ADDENDUM TO THE BID DOCUMENTS	Page: 1	Total Pages: 33
Addendum No: **# 2**	Date this Addendum Issued: **September 13, 2022**	
Issuing Office: Matanuska-Susitna Borough School District (MSBSD) Purchasing Department 690 Cope Industrial Way Palmer, Alaska 99645 Phone: (907) 861-5120 Facsimile: (907) 861-5184	Previous Addenda Issued: One 1 September 2, 2022	
Return Acknowledgment To: **Issuing Department** Bid Title: **New Building at Academy Charter School** Bid No: **B23-01**	Date and Hour of Bid Due Date: ~~**September 9, 2022 at 2:00 P.M.**~~ **September 19, 2022 at 2:00 P.M.** As Advertised (Frontiersman): **August 19 and 21, 2022** As Advertised (ADN): **August 18 and 21, 2022**	

The following corrections, changes, additions, deletions, revisions, and/or clarifications are hereby made a part of the contract documents. In case of conflicts between this addendum and previously issued documents, this addendum shall take precedence. The bidder must acknowledge receipt of this addendum in the space provided on Appendix #1. Failure to do so may subject the bidder to disqualification.

Attachments:
Clarifications (4 pages)

Appendix 9: Pre-Bid Sign-in Sheet (1 page)

Appendix 10: Updated Ground Contours (1 page)

Appendix 11: Updated Pavement Section (1 page)

Appendix 12: GeoTech Report (25 pages)

END OF ADDENDUM #2

APPROVED BY: Signature on File	DATE: September 13, 2022

ADDENDUM #2

Information in this addendum takes precedence over original information. All other provisions of the document remain unchanged.

Note to Bidders: Bidders are required to acknowledge all addenda on Appendix 1.

The following additions, corrections and changes are hereby made to the above-referenced Invitation to Bid.

QUESTIONS AND ANSWERS:

GENERAL QUESTIONS:

1. Q: I did not see any requirements for a bid bond or performance & payment bond with this solicitation. Can you confirm if either a bid bond or the performance & payment bond will be required for this project?

   A: Please refer to AS 36.25.010 for bonding requirements on public construction projects. It is the contractor's responsibility to ensure compliance with all applicable laws and statutes.

2. Q: Attachment B only states "If required" and there are no bond forms provided. Will a bid bond be required?

   A: A bid bond is not required for this project. The MSBSD doesn't have standard bid bond or performance and payment bond forms.

3. Q: Also notice higher amounts than normal of insurance requirements. That will add significant cost.

   A: The successful contractor is required to meet the MSBSD insurance requirements per Appendix 3.

4. Q: The door and frame material are all over the board. See plan page A7.0 Division 8 Doors and Windows lists the following doors and frames in the specification, see below. Can the architect get more specific to what material is required for this project:
   Exterior Thermally Broken Frames, Exterior Flush Glazed Insulated Metal Doors, Exterior Flush Glazed Fiberglass Doors, Interior Timely KD frames, Interior Plastic Laminate Doors, & Interior Wood Veneer Doors.

   A: The exterior door frames and doors must be exterior thermally broken frames and exterior insulated metal doors. The interior doors must be solid core wood door with a wood veneer face.

5. Q: Room Finish Schedule calls for all rooms to have Polished Concrete. Drawing A1.1 calls for Workroom 101 to be Carpet with the remaining to get Level 2 Concrete Polish, please advise.

   A: Please disregard carpet reference. The floors must be polished concrete.

6. Q: Alternate #1: a) Is there a separation between the base bid and alternate buildings, joined together, seismic joint? b) Alternate #1 description on A1.2 does not line up with one shown on M2.0 and the Electrical Drawings do not give a description for the Alternate #1. Please advise. c) Will a separate Sewer and Water Service be required?

A: Seismic separation is not needed. A separate sewer and water service is not required.

7. Q: Please confirm the above referenced project bidding September 9, 2022, at 2:00 pm does not require a bid bond. Additionally, in reviewing the information it does appear a performance/payment bond will be required if awarded a contract, is that correct as well?

   A: A bid bond is not required for this project. Please refer to AS 36.25.010 for bonding requirements on public construction projects. It is the contractor's responsibility to ensure compliance with all applicable laws and statutes.

8. Q: I believe an optional prebid meeting was held on Aug. 25th. Would it be possible to get a list of firms who attended?

   A: Appendix 9: Pre-bid Sign-in Sheet is attached.

9. Q: For the roof panels called out in alternate 2 please consider a 22 gauge, onsite fabricated, concealed fastener metal roof panel system in lieu of the AEP PBR panel specified in basis of design. The PBR panels has exposed fasteners and are vulnerable to high wind and snow loads.

   A: A 22-gauge, onsite fabricated, concealed fastener metal roof panel system is an acceptable alternative.

10. Q: In Item #3 General Information section H notes a base bid budget of $600k, with the initial PEMB quotes we are seeing just that portion at $250k. With the sitework, foundation, utilities, electrical, and mechanical we believe this project will be well over $600k, is there budget contingency?

    A: Please submit your best and final price for this project.

11. Q: Please provide a site drawing with existing topography.

    A: Appendix 10, Updated Ground Contours is attached.

12. Q: Please provide specifications for Insulated Metal Roof Panels.

    A: For bidding purposes, please quote All Weather insulated panels SR2, 3.25", R26.

13. Q: What type of trims are required for the Insulated Metal Wall Panels, panel widths?

    A: Please provide a standard trim package and components for windows, doors, corners, top and bottom of panels, gable, and eave trim, etc. The width should be not less than 40".

14. Q: Where is the Alternate #3 concrete apron?

    A: The concrete apron is on Plan Sheet A1.1.

15. Q: Is the foundation damproofed?

    A: Yes, the foundation must be damp proof.

16. Q: Please further clarify Alternate 2b.

A: Please delete insulated wall panels and spray insulation. The other items in Alternate 2b must be provided.

17. Q: What is the intended diameter for the 3 ceiling fans?

A: The ceiling fans must have a 7 ft. diameter.

18. Q: Is there 3PH power available, or must all equipment be single phase?

A: 3 phase power is available.

19. Q: Will a Bid Bond be required for this bid?

A: A bid bond is not required for this project.

20. Q: What is the thickness of asphalt, note calls to match existing?

A: The existing asphalt is 2" thick and the new asphalt must match it.

21. Q: Is there a boring log available?

A: Yes, please review Appendix 11, Updated Pavement Section.

22. Q: Site completion and foundation calls for completion in 2022 with final completion 7/2023. Given that the PEMB has to design the concrete foundation to be submitted as a deferred submittal before the foundation can be finalized and rebar shops made, getting a foundation in this year would be during freezing temperatures.

A: The successful contractor should complete as much work as possible during Fall/Winter 2022. The MSBSD understands work will continue Spring 2023, but the building must be ready for occupation by July 1, 2023.

23. Q: Is there a geotech report available?

A: Yes, please review Appendix 12, Geotech Report.

24. Q: On plans sheet C6 Drawing #1 Shows 2" Asphalt and 3"Leveling course, 8" Type II-A , and 30"Type II Materials as NIC. Is this correct?

A: Please review Appendix 11, Updated Pavement Section for clarification.

25. Q: Per Additive Alternate #1 (Bid Item #2) can the siding be eliminated along the middle wall (Grid Lines A/C) to eliminate the siding being duplicated? Or will it be required to be included between both buildings?

