15 August 2014

MILITARY DEPARTMENT
STATE of NEBRASKA
LINCOLN, NEBRASKA

NEBRASKA ARMY NATIONAL GUARD
CATS-M AIRBORNE REFRESHER MOCKUP TRAINING

at

Mead Training Site
793 County Road J
Mead, NE 680741

PROJECT NO. 31090351

A D D E N D U M N O. 1

The original specifications and drawings on the STATE OF NEBRASKA REQUEST for PROPOSAL FORM for the project noted above are amended as noted in this Addendum No. 1.

Receipt of this Addendum shall be acknowledged by inserting its number and date in the space provided on the Bid Form.

ADDENDUM NO. 1

NOTE TO ALL PLANHOLDERS: Please insert this Addendum into your copy of the Contract Documents for the above named project.

The following changes to the Contract Documents are issued by the CFMO-CMB and shall have the same force and affect as though a part of the original issue.

THE RECEIPT DATE, TIME and LOCATION of the BID PROPOSAL submission HAVE NOT CHANGED.

ITEM NO.

ADD 1-1. Attached is the Pre-Bid Meeting "Sign In Sheet".

ADD 1-2. Attached is the Geotechnical Exploration Report prepared by Thiele Geotech Inc.

ADD 1-3. Provide a $6,000 allowance for Material Testing and Inspection.

ADD 1-4. 133419, Metal Building Systems: Paragraph 2.3, E. Hot-Dip Galvanized Finish: Apply zinc coating by hot-dip process to structural steel according to ASTM 123/A 123M.

ADD 1-5. Sheet C2, Bollard Detail:
Provide a flat steel cap in lieu of rounded concrete top. Concrete fill shall remain.

ADD 1-6. Building Bracing:
Provide Portal Frames or Wind Columns, Contractors choice, shall maintain 18'-0" clear below structure. Contractor shall include any and all changes in foundation design.

ADD 1-7. Building, Loads:
500# load for each brace at the mockups.

ADD 1-8. Building, Post welding in the field on the galvanized surfaces:
Cold galvanizing (galvanizing touchup paint) is acceptable.

ADD 1-9. Building, roof live load:
Roof live load is 20 PSF, non-reducible. Ground snow load is 30 PSF, non-reducible.

ADD 1-10. Building, Occupancy:
Open pavilion with no occupancy classifications.

ADD 1-11. Building, clear heights:
18'-0", refer to attached sketches, A101.1 and A201.1.

ADD 1-12. Building, roof slope:
12:1, refer to attached sketches, A101.1 and A201.1.

ADD 1-13. Building, Roofing
NUCOR standing seam roof is acceptable.

ADD 1-14. Sheet ES101, General Electrical Note:
F. Painting of conduit is not required. Surrounding structure is galvanized so the finish will match.

ADD 1-15. Sheet ES101, General Electrical Note:
H. The integrity of finishes shall be maintained for any elements that the electrical work attaches to or penetrates.

ADD 1-16. Yes, OPPD will allow the new transformer to be connected to the existing transformer.

ADD 1-17. OPPD requires a pull box for runs over 500'. Provide a pull box at the midpoint of the primary conduit run. The pull box shall have the minimum internal dimensions of 60"Lx36"Wx48"D and shall have an HS-20-44 traffic rating. See the attached pull box specifications from OPPD.

ADD 1-18. Provide an allowance of $9,000 for OPPD's facility charges. Contact Brendan Linse at OPPD's Louisville office for coordination.

THIS ADDENDUM SHALL BE ATTACHED TO AND MADE A PART OF THE DRAWINGS AND SPECIFICATIONS AND SHALL BE ACKNOWLEDGED WITH THE BIDDER'S PROPOSAL.

DARYL L. BOHAC
MAJOR GENERAL The Adjutant General

End of Addendum No. 1

Nebraska Military Department

Construction and Facilties Management Office
JFHQ Building, 2433 NW 24th Street, Lincoln, Nebraska 68524-1801
(402) 309-8450 (main) (402) 309-7480 (fax)

Pre-Bid Meeting - CATS M AIRBORNE REFRESHER MOCKUP FACILITY

August 5, 2014 @ 10:00 AM

Name	Agency/Company	Phone Number	E-mail Address
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Thiele Geotech Inc

Geotechnical Exploration Report

CATS-M Mockup Airborne Training Facility

793 County Road J
Mead, Nebraska

Prepared for:
Calvin L. Hinz Architects
3705 N. 200th Street
Elkhorn, NE 68022

PROFESSIONAL CIVIL ENGINEER
ROBERT K. LAPKE
E-10089
1-27-14
STATE OF NEBRASKA

January 27, 2014
TG Project No. 14004.00

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Geotechnical Exploration Report

CATS-M Mockup Airborne Training Facility

Table of Contents

INTRODUCTION

Thiele Geotech, Inc. has completed a geotechnical exploration study for the proposed CATS-M Mockup Airborne Training Facility to be located at 793 County Road J in Mead, Nebraska. The purpose of this study was to identify the general soil and ground water conditions underlying the site; to evaluate engineering properties of the existing soils; to provide earthwork and site preparation recommendations; and to recommend design criteria and parameters for foundations, pavements, and other earth supported improvements.

This study included soil borings, laboratory testing, and engineering analysis. A series of five test borings was spaced across the project site at strategic locations. The field and laboratory data are presented in the Appendix, along with a description of investigative methods.

The drilling and testing performed for this study were conducted solely for geotechnical analysis. No analytical testing or environmental assessment has been conducted. Any statements or observations in this report regarding odors, discoloration, or suspicious conditions are strictly for the information of our client. If an evaluation of environmental conditions is desired, a separate environmental assessment should be conducted. This study did not include biological assessment (e.g. mold, fungi, bacteria) or evaluation of measures for their control.

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

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

PROJECT DESCRIPTION

Our understanding of the project is based upon information provided by Calvin L Hinz Architects.

The project consists of improvements to the National Guard facility near Mead, Nebraska. The improvements will include a new parachute training tower, similar to the parachute training tower in Fort Benning, GA. Trainees will exit the tower from approximately 34 feet above final grade, with the tower continuing up to a height of approximately 55 feet to enable the attachment of cables. The cables will be stayed behind the tower to the east with a 300 feet landing zone for the trainees to the west of the tower. It will be a steel erected tower and we anticipate it will be lightly loaded and supported on shallow foundations.

