurface conditions can change a great deal over short horizontal distances. Also, the actual interface between strata will likely be a gradual transition rather than an abrupt change as represented on the boring logs.

Geotechnical engineering is based extensively on opinion. Therefore, the data contained in this report should be used as a guide, and we recommend that construction monitoring be performed by a qualified geotechnical engineer or technician. Any changes in the subsurface conditions from those found during this geotechnical investigation should be brought to the attention of a soils engineer.

c:b13181-rpt

APPENDIX 1

BORING LOCATION PLAN



Industrial Dr. SW

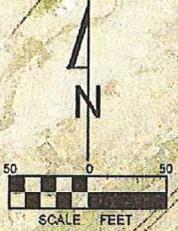
City of Willmar Public Works Facility  
801 Industrial Dr SW

○ — Soil Boring Location (Typ)  
B-1

B-2

B-4

B-3



Willmar Ave SW

APPENDIX 2  
SOIL BORING LOGS

**PROJECT: 13-166 CITY OF WILLMAR  
SALT STORAGE SHED  
WILLMAR, MINNESOTA**

**DATE: 6/20/13 BORING #: B-1  
START TIME: 8:30 END TIME: 9:01**

**METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / LM  
ELEVATION: 96.9**

**LOCATION: North Boring- See Location Plan**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	W <sub>n</sub>	Notes
7"		7 inches Aggregate Surfacing					
	CL	SANDY LEAN CLAY, w/ fine grained SAND, brown. FILL					
2.5			1	10		17.0	
	CL	SANDY LEAN CLAY, w/ fine grained SAND, black. remnant topsoil					Organic= 2.4%
4.5			2	7		11.9	
5.0	SC	CLAYEY SAND, fine grained, grey, mottled.					
6.0			3	7	V	17.9	
	CL	SANDY LEAN CLAY, with fine grained SAND, brown, mottled.					Water measured at 6.0 feet after completion.
10.0			4	9		17.4	
		dark grey at 12.5 feet.					
15.0			5	8		17.2	
20.0			6	6		18.0	
		Boring Complete to 20.0 feet. Water was encountered at 7.5 feet during drilling. Water measured at 6.0 feet after drilling.					

**PROJECT: 13-166 CITY OF WILLMAR  
SALT STORAGE SHED  
WILLMAR, MINNESOTA**

**DATE: 6/20/13 BORING #: B-2  
START TIME: 9:04 END TIME: 9:38**

**METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / LM  
ELEVATION: 97.1**

**LOCATION: West Boring- See Location Plan**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table W <sub>n</sub>	Notes
6"		6 inches Aggregate Surfacing				
12"		6 inches TOPSOIL				
	SC-SM	SILTY CLAYEY SAND, fine grained, grey.  FILL	1	6	12.3	
4.0	CL	SANDY LEAN CLAY, w/ fine grained SAND, black.	2	15	16.2	Organic= 2.0%
5.0	SC	CLAYEY SAND, fine grained, grey, mottled.	3	9	17.0	
6.5	CL	SANDY LEAN CLAY, with fine grained SAND, grey, mottled.  brown, mottled at 8.0 feet.	4	9	18.4	
10.0		dark grey at 12.0 feet.	5	13	16.3	
15.0			6	10	17.1	
20.0		Boring Complete to 20.0 feet. Water was not encountered during drilling. Water was not present to cave-in at 15.0 feet after drilling.				

PROJECT: **13-166 CITY OF WILLMAR  
SALT STORAGE SHED  
WILLMAR, MINNESOTA**

DATE: **6/20/13** BORING #: **B-3**  
START TIME: **9:41** END TIME: **10:09**

METHOD: **3 1/4" I.D. Hollow Stem Auger**  
CREW: **RB / LM**  
ELEVATION: **96.1**

LOCATION: **South Boring- See Location Plan**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	W <sub>n</sub>	Notes
6"		<b>6 inches Aggregate Surfacing</b>					
	SC	CLAYEY SAND, fine grained, grey, black.  FILL	1	8		21.2	
			2	5		18.7	
5.0							
	CL	SANDY LEAN CLAY, with fine grained SAND, grey, mottled.  brown, mottled at 6.0 feet.	3	7		17.9	
			4	12		18.1	
10.0							
					V		Water encountered at 14.0 feet.
14.0	SC-SM	SILTY CLAYEY SAND, fine grained, brown, mottled.	5	19		18.0	
15.0							
16.0							
	CL	SANDY LEAN CLAY, with fine grained SAND, dark grey.					
			6	7		19.4	
20.0							
		Boring Complete to 20.0 feet. Water was encountered at 14.0 feet during drilling. Water was not present to cave-in at 14.0 feet after drilling.					

PROJECT: **13-166 CITY OF WILLMAR  
SALT STORAGE SHED  
WILLMAR, MINNESOTA**

DATE: **6/20/13** BORING #: **B-4**  
START TIME: **10:12** END TIME: **10:41**

METHOD: **3 1/4" I.D. Hollow Stem Auger**  
CREW: **RB / LM**  
ELEVATION: **96.5**

LOCATION: **East Boring- See Location Plan**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	W <sub>n</sub>	Notes
6"		6 inches Aggregate Surfacing					
	SC-SM	SILTY CLAYEY SAND, fine grained, brown, mottled.					
		FILL	1	12		33.6	Organic = 6.0%
2.5	CL	SANDY LEAN CLAY, black, slightly organic. TOPSOIL	2	6		12.2	
4.5	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown, mottled.					
5.0	CL	SANDY LEAN CLAY, with fine grained SAND, grey, mottled.	3	6		20.0	
6.0			4	7		18.0	
10.0			5	10		18.3	
15.0		dark grey at 16.0 feet.	6	6		16.5	
20.0		Boring Complete to 20.0 feet. Water was not encountered during drilling. Water was not present to cave-in at 15.5 feet after drilling.					