A: Yes, the wall can be eliminated if Additive Alternate 1 is awarded.

26. Q: In General Information Item G indicated in the scope of services indicates the exterior site work and foundation including utilities are to be completed by October 30, 2022. Can this requirement be omitted? Depending on the award time and date and the engineering/coordination needed for the metal building components and locations it is not likely all site work and foundation items can be completed within this time frame. In addition, the utilities make take a substantial time to schedule and get completed and is not likely they will be completed this time.

A: The successful contractor should complete as much work as possible during Fall/Winter 2022. The MSBSD understands work will continue Spring 2023, but the building must be ready for occupation by July 1, 2023.

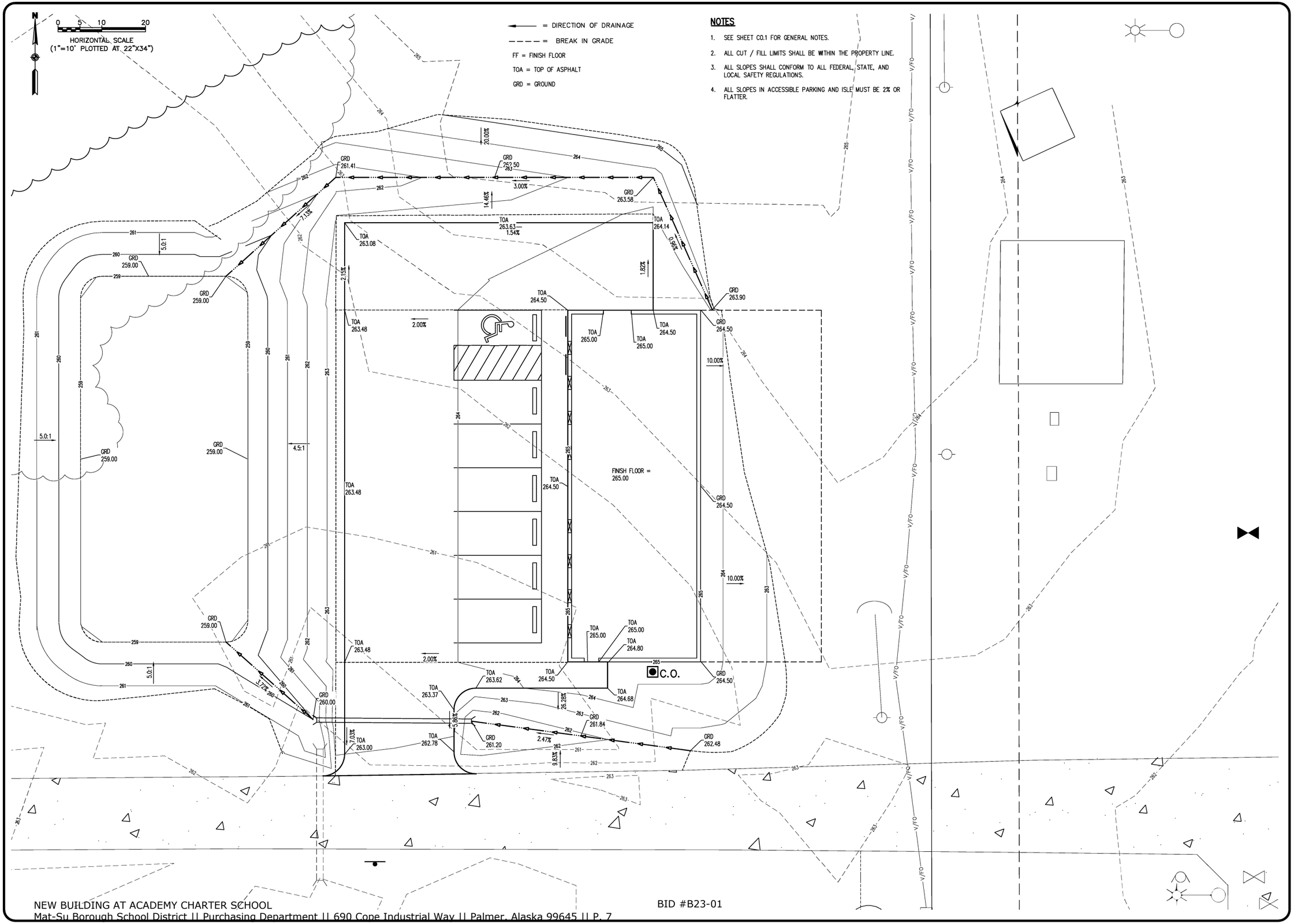
MATANUSKA-SUSITNA BOROUGH SCHOOL DISTRICT
PURCHASING DEPARTMENT
690 COPE INDUSTRIAL WAY
PALMER, AK 99645

BID NAME: NEW BUILDING AT ACADEMY CHARTER SCHOOL

BID NUMBER: B23-01

SIGN-IN ROSTER ~ PRE-BID CONFERENCE
AUGUST 25, 2022 AT 3:00 PM

PRINTED NAME	TITLE	COMPANY NAME	EMAIL	PHONE
KRISTIAN DEKRUIF	ENGR.	TBI CONSTRUCTION	KDEKRUIF@TBI-CONSTRUCTION.COM	907.841.3106
BRANDON OLMS		FICKLIN		907-315-9109
Steve Linden		Premier Elec		907.315-9445
Josh Waisanen		Collins construction		9073768299
KEVIN CHRISTIANSEN		Megawatt electric		907-841-6490
Vince Schuerch		ARCTIC TUNDRA Supply		907 341 7845
Vince Schuerch		JRASOLUTIONSLLC		907341 7845
Samantha Spree		Collins		907 203 3293
Erin Dickson		RHC		907-360-7036
Tony Reese		MSBSD		907-354-3393
Eli Wolk		MSBSD		907-861-5125
Steve Murray		MSBSD		907-864-2005



STATE OF ALASKA
49TH
DAN E. STEINER
No. CE 9505
9/1/22
REGISTERED PROFESSIONAL ENGINEER

SDCS, LLC
STEINER DESIGN & CONSTRUCTION SERVICES, LLC
5900 W. DEWBERRY DR. PH:(907) 357-5609
WASILLA,AK 99623 FAX:(907) 357-5608

MSB SCHOOL DISTRICT
ACADEMY CHARTER SCHOOL
PROPOSED STORAGE BUILDING
T18N, R2E, SEC. 33, LOT A15
E. ARCTIC AVE. PALMER, ALASKA

BY	DATE	REVISIONS
1	9/7/22	ORIGINAL GROUND CONTOURS ADDED

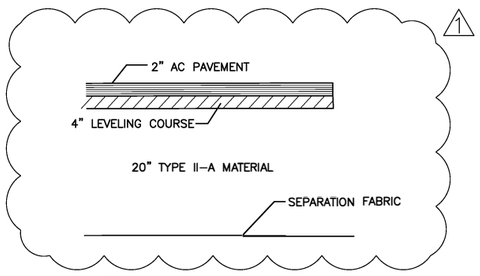
JOB NO.: 21-019
DATE: 9/7/2022
DRAWN: DES
REVIEWED: DES