North of the tower will be a new rock covered access road and north of the road will be a new lighted concrete pad for helicopter landings. Northeast of the tower will be a new rock covered parking area and mock training building. The building will be approximately 150 ft by 50 ft. The building will contain multiple simulators and have a staging area on the north end. The building will have 25 kip column loads and wall loads around 2 kips per lineal foot. The road and parking lot are expected to be raised above the surrounding existing grade. Grades are not anticipated to change by more than 3 feet.

SURFACE AND SUBSURFACE CONDITIONS

SITE CONDITIONS

The site is located east of County Road 8 between County Roads K and J on the National Guard training grounds. It is a grass covered field with some trees along the eastern edge near the road and western fence line. The only previous grading noted on the site is for the road on the east side. North of the project are other training facilities for the National Guard. The site is relatively flat with a gradual drop from the west down towards the east side of the property.

LOCAL GEOLOGY

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

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

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

SOIL CONDITIONS

The soils encountered in the test borings generally consisted of man placed fill, altered Peoria loess, Peoria loess, and Todd Valley alluvium.

Man placed fill was encountered in Boring B-4 between approximate depths of 0 to 3 feet. It was described as gray, moist, firm, lean clay. Based on an assumed Standard Proctor, the one fill sample obtained appears to be compacted to 85 percent.

Altered Peoria loess was encountered beneath the fill in Boring B-4 or from the surface in all other borings, between approximate depths 0 to 8 feet. It was described as brown, dark gray, moist to very moist, soft to very hard, fat clay.

Peoria loess was encountered beneath the altered Peoria loess between approximate depths of 2.5 to 18 feet. It was described as light brown, brown, slightly moist to moist, firm to very hard, lean clay or silt.

Todd Valley alluvium was encountered beneath the Peoria loess between approximate depths of 13 feet to the termination of the borings. It was described as light brown, dry to wet, medium dense to dense, poorly graded sand.

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

Table 1 - Laboratory Results

Soil Layer	Moisture Content (%)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (tsf)	Standard Penetration Values (N)*	Classification *(LL/PI)*
Man placed fill	22.6	88			CL (visual)
Altered Peoria loess	15.4 to 26.5	77 to 103	0.2 to 4.5		CH (54/29)
Peoria loess	11.4 to 21.2	82 to 111	1.3 to 8.8		CL, ML (visual)
Todd Valley alluvium	1.0 to 18.0			20-34	SP (visual)
* Standard Penetration Values are actual field recorded values and have not been corrected for hammer energy					

GROUND WATER OBSERVATIONS

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

Table 2 - Water Level Observations

Boring Number	Boring Elevation	Water Level (ft. below grade)		Groundwater Elevation
		During Drilling	After Drilling	
B-3	1179	40.0	N/E*	1139

*****None Encountered

ANALYSIS AND RECOMMENDATIONS

GENERAL

The primary geotechnical engineering concerns for this project include the presence of low density fill in the area of Boring B-4, the presence of variable strength and density material within the altered Peoria loess and Peoria loess, and the presence of fat clay soils that may be near floor slabs. The Peoria loess at times exhibited very high unconfined compressive strengths, which are typically not indicative of this material. The soil was quite dry and appeared to be desiccated. With the recommended site preparation procedures, the site should be suitable for support of the building and tower on shallow foundations.

The altered Peoria loess encountered near the proposed tower exhibited very low densities and appeared dry. We recommend that the soils at the tower footings be overexcavated 3 feet below bottom of footing to allow for placement of 3 feet of controlled structural fill to be placed below the footings. The undercut should extend laterally one foot for every foot of depth below the footing. If footings are close together, this may required doing one large overexcavation to encompass all footings. The soil removed during the overexcavation can be moisture conditioned and reused as structural fill. Recommending supporting the tower on shallow foundations is based on the assumption that the tower loads are relatively light. We assume that the individual column reactions for the tower will be less than 25 kips each. We should be given the opportunity to review our recommendations once loads are available to make sure shallow foundation support is still feasible.

Poor density fill was encountered in Boring B-4 near the southwest corner of the mock training building. We are recommending this structure be supported on shallow foundations. It is possible that some footings for the building will need to be deepened through low density material if encountered.

Fat clay in the form of altered Peoria loess was encountered at this site and this material can exhibit high shrink/swell potential. We recommend this material be undercut to a level that will allow placement of a minimum of 18 inches of low volume change material consisting of lean clay. The base of the undercut should be moisture conditioned prior to placing the low volume change fill. Care should be exercised while completing interior utility excavations to sort the lean clay from the fat clay soils that are removed while excavating. These materials should placed back in the excavations as backfill in the same order they were removed. The new fill should be placed in accordance with recommendations presented in the Earthwork and Excavations Section of this report.

We further recommend that the fat clay soils exposed at subgrade level for pavements and exterior slabs be maintained in a moist condition until pavements are constructed. Maintaining these soils in a moist condition reduces the potential for heave. It should be noted that there is still some risk that the fat clay soils below subgrade level could swell after the pavements and slabs are placed.

EARTHWORK AND EXCAVATIONS

Rubble and waste materials from site clearing and demolition should be removed from the site and lawfully disposed or recycled. Waste materials should not be buried on-site. Where trees are cleared, the stumps should be excavated and removed.

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

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

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

The excavated site soils will generally be suitable for reuse as structural fill, although some moisture conditioning may be required. Fat clays should not be used within 18 inches of floor slabs. Any off-site borrow should be a clean, inorganic silt or lean clay with a liquid limit less than 45 and a plasticity index less than 20. Borrow material should not contain an appreciable amount of roots, rock, or debris, and should not contain any foreign material with a dimension greater than 3 inches.

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

Backfill soils in utility trenches should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum. Lift thicknesses should be appropriately matched to the type of compaction equipment used. Backfill soils around foundations, basement walls, and retaining walls should be compacted to a minimum of 95 percent of the maximum dry density at a moisture content between -3 and +4 percent of optimum. Granular backfill should not be used in exterior trenches or around foundation elements.

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

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

SHALLOW FOUNDATIONS

With the recommended site preparation procedures, the site conditions identified are favorable for the use of conventional spread foundations to support structural loads. Based on our bearing capacity and settlement analysis, the net allowable bearing pressures in Table were determined. These bearing pressures were calculated based on a safety factor of 3 against bearing failure. Foundation settlements are estimated at less than 1 inch total and ½ inch differential over a span of 20 feet. If maximum design loads significantly exceed 25 kips for columns or 2 kips per foot for walls, these bearing pressures may not be applicable and should be reevaluated.

Table 3 - Net Allowable Bearing Pressures

Condition	Allowable Bearing Pressure
Tower Footings with Overexcavation	2,500 psf
Mock Training Building (no overexcavation)	1,500 psf

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

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

Uplift loads for the cable anchor blocks can be resisted by the effective dead weight of the foundation plus the weight of any soil above the foundation. For design purposes, the soil above the foundation should be assumed to have a unit weight of 110 pounds per cubic foot. Lateral loads acting on the foundation may be resisted by a passive resistance of the existing soil and adhesion resistance acting at the base of the foundation. The lateral load capacity of the foundation can be determined using an equivalent fluid unit weight of 250 pcf for the lateral earth passive pressure acting on the edge of the footing. In addition, an allowable base adhesion of 500 psf could be assigned to the base of the foundation. The recommended passive pressure is applicable for earth formed foundations and should be neglected in the upper 3.5 feet, which is the zone subject to frost action.

SEISMIC SITE CLASS

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

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

FLOOR SLABS

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

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

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

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

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

PAVEMENTS

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

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

Based on the forgoing subgrade preparation procedures, recommended minimum pavement thicknesses are provided in Table . These assume light vehicle traffic only with no trucks. These minimum thicknesses are prescriptive values based on traffic classification, and not on a detailed analysis using traffic counts. It should be noted that life cycle costs for concrete pavements are generally lower, despite their higher initial cost. Local experience has shown that well constructed concrete pavements typically perform better, have lower maintenance costs, and have longer service lives than comparable asphalt pavements. Note that we do not recommend using an aggregate base as part of the pavement section due to concerns over drainage and freeze/thaw deterioration of the base material.

Table 4 - Minimum Pavement Thicknesses

	Pavement Type/Thickness (inches)
Pavement Category	**Concrete**
Exterior Staging Slab	5
Subgrade Support Values: CBR = 3, k=120 pci	

Contraction joints are important to control the location of cracks in concrete pavement that result from stresses caused by normal drying shrinkage and thermal effects. A proper jointing system will enhance structural capacity and prolong the life span of a concrete pavement as well as improve ride quality. Contraction joints should be cut to a minimum of ¼ of the slab thickness (1/5 of the thickness for early entry saw method). Joints should be cut as soon as practical after the concrete has set sufficiently to support foot traffic, and must be cut before any shrinkage cracks form. Joints should be spaced no more than 24 times the thickness of the slab or 12½ feet maximum. Panels should be kept as square as possible, with the length to width ratio limited to 125 percent. Dowel bars should be used for load transfer across construction joints, and should be considered for contraction joints subjected to heavy truck traffic. Joints should be carefully planned and laid out to meet inlets, drainage structures, reentrant corners, and radiuses. Joints should be perpendicular to edges and radiuses, and should not form angles less than 45 degrees or over 225 degrees. Isolation joints should be provided around any structures.

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

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

SURFACE DRAINAGE AND LANDSCAPING

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

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

The final grade of the foundation backfill and any overlying pavements should have a positive slope away from foundation walls on all sides. For grass or landscape covered areas, a minimum slope of 1 inch per foot for 5 to 10 feet away from the building is recommended. A minimum slope of 2 percent is recommended for grassed or landscaped areas of the site away from the building. For paved areas, minimum slopes of 1 percent for concrete pavements and 1½ percent for asphalt pavements are recommended. Pavements and exterior slabs that abut the structure should be carefully sealed against moisture intrusion at the joint.

OTHER RECOMMENDATIONS

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

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

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

Respectfully submitted,
Thiele Geotech, Inc.

Prepared by,

Michael True, E.I.

Prepared under the supervision of,

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

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APPENDIX

SUBSURFACE EXPLORATION METHODS

The fieldwork for this study was conducted on January 13, 2014. The exploratory program consisted of 5 test borings drilled at the approximate locations shown on the Boring Location Plan. Boring locations were selected to provide the desired site coverage and were adjusted to accommodate access conditions. Elevations were interpolated from contours on the topographic survey. The boring and elevation locations should only be considered accurate to the degree implied by the methods used to define them.