SHEET TITLE
GRADING PLAN

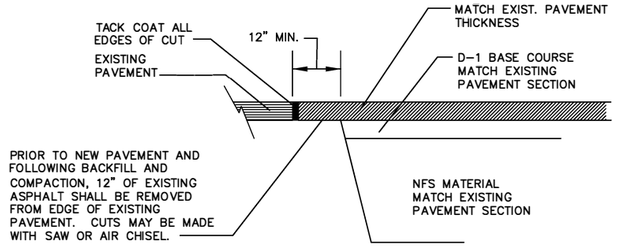
SHEET
C2.0

NOTES

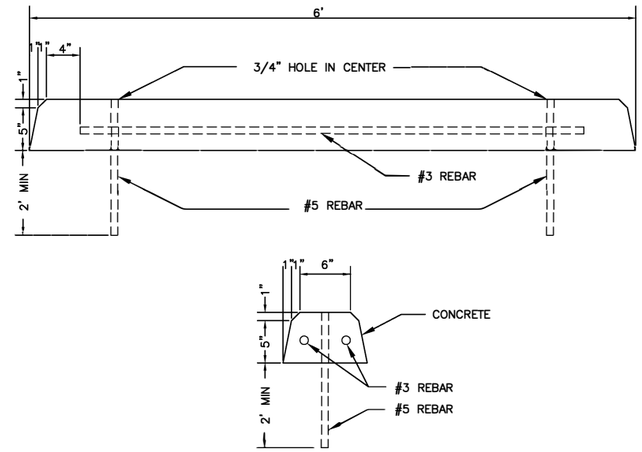
1. REMOVE ALL TOPSOIL AND ORGANICS BENEATH ALL FILL IN PAVEMENT AREAS.
2. COMPACT EXISTING SUBGRADE TO 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM – D1557 PRIOR TO THE PLACEMENT OF FILL
3. COMPACT ALL FILL TO TO 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM–D1557.
4. TYPE II MATERIAL SHALL HAVE NO MORE THAN 6% OF THE MATERIAL PASSING A NO. 200 SIEVE. MAXIMUM PARTICLE SIZE SHALL BE 4".



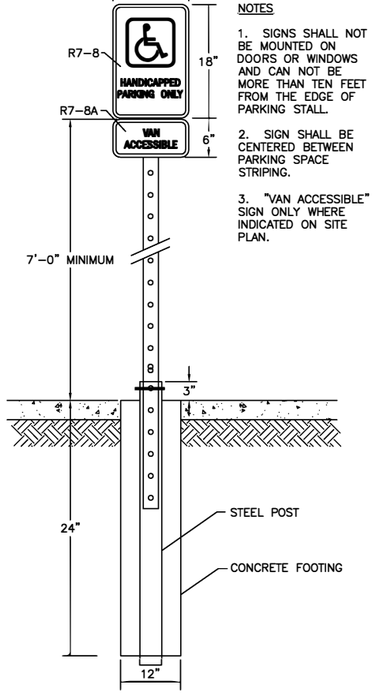
1 PAVEMENT SECTION
C6.0 SCALE: NOT TO SCALE



2 PAVEMENT MATCH DETAIL
W2.0 SCALE: NOT TO SCALE



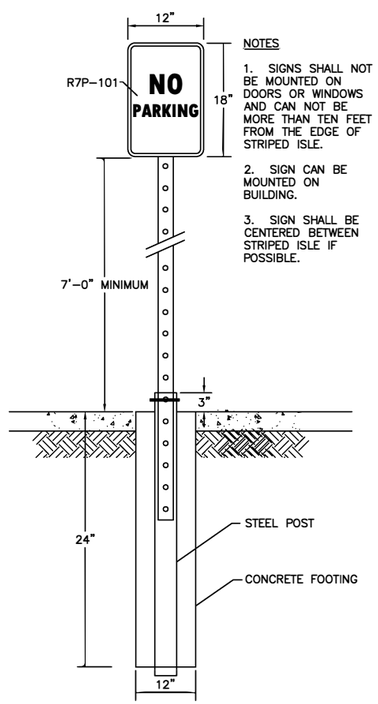
3 WHEEL STOP
C6.0 SCALE: NOT TO SCALE



NOTES

1. SIGNS SHALL NOT BE MOUNTED ON DOORS OR WINDOWS AND CAN NOT BE MORE THAN TEN FEET FROM THE EDGE OF PARKING STALL.
2. SIGN SHALL BE CENTERED BETWEEN PARKING SPACE STRIPING.
3. "VAN ACCESSIBLE" SIGN ONLY WHERE INDICATED ON SITE PLAN.

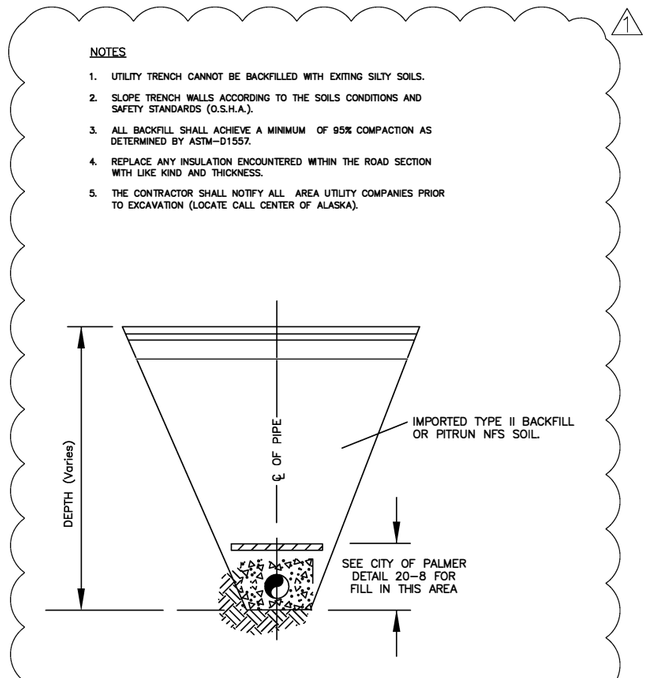
4 HANDICAP PARKING SIGN
6.0 SCALE: NOT TO SCALE



NOTES

1. SIGNS SHALL NOT BE MOUNTED ON DOORS OR WINDOWS AND CAN NOT BE MORE THAN TEN FEET FROM THE EDGE OF STRIPED ISLE.
2. SIGN CAN BE MOUNTED ON BUILDING.
3. SIGN SHALL BE CENTERED BETWEEN STRIPED ISLE IF POSSIBLE.

5 NO PARKING SIGN
C6.0 SCALE: NOT TO SCALE



6 UTILITY TRENCH BACKFILL
C6.0 SCALE: NOT TO SCALE

STATE OF ALASKA
49TH
DAN E. STEINER III
No. CE 9505
9/1/22
REGISTERED PROFESSIONAL ENGINEER

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MSB SCHOOL DISTRICT
ACADEMY CHARTER SCHOOL
PROPOSED STORAGE BUILDING
T18N, R2E, SEC. 33, LOT A15
E. ARCTIC AVE. PALMER, ALASKA

BY	DATE	REVISIONS
1	9/7/22	INFORMATION ADDED FROM SOILS REPORT

JOB NO.: 21–019
DATE: 9/7/2022
DRAWN: DES
REVIEWED: DES

SHEET TITLE
CIVIL DETAILS

SHEET
C6.0

HANSEN ENGINEERING, INC.
CONSULTING ENGINEERS TESTING LABORATORY
2605 N Old Glenn Hwy, Palmer, AK 99645 Phone: (907) 745-4721
e-mail: mhpe@mtaonline.net

Academy Charter School Storage Building

Palmer, AK

Geotechnical Investigation

August 2022

Prepared for: Matanuska-Susitna Borough School District
690 Cope Industrial Way
Palmer, AK 99645

Prepared by: Tyler Hansen, P.E.
Hansen Engineering, Inc
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Academy Charter School Storage Building

Geotechnical Investigation

Contents

Report Narrative 10 pages

Location Information

Vicinity Map 1 page
Test Hole Location Map 1 page

Test Holes

Boring Logs Plates 1-3
Log Graphics Key 1 page

Soil Testing

Sieve Test Reports of Samples 2 page
Laboratory Testing Summary 1 page

Supplemental Information

ASTM Soil Classification Chart
Plasticity Chart
Frost Design Soil Classification
IBC-Site Class

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Academy Charter Storage Building

Geotechnical Investigation

Location

The proposed project is located in Palmer, Alaska at 801 E Arctic Ave.

Scope

An approximately 2400 ft^2 footprint metal building is planned. This report addresses soil characteristics relating to the building foundations and parking/driveway structural section. The recommendations contained herein are not necessarily applicable for changed locations or changed use such as a different type or size of building.

Previous Use and General Topography

The building site is adjacent to the Academy Charter School parking lot. An approximately 4 foot tall slope runs diagonally across the site making the northeast end of the building about 4 feet higher than the southwest end of the building and the parking area. The site was recently cleared of forest. Previous use is unknown.

Findings

1. Shallow soils were primarily low to medium density *Silt* and *Silt With Sand.* The top 2 feet was quite loose and had high moisture.

2. Dense gravels and sands were encountered below 9 feet.

3. Ground water was observed at 16.5 feet in boring #1 on 8/18/22.

Field Exploration

The subsurface exploration was conducted July 26, 2022, and consisted of three borings advanced by Denali Drilling using a hollow-stem auger on a truck mounted CME 85 drill rig. One 20 foot deep boring was placed in the middle the proposed building. two 5 foot deep borings were placed within the proposed parking area. The borings were logged by Tyler Hansen PE, geotechnical engineer with Hansen Engineering, Inc. The attached Boring Location Map shows the approximate boring locations.

Samples were taken by driving a 3" outside diameter split spoon sampler through the hollow-stem auger using a 340-pound automatic hammer with a 30-inch drop. The blow counts reflect the density and/or the presence of large particles (cobbles) in the soil. A larger sampler and hammer were used than in the "Standard Penetration Test" (SPT) to facilitate better sampling of the gravel material. Blow counts would be higher for the Standard Penetration Test.

Laboratory

In the laboratory, the samples were visually classified according to frost and unified classification and the moisture contents determined. Sieve analyses were performed on selected sample from typical footing depth. The results of these analyses are shown on the testing summary and on the test report attached.

Please note that the samples are by nature not entirely representative of the actual in-situ material. The actual material contains particles larger than can be sampled with the split spoon. The split spoon, because of its rigid inside diameter, tends to drive out and/or fracture cobbles and larger gravel. This crushing and segregating process also tends to drive up the percent of the observed fine sand and omit larger gravel. Because of this, the soil as logged may disagree with the sieve analysis of the same soil. The log is based on our opinion of the nature of the soil, not purely on analysis of the samples.

Boring Logs

Descriptions of the soils encountered are recorded on the right side of the boring logs. Also shown are properties such as cobble presence, which were implied by the drilling action in the field but not reflected in the samples.

The moisture content, blow count, type and location of samples, and the general soil type are shown graphically on the left side. All soil transitions not directly sampled by the split spoon were logged by observation of the change in drilling action (speed/noise). Where changes in the soil occurred between samples and no change in drilling action was observed, the transition is shown on the log as a slanted line.

The log shows the number of blows required to advance the sampler from 6" to 18" below the beginning of each sample as "blows per foot". The actual blow counts are shown on the test data summary. The logs show the raw, uncorrected blow counts.

Soil Profile

The following is a generalized soil profile. A more detailed and specific profile can be found on the boring logs attached. The subsurface profile is likely to be variable at locations other than the borings. The exact locations where the subgrade type changes could not be identified through test holes alone. It must be identified through observations during construction.

The top 2 feet was low density *Silt* with some organics. Unified class is ML and frost class is F4. This soil is quite soft and has too high moisture content compact well.

From 2 to 9 feet the soil was *Silt* (ML) and *Silty Sand* (SM). Frost class is F4. This soil has low to medium density with density increasing with depth. This silty material, common of the palmer area, is typically stable under light loads as long as it remains undisturbed.

From 9 to 15 feet the soil encountered was *Poorly Graded Gravel With Sand And Silt* (GP-GM). Frost class is F1. Density is medium to high.

Below 15 feet, the soil ranged from *Silty Gravel with Sand* (GM) to *Silty Sand With Gravel* (SM). This soil is very dense and extended through the bottom of the boring at 21 feet.

Ground water is measured at 16.5 feet on 8/18/22.

The descriptions above are generalized. Please see the log for specific soil profiles. At other locations, the soil transitions may occur at different depths than described.

Seismic Class

Use site class "C" under the IBC classification system. This recommendation is based on the blow counts observed during exploration. The surface trace of the Castle Mountain Fault is about 3 miles away. It is the major known active fault in the area.

Following are the IBC-2015 earthquake ground motion accelerations for the project GPS coordinates. These are taken from the ATC "Hazards by Location" website for Site Class "C":

0.2 sec: S_S = 1.547g	S_{MS} = 1.547g (max),	S_{DS} = 1.031g (design)
1.0 sec: S_1 = 0.753g	S_{M1} = 0.979g (max)	S_{D1} = 0.652g (design)

RECOMMENDATIONS

Site Preparation

The high moisture Silt with organics encountered in the top 2 feet is not suitable to support foundation loads. The underlying *Silty Sand* (SM) and *Silt* (ML) can be made to support footings with a reduced bearing capacity.

Remove any organics and muddy soils from the building footprint. Excavate the silty soils to a least 1 foot below footing grade. Compact the subgrade with a large vibrating drum compactor to correct any disturbances that may have occurred. If any areas appear soft under the compactor, remove the soft soils and replace with compacted classified fill.

Do not allow water to accumulate in excavations or on the surface of silty soils during construction. Maintain the surface sloped for drainage, and seal exposed surfaces with a smooth drum or plate compactor to minimize infiltration. The silty soil will become muddy and unmanageable if water is allowed to infiltrate. Do not route multiple passes of heavy construction traffic over a silt surface. The silt will become unstable and begin to pump.

Place a minimum 1 foot thick layer of compacted classified fill over the Silt or Silty Sand to act as a drainage layer, working surface, and to help distribute building loads to the underlying soil. Over excavation should be widened each side of the footing a distance equal to the depth of over excavation. For example, if 1 foot of classified fill is placed below the footing, the classified fill should extend 1 foot each side of the footing

Remove silty material from beneath driveways/parking areas to at least 24" below the driving surface. For light traffic areas an 18" structural section may be adequate. See 'Driveway Structural Section' on page 10 of this report.

Buried Utilities

The onsite silt is impractical to compact after it has been excavated. Do not use silt as backfill over buried utilities at locations were future settlement will become a problem. For example, under buildings and parking areas. Utilities should be backfilled with compacted classified fill.