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

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

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

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

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

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

LEGEND OF TERMS

Soil Description Terms

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

Sample Identification

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

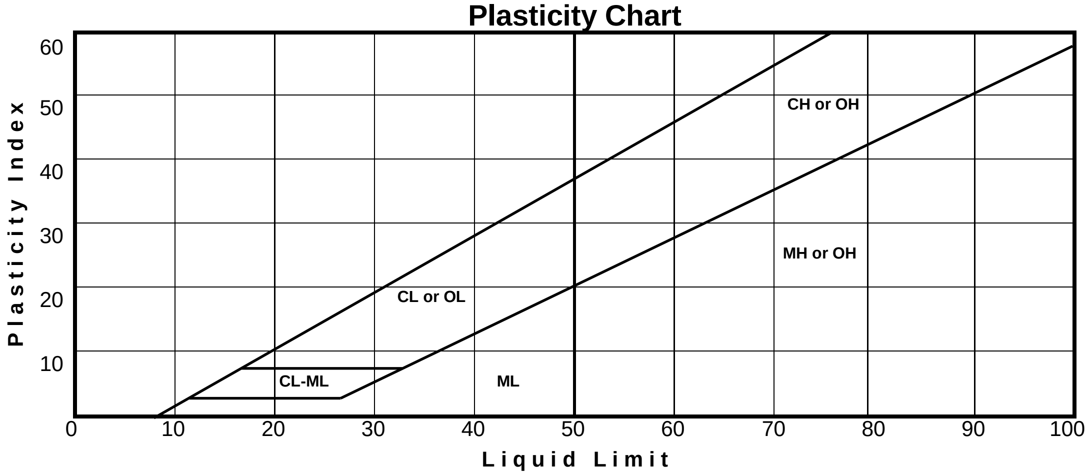
Unified Soil Classification System

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

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

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

Plasticity Chart



Criteria for Sands and Gravels

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

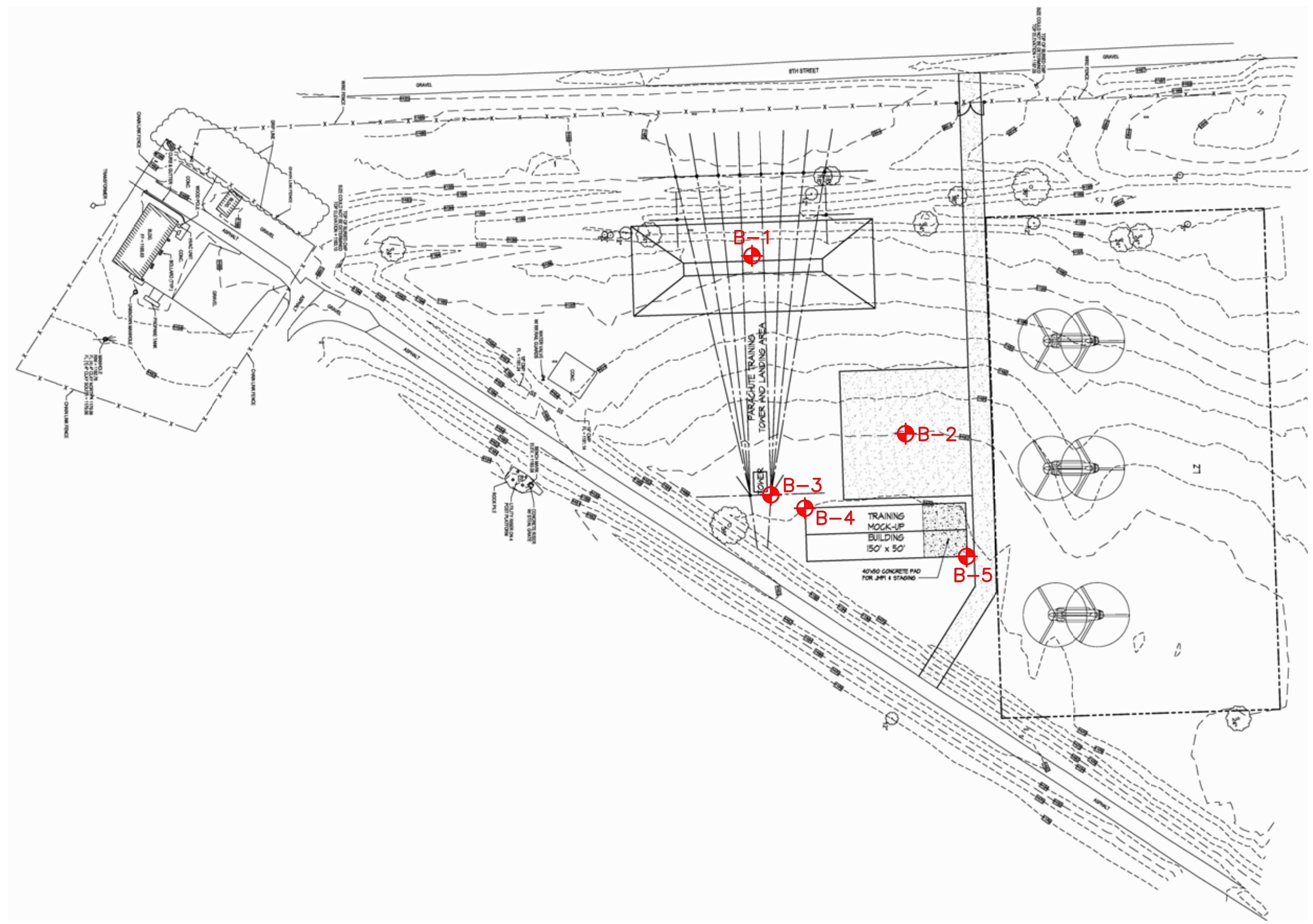
Well-graded sands (SW) $C_u = D_{60}/D_{10} \geq 6$ and $C_c = (D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

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

N

0 100 200

SCALE: 1"=200'



LEGEND:

⊕ BORING LOCATION

Thiele Geotech Inc

PROJECT

CATS-M MOCKUP AIRBORNE
793 COUNTY ROAD J
MEAD, NEBRASKA

JOB # 14004.00 DATE: 1/16/14

TRAINING FACILITY

BORING LOCATION PLAN

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	CAT-S Airborne Training Facility	Epley	Gorham	14004.00	1/13/14
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		793 County RD J, Mead, NE	6” flight augers		CME 45B	B-1
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	grass		1185	25’

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	brown	very moist	soft	fat clay	altered Peoria loess	roots	U-1		12	26.5	89.9	0.34		
5	light brown	slightly moist	firm	silt	Peoria loess		U-2		12	14.1	86.6			5
10							U-3		12	11.4	81.6			10
15	light brown	dry	medium dense	poorly graded sand	Todd Valley alluvium	fine sand	U-4		12	1.0				15
20							S-5	20		1.8				20
25						bottom of hole @ 25’	S-6	23		1.9				25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	CAT-S Airborne Training Facility	Epley	Gorham	14004.00	1/13/14
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		793 County RD J, Mead, NE	6" flight augers		CME 45B	B-2
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	grass		1180	10'

DEP (ft.)	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	dark gray	moist	soft	fat clay	altered Peoria loess	roots								
							U-1		12	23.6	86.0	0.31		
							U-2		10	15.4	76.5	0.18		
5														5
	light brown	moist	hard	silt	Peoria loess									
							U-3		12	16.1	87.5	1.82		
10														10
						bottom of hole @ 10'								
15														15
20														20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	40.0'	CAT-S Airborne Training Facility	Epley	Gorham	14004.00	1/13/14
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
Cave In	39.4'	793 County RD J, Mead, NE	3.25" HSA		CME 45B	B-3
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	grass		1179	45'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	dark gray	moist	firm	fat clay	altered Peoria loess	roots								
							U-1		12	18.7	77.6	1.14		
							U-2		8	16.7	78.8			
5														5
	light brown	slightly moist	very hard	silt	Peoria loess									
							U-3		8	13.8	93.9	4.18		
10														10
							U-4		12	14.7	97.6	4.10		
15														15
	light brown	slightly moist	medium dense	poorly graded sand	Todd Valley alluvium	fine sand								
							U-5		12	3.7				
20														20
							S-6	27		2.9				
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	40.0'	CAT-S Airborne Training Facility	Epley	Gorham	14004.00	1/13/14
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
Cave In	39.4'	793 County RD J, Mead, NE	3.25" HSA		CME 45B	B-3(cont.)
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	grass		1179	45'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION: COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	SAMPLE DATA: NO. & TYPE	SPT (bpf)	REC (in.)	LABORATORY DATA: MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	DEP (ft.)
	light brown	slightly moist	medium dense	poorly graded sand	Todd Valley alluvium	fine sand								
			dense											
30							S-7	34		2.7				30
			medium dense											
35							S-8	27		3.1				35
		very moist												
40							S-9	24		18.0				40
		wet												
			dense											
45							S-10	32		17.6				45
						bottom of hole @ 45'								
50														50

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	CAT-S Airborne Training Facility	Epley	Gorham	14004.00	1/13/14
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		793 County RD J, Mead, NE	6" flight augers		CME 45B	B-4
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	grass		1179	15'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
	gray	moist	firm	lean clay	fill		U-1		10	22.6	88.1			
5	dark gray	moist	very hard	fat clay	altered Peoria loess		U-2		12	18.5	102.9	4.50		5
10	brown	moist	very hard	silt	Peoria loess		U-3		12	17.6	111.0	8.78		10
15			firm				U-4		12	18.2	84.8	1.27		15
20						bottom of hole @ 15'								20
25														25

Thiele Geotech Inc

BORING LOG

WATER LEVEL OBSERVATIONS		PROJECT	DRILLER	LOGGER	JOB NO.	DATE
During Drilling	N/E	CAT-S Airborne Training Facility	Epley	Gorham	14004.00	1/13/14
End of Drilling	N/E	**LOCATION**	**DRILLING METHOD**		**DRILL RIG**	**BORING NO.**
(none encountered)		793 County RD J, Mead, NE	6" flight augers		CME 45B	B-5
		LOCATION OF BORING	**TYPE OF SURFACE**		**ELEVATION**	**DEPTH**
boring backfilled with cuttings		see Boring Location Plan	grass		1179	20'

DEP (ft.)	VISUAL/MANUAL DESCRIPTION						SAMPLE DATA			LABORATORY DATA				DEP (ft.)
	COLOR	MOIST.	CONSIST.	SOIL TYPE	GEOLOGIC ORIGIN	REMARKS	NO. & TYPE	SPT (bpf)	REC (in.)	MC (%)	γ_d (pcf)	q_u (tsf)	LL/PI CLASS	
0–3.5	dark gray	moist	firm	fat clay	altered Peoria loess	roots	U-1		10	19.6	97.8	1.48	LL=54 PI=29 CH	
3.5–7	brown	moist	firm	lean clay	Peoria loess		U-2		12	17.6	97.8			5
7–9	light brown		hard	silt										
9–12							U-3		12	16.8	84.9	2.37		10
12–18				lean clay			U-4		12	21.2	98.3	2.07		15
18–20	light brown	moist	medium dense	poorly graded sand	Todd Valley alluvium	fine sand	S-5	25		7.2				20
20						bottom of hole @ 20'								25

Thiele Geotech Inc

SOIL TEST SUMMARY

Project: CAT-S Airborne Training Facility

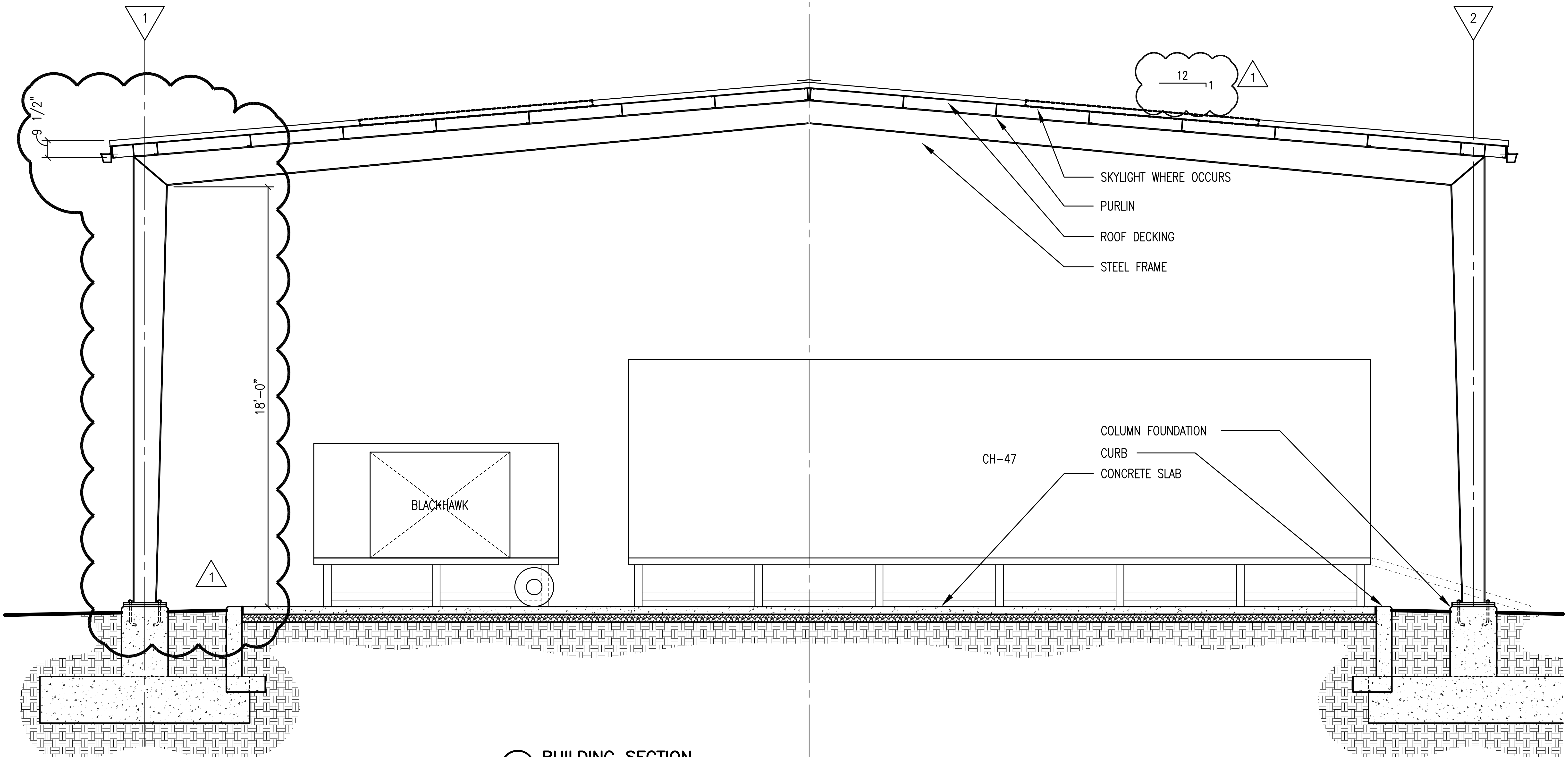
Job No.: 14004.00

Location: 793 County RD J, Mead, NE, Mead, NE

Date: 1/20/2014

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	SAMPLE DIA. (in.)	MOISTURE CONTENT (%)	UNIT WEIGHT WET (pcf)	UNIT WEIGHT DRY (pcf)	VOID RATIO (e)	SAT. (%)	UNCONFINED COMPRESSION q_u (tsf)	UNCONFINED COMPRESSION STRAIN (%)	SOIL CLASSIFICATION ATTERBERG LIMITS LL	SOIL CLASSIFICATION ATTERBERG LIMITS PL	SOIL CLASSIFICATION ATTERBERG LIMITS PI	SOIL CLASSIFICATION PASS #200 (%)	SOIL CLASSIFICATION	REMARKS
B-1	U-1	0.5-2	2.85	26.5	112.4	88.9	0.895	80	0.34	2.5						
	U-2	3.5-5		14.1	98.8	86.6	0.946	40								
	U-3	8.5-10		11.4	90.9	81.6	1.065	29								
	U-4	13.5-15		1.0												
	S-5	18.5-20		1.8												
	S-6	23.5-25		1.9												
B-2	U-1	0.5-2	2.85	23.6	106.2	86.0	0.960	66	0.31	5.7						
	U-2	3.5-5	2.85	15.4	88.3	76.5	1.202	35	0.18	5.7						
	U-3	8.5-10	2.80	16.1	101.6	87.5	0.926	47	1.82	2.5						
B-3	U-1	0.5-2	2.85	18.7	92.1	77.6	1.170	43	1.14	3.4						
	U-2	3.5-5		16.7	92.0	78.8	1.137	40								
	U-3	8.5-10	2.85	13.8	106.9	93.9	0.794	47	4.18	3.0						
	U-4	13.5-15	2.85	14.7	111.9	97.6	0.727	55	4.10	5.0						
	U-5	18.5-20		3.7												
	S-6	23.5-25		2.9												
	S-7	28.5-30		2.7												
	S-8	33.5-35		3.1												
	S-9	38.5-40		18.0												
	S-10	43.5-45		17.6												
B-4	U-1	0.5-2		22.6	108.0	88.1	0.912	67								
	U-2	3.5-5	2.85	18.5	121.9	102.9	0.638	78	4.50	1.8						
	U-3	8.5-10	2.85	17.6	130.5	111.0	0.518	92	8.78	4.6						
	U-4	13.5-15	2.85	18.2	100.3	84.8	0.986	50	1.27	4.9						
B-5	U-1	0.5-2	2.85	19.6	116.9	97.8	0.723	73	1.48	6.8	54	25	29		CH	
	U-2	3.5-5		17.6	115.0	97.8	0.723	66								
	U-3	8.5-10	2.85	16.8	99.2	84.9	0.985	46	2.37	2.0						
	U-4	13.5-15	2.85	21.2	119.1	98.3	0.714	80	2.07	3.9						
	S-5	18.5-20		7.2												

PROFESSIONAL CIVIL ENGINEER
ROBERT K.
LAPKE
E-10089
1-27-14
STATE OF NEBRASKA

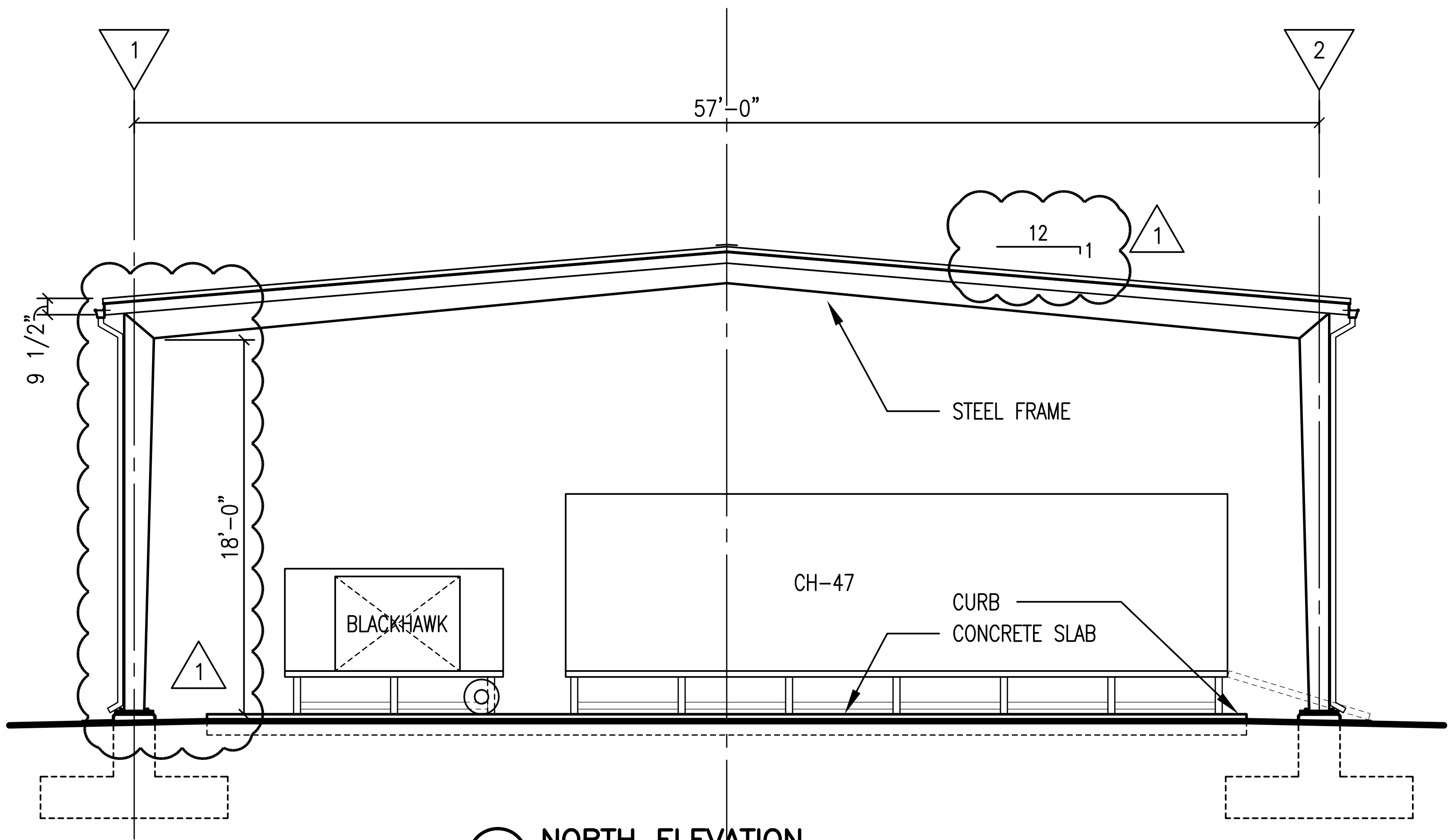


3D BUILDING SECTION
SCALE: 1/4" = 1'-0"

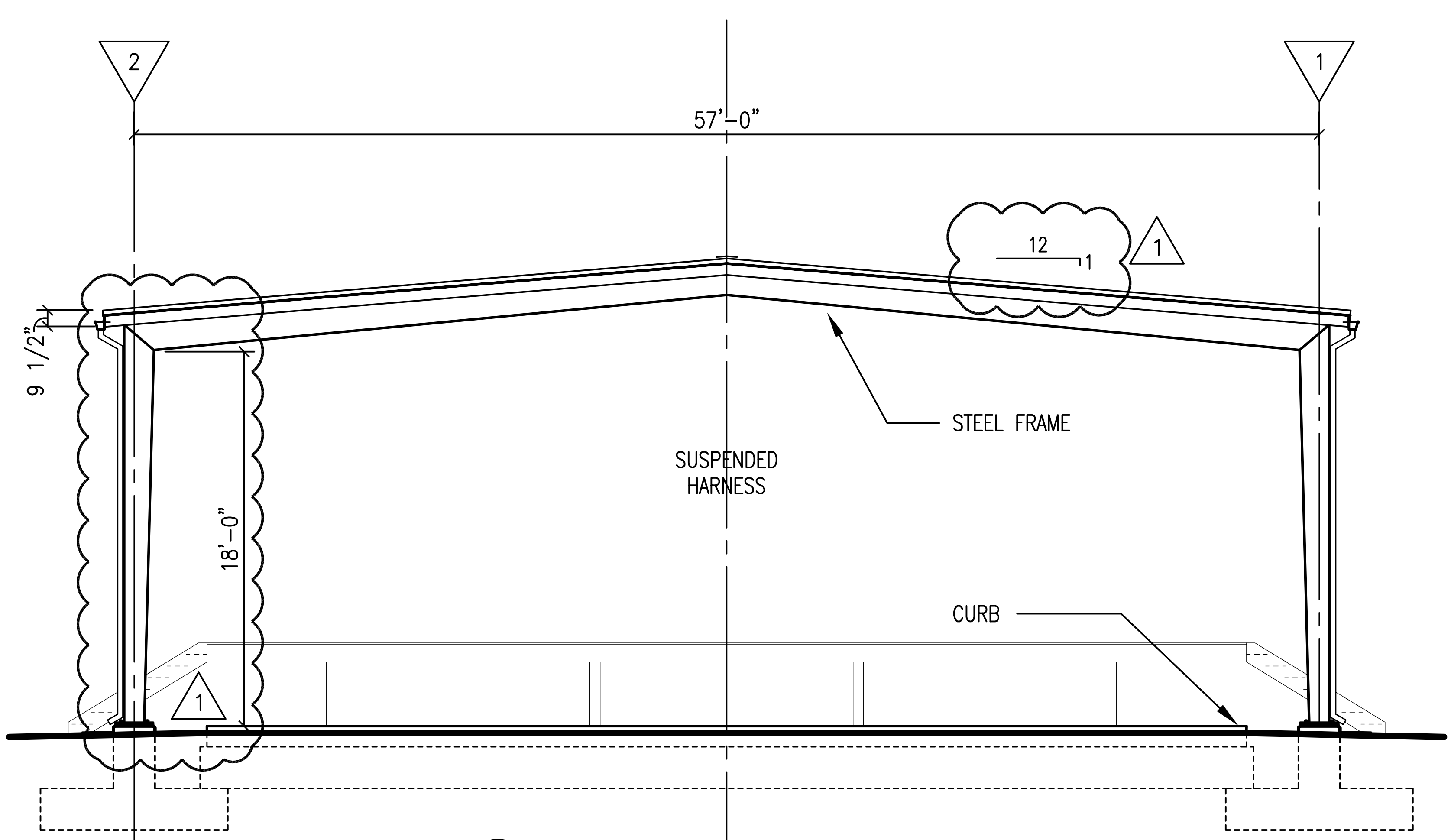
Project Title: Nebraska National Guard – 31090351 CATS-M Airborne Refresher Mockup Training Facility	Project Number: 2013-24	Reference Sheet: A101
Sheet Title: Floor Plan & Sections	Project Manager: B. Ryckman	Reference Document: Addendum 1
	Date: 14AUG14	Sketch Number: A101.1

CLH Calvin L. Hinz ARCHITECTS, P.C.

ADD 1-11 & ADD 1-12



2B NORTH ELEVATION
SCALE: 1/8" = 1'-0"



2A SOUTH ELEVATION
SCALE: 1/8" = 1'-0"

CLH
Calvin L. Hinz
ARCHITECTS, P.C.

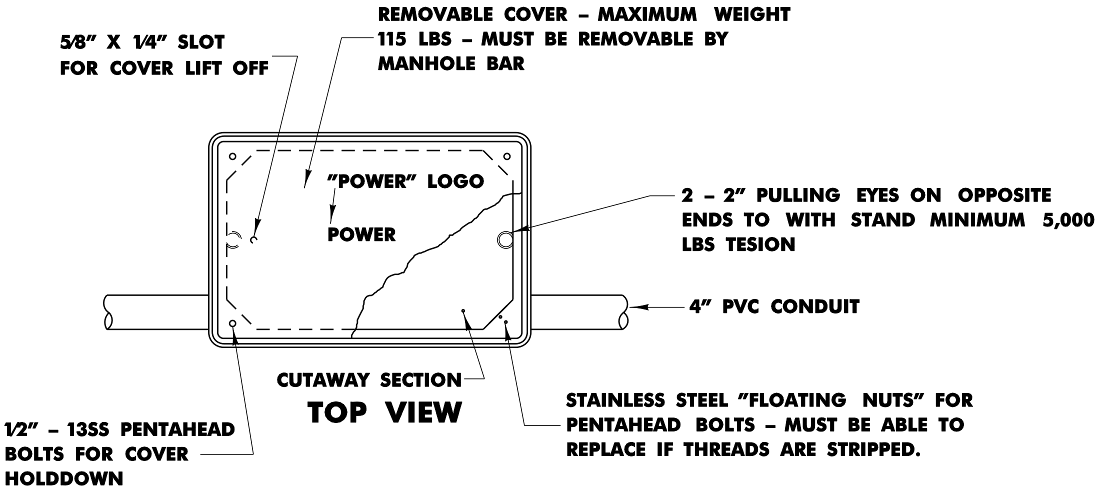
Project Title: Nebraska National Guard – 31090351 CATS-M Airborne Refresher Mockup Training Facility		Project Number: 2013-24	Reference Sheet: A201
Sheet Title: Floor Plan & Sections		Project Manager: B. Ryckman	Reference Document: Addendum 1
		Date: 14AUG14	Sketch Number: A201.1

ADD 1-11 & ADD 1-12

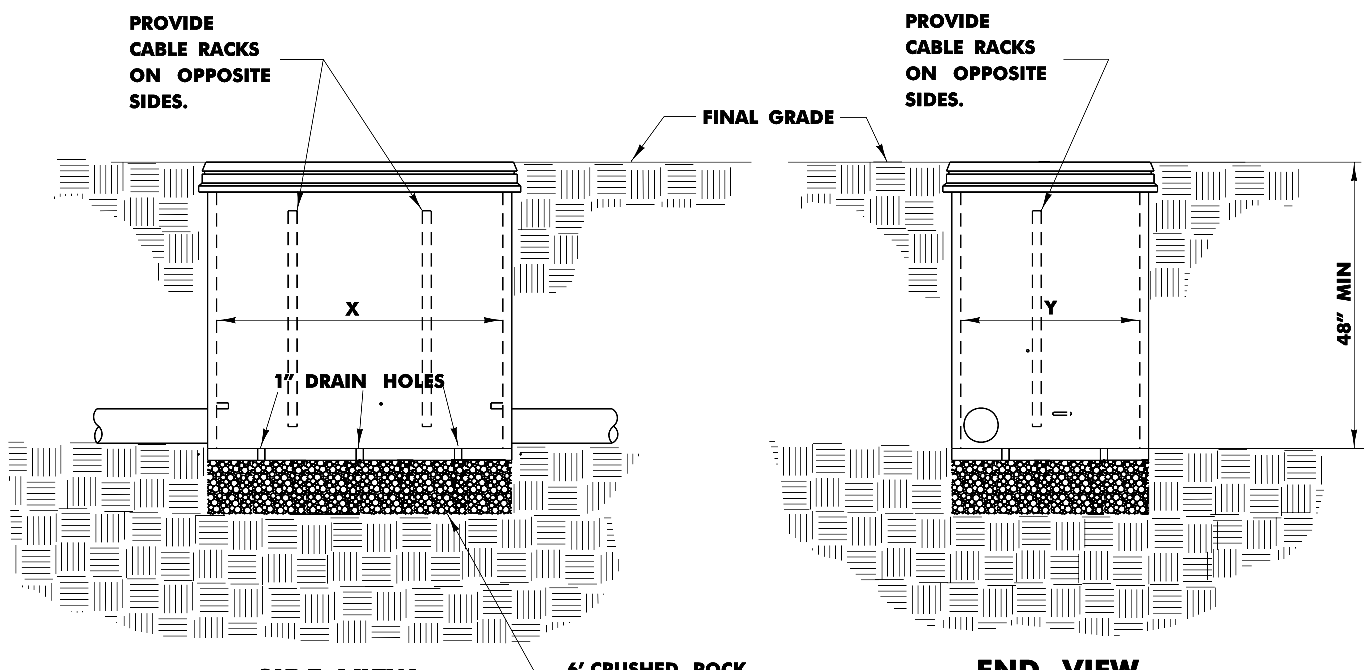
CUSTOMER INSTALLED PULLBOX

MAXIMUM 1/0 CABLE
DO NOT INSTALL IN DRIVING SURFACE

SINGLE PHASE: 8.08.7A
THREE PHASE: 8.08.7B



TOP VIEW



SIDE VIEW **END VIEW**

DIMENSIONS			CONDUIT	EXCAVATION	MAX CABLE	MAX NO OF
STD		Y	KNOCKOUTS	REQ'D (LABOR)	SIZE	SPLICES
8.08.7A	60"	36"	4 3/4"	7 CU YDS	1/0	2
8.08.7B	78"	48"	4 3/4"	9.8 CU YDS	1/0	6

NOTE:

1 DESIGN LOAD - HS-20-44 (FULL TRAFFIC LOADING).
2 CDR (DIVISION OF HOMAC MFG CO).
3 PLACEMENT PER MANUFACTURER'S RECOMMENDATION.
4 PULLBOX IS FOR OPPD'S EXCLUSIVE USE. JOINT USE WITH CUSTOMER EQUIPMENT OF ANY NATURE SHALL NOT BE ALLOWED.

Revised 09-15-08 By SAH
DESIGN ENTRY BY: BRANT DANGEL

ISSUED DATE__________