Soil Bearing Capacity

The allowable bearing capacity of footings placed on a 1 foot layer of classified fill over the Silt is 1,500 psf. If all the *Silt* and *Silty Sand* is removed, the allowable bearing capacity of footings placed on classified fill over the deep *Poorly Graded Gravel With Sand And Silt* is 4,000 psf. These values are for static loads. For transient wind and seismic loads, the static bearing pressure may be increased by

one third. For resistance to sliding of footings, a coefficient of friction of 0.35 may be assumed.

Frost Depth

Local frost penetration can exceed ten feet in areas of traffic or snow removal. The foundation systems below do not extend the foundation below the maximum frost depth. They depend on heat loss from the building to keep the founding soils thawed.

Foundation Systems

The site is suitable for conventional footings with a perimeter foundation wall, or frost protected shallow foundations (FPSF).

Both foundation systems as outlined below are for heated buildings only, and depend on heat loss from the building to keep the founding soils thawed. These foundations are intended to prevent frost penetration under the footing and limit differential settlement of footings to less than an inch.

Conventional Foundations

Interior footings may be continuous or isolated. Minimum footing widths are 16" for continuous footings and 30" for isolated square footings. Footings at the building perimeter should be at least 6" wider than the stem wall and have at least 42" soil cover.

Heated Footings

Protect perimeter footings of heated buildings from frost with a minimum of 42 inches soil cover over the bottom of the footing. Perimeter foundation walls should be insulated with two inches minimum of insulation board. Insulation should be detailed to direct heat loss downward below the footing and retain the bearing soil in a thawed state. Alternative insulation schemes such as the "frost protected shallow foundation" described on the next page may decrease the required soil cover.

Unheated Footings

Unheated footings should be avoided where possible. Such footings may sustain some movement because they will be within the seasonal frost zone, particularly if in areas where the snow will be removed. Unheated footings exterior to the structure should be placed a minimum of 60 inches below surface grade (assuming they have a footing wider than the column or foundation wall to resist uplift forces). Without a wider footing, posts or piles would need to be placed at least 10 feet deep to reduce the frost action. Any roof extensions (covered entrances) designed with cold footings should have a design that allows for differential movement between the heated building and the cold footings.

Shallow Frost-Protected Foundations

Monolithically placed concrete footings and slabs are usually used for this type of construction. Interior footings may be thickened portions of the monolithic slab in squares or strips.

The frost-protected shallow foundation should be designed for the local air-freezing index using a 100-year return period. The included sketches are an example of a frost-protected shallow foundation taken from ASCE Standard 32, "*Design and Construction of Frost-Protected Shallow Foundations*". This system uses horizontal "wing" insulation to decrease the required depth of foundation. It is particularly useful for slab-on-grade foundations. The example, using the ASCE 32 "Simplified FPSF Design Method", is based on a heated structure with floor insulation R 10 or less and a 100-year freezing index of 4000 degree Fahrenheit days.

Example – Frost-Protected Shallow Foundation – Simplified Method:

	Width	Minimum "R" Value
A. Horizontal Wing Insulation Along Wall	24"	10.5
B. Horizontal Wing Insulation at Corners	36"	13.1
C. Horizontal Insulation at Corners, Distance from Corner		60"
D. Footing minimum depth below ground surface. (This is measured from the finished surface grade to the bottom of the footing)		16"
E. Vertical insulation at perimeter, minimum "R" value		10.1

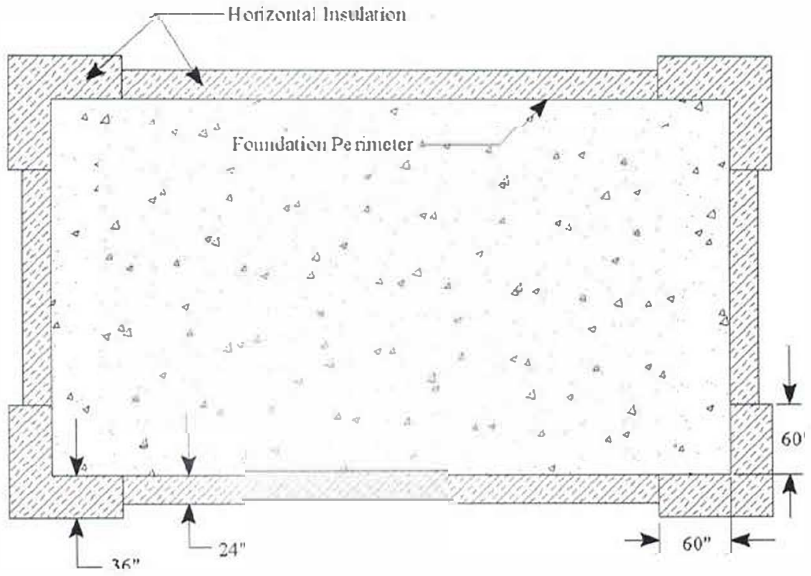
If the foundation is designed according to ASCE 32 (not the simplified method), different floor insulation schemes can be considered, as well as considering different footing depths and perimeter insulation schemes. This would provide an opportunity to decrease the width of wing insulation if clearance to property line or other obstacles is a consideration. There are many possible combinations of depth and insulation.

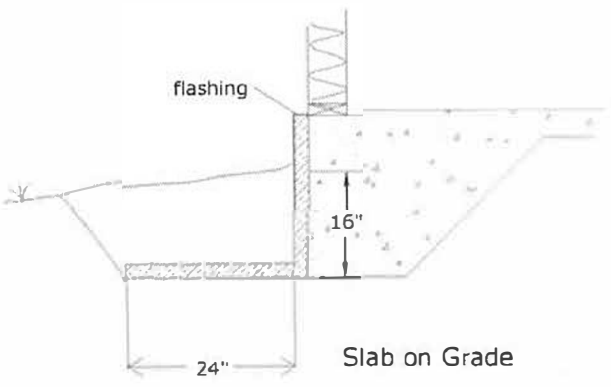
Note that the recommended insulation is not exactly the same as required by Anchorage building code. Anchorage uses a 100-year freezing Index of 3340 degree-days. Records from the Matanuska Valley show a somewhat colder freezing index.

The air-freezing index for nearby stations is as follows:

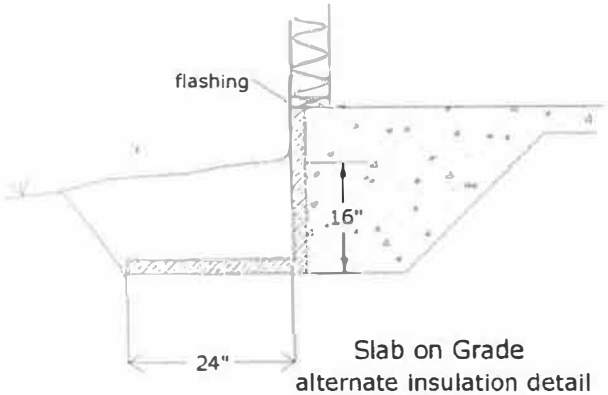
Station	Air Freezing Index ^{0}F – Days 100 – Year Return Period
Eklutna Project	4204
Matanuska Agricultural Exp.St 1	3529
Palmer AAES	3893

The following sketches show example insulation geometry.

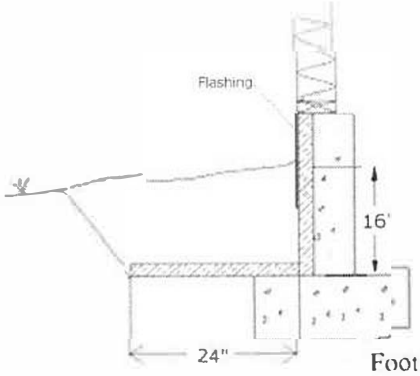




Slab on Grade



Slab on Grade
alternate insulation detail



Footing and Stem Wall

Frost Protection at Entrances

Do not attach exterior slabs to buildings. They may move vertically due to frost action, and in some circumstances could lift and damage the building.

Depress exterior grade slabs at entrances below floor elevation to allow for movement. The maximum depression of exterior slabs is limited by ADA regulations. In frost susceptible soils, an unprotected exterior entry slab can lift due to frost heave and prevent a door that swings to the exterior from opening. It frequently takes only fractions of an inch frost heave immediately outside the door to cause problems with the functioning of the door.

To reduce lifting of exterior slabs at entrances, place wing insulation at top of footing or bottom of FPSF depth. Provide a minimum of 6" non-frost susceptible classified fill beneath the wing insulation. Extend wing insulation out at least 48 inches from the building and 32 inches beyond entry slab each way along the heated foundation. Fill above the wing insulation to the bottom of entry slab with compacted non-frost susceptible classified fill. For conventional foundations, place the wing insulation at the top of footing, abutting the foundation wall insulation and use a minimum R value of 9. For frost protected shallow foundations, place the special wing insulation under the entry slab 16" deep in place of the regular wing insulation and use a minimum R value of 13.

Place a control joint in the entry slab approximately over the outside edge of the wing insulation.

If all frost susceptible material is removed for at least 5 feet below entry slabs, the special wing insulation may be omitted. Heated exterior slabs may also be used to decrease the potential for frost heave at entrances. The operating cycle for the heated slabs must be designed to provide sufficient heat to prevent freezing of underlying frost susceptible soils.

Retaining Walls and Earth Pressures

Retaining walls will require backfill with non-frost susceptible materials, such as described in the section "Classified Fill". Clean sand (less than 6% passing the #200 sieve) is also acceptable for fill behind foundation retaining walls.

The following equivalent fluid loads may be assumed for earth pressures:

Active	30 pcf, Sand or Gravel
At Rest	60 pcf, Sand or Gravel
Passive	150 pcf, Native Silty Sand or Silty Gravel
Passive	200 pcf, Compacted engineered fill

Even light compaction behind retaining walls may increase the earth pressure into the passive range. Retaining walls should be braced before compacting backfill.

Structural Fill

Classified fill should conform to the following gradation:

Sieve Size	Percent Passing
3"	100*
#4	20 - 60
#40	3 - 30
#200	0 – 6

*Except for the top 6" below footings or slabs, the fill may contain up to 15% cobbles between 3" and 8" diameter. This size is typically not included in sieve analyses.

Pavement **Leveling Course;** This material should conform to City specifications for leveling course, or alternately to Alaska DOT/PF specifications for D-1, crushed aggregate base.

Surface Course; This is the top 4 inches of a gravel driveway section if paving is not desired. The upper size limit reduces irregularities in the surface and the increased fines content acts as a binder to stabilize the driving surface. Specified gradation is as follows:

Sieve Size	Percent Passing
1.5"	100
#4	20 - 60
#40	4 - 30
#200	5 – 15

Compaction

Compact any fills supporting footings, slabs or paved areas to not less than 95% of ASTM D 4253, (Maximum Index Density of Cohesionless, Free-Draining Soils). Clean, free-draining soils are most effectively compacted when saturated. Compact soils not having free-draining properties to not less than 95% of ASTM D1557.

Granular soils require vibration for compaction. The effective depth of compaction will be improved by using the largest vibratory compactor available. The effective compaction depth in clean soils with less than about 5% fines is improved by watering each soil lift generously before any compactive effort takes place.

Soils with more than about 5% passing the #200 sieve will be sensitive to moisture. They will not compact adequately if too dry, and may pump if placed and compacted when too wet.

Compaction of fills beneath footings and slabs should be verified by testing.

Suggested maximum compacted lift thickness is as follows:

Plate Compactor	4"
Jumping Jack	6"
Large vibrating drum compactor	12"

Surface Drainage

Backfill perimeter foundations with free draining sand or gravel to within one foot of the finished grade. Where not paved with concrete or asphalt, the top 6" of backfill around the exterior perimeter of the structure should be silt or other soil of low permeability. This will limit infiltration of surface water around the foundation.
Surface water, including roof drainage and snowmelt, should be directed away from the buildings by appropriate site grading. Minimum gradient is 5% for ten feet away from the building, and larger gradients are encouraged. Site grading should allow for melt of snowdrifts.

Driveway Structural Section

The following **pavement** section is suggested for light to moderate traffic areas:

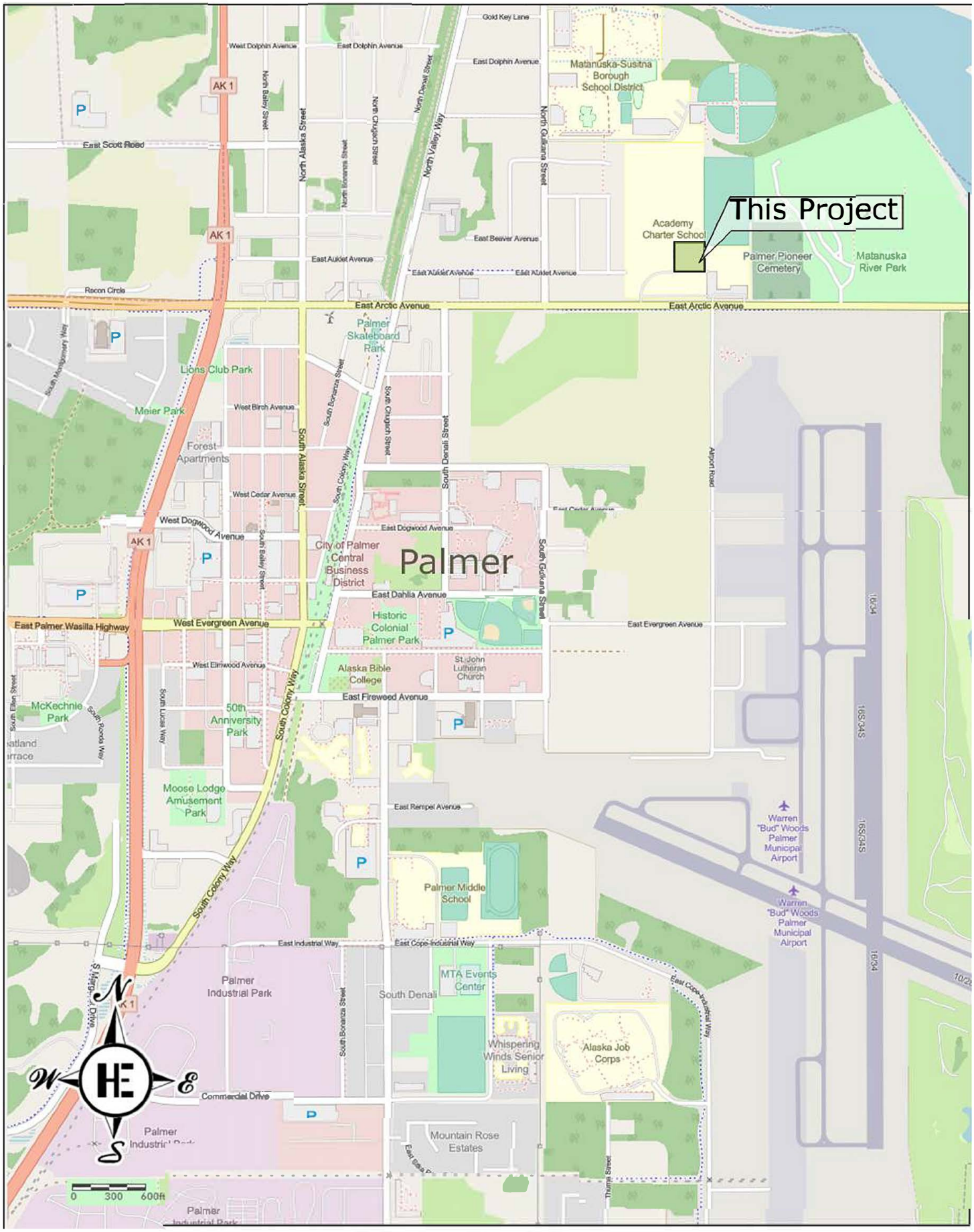
Asphalt Concrete	2"
Crushed Aggregate Leveling Course	4"
Classified Fill	20"
Silt Subgrade	

This section is much shallower than the frost penetration. It will not eliminate frost heave, but should provide sufficient thickness to bridge over a thawing subgrade and still support moderate traffic. When this section is evaluated using the Alaska DOT/PF "flexible Pavement Design" software with the excess fines method, estimated pavement life is about 85,000 Equivalent Single Axle Loads (ESALs).

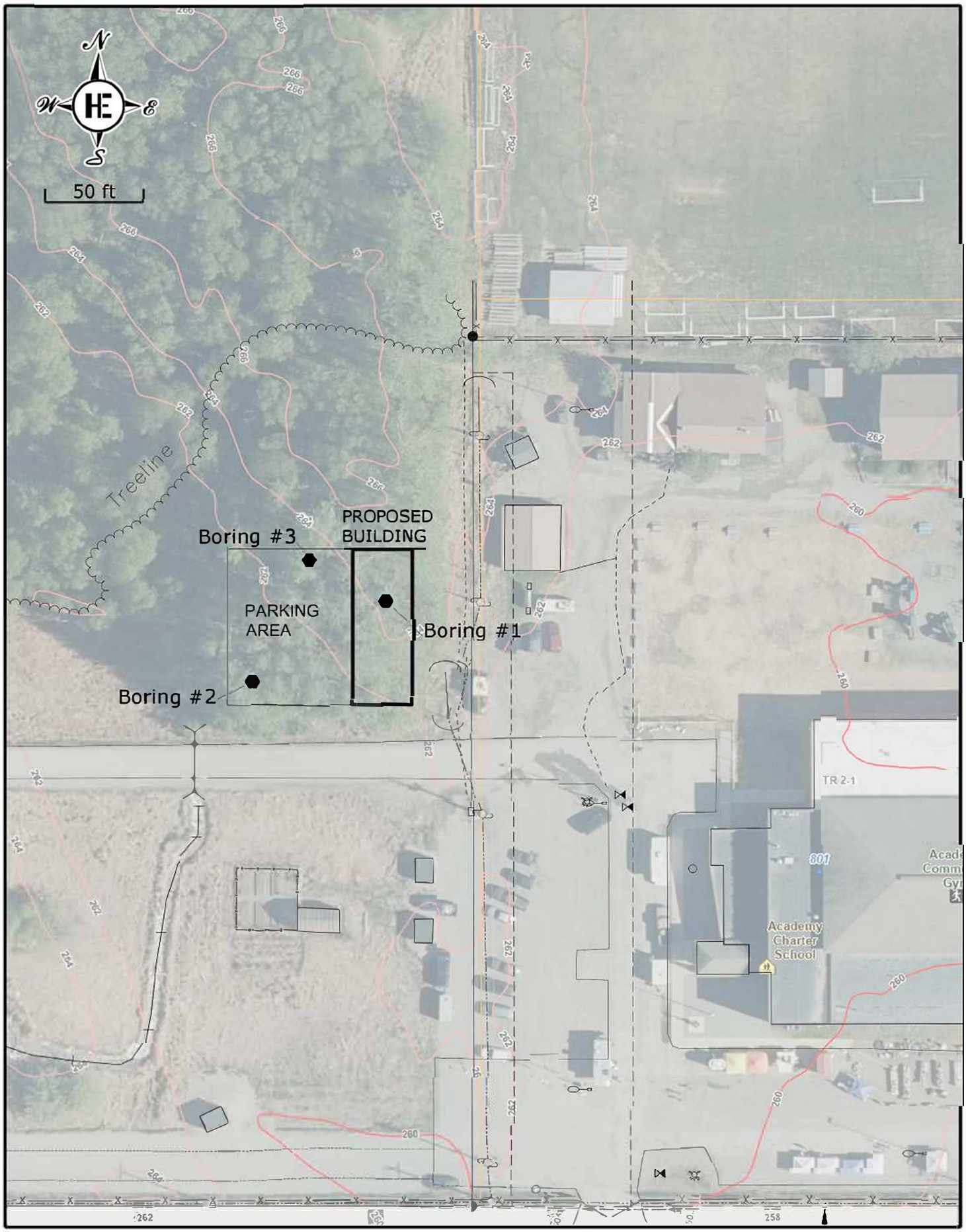
For areas with only lightweight traffic (outside of driveways and fire lanes), the classified fill layer may be reduced to 14 inches for a total NFS structural fill section of 18 inches. An 18 inch structural section is the bare minimum thickness to support light traffic. A 24" section is encouraged.

Gravel Parking Areas

If Paving is not planned, the Crushed Aggregate Leveling Course may be replaced with a 4 inch "surface course" as specified in the 'Structural Fill' section on page 9. The driveway surface should be finished with a 3% crown or cross slope to promote drainage.



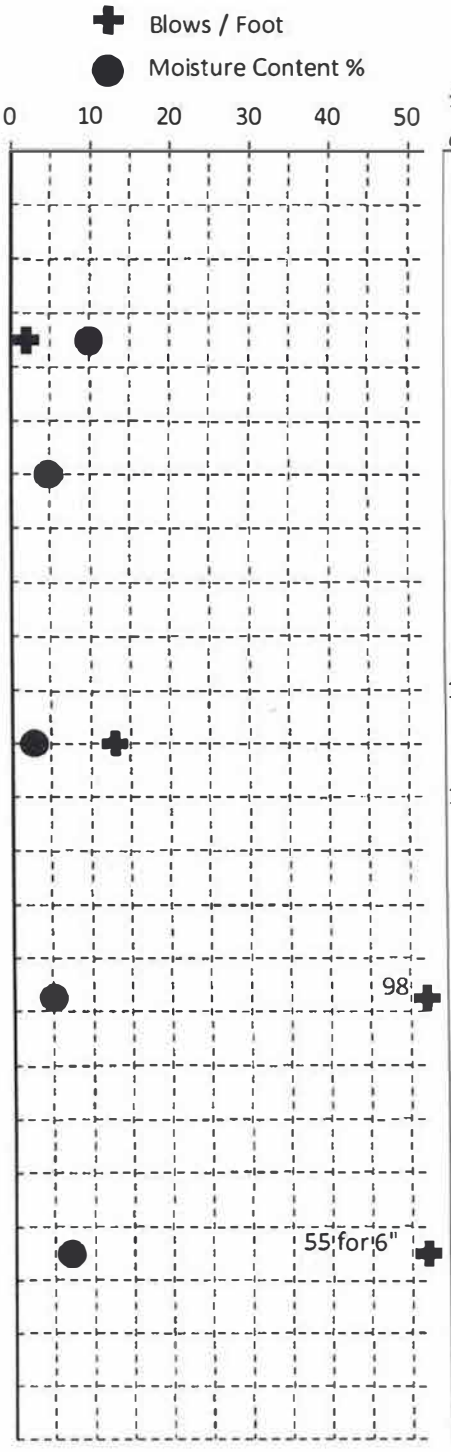
Vicinity Map

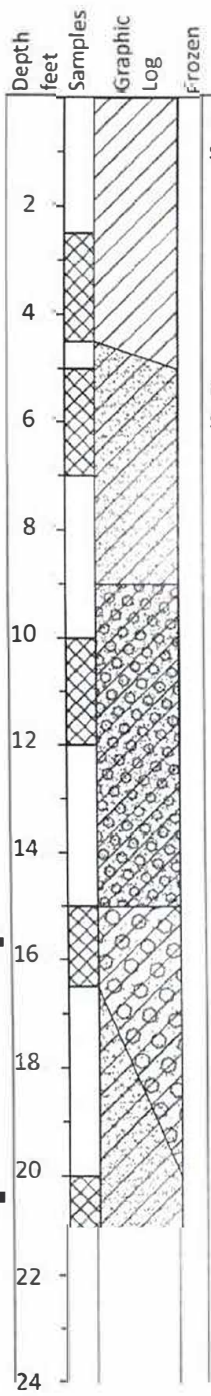


Boring Location Map

Log of Boring 1

Exploration: July 26, 2022
Equipment: CME 85 Truck
Location: Middle of Building
61° 36' 27.5" North
149° 5' 44.9" West





Description	Other Testing
F4, TAN/GRAY SILT (ML), non-plastic, some very fine sand, some roots	Pass #200 87%
F4, TAN SILTY SAND (SM), non-plastic, fine to very fine sand	Pass #200 35%
F1, TAN POORLY GRADED GRAVEL WITH SAND AND SILT (GP-GM), all sand sizes, occasional cobbles	
F2, TAN SILTY GRAVEL WITH SAND (GM), all sand sizes, gravel particles up to 2"	
F3, GRAY SILTY SAND WITH GRAVEL (SM), low plasticity, all sand sizes, gravel particles up to 1.5"	
Bottom of Exploration: 21 ft	

Blows / Foot
Moisture Content %

NALPT (2.5" I.D. split spoon, 340# Hammer, 30" drop)
Grab Sample

HANSEN ENGINEERING, INC.
CONSULTING ENGINEERS TESTING LABORATORY
2605 N. Old Glenn Hwy, Palmer, AK 99645 Phone:(907)745-4721
e-mail: mhpe@mtaonline.net

Log of Boring 1

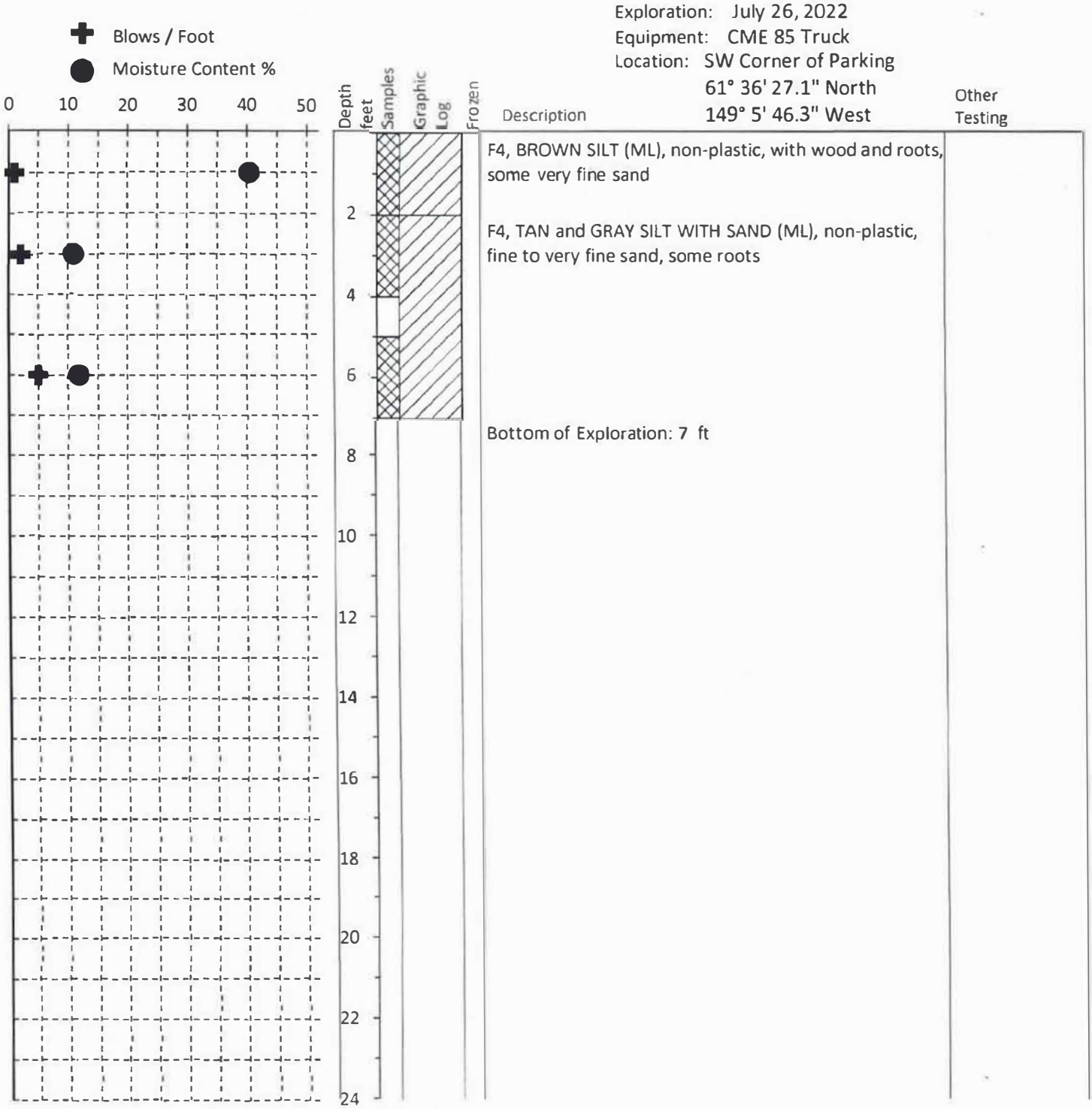
Academy Charter Storage Building
Matanuska-Susitna
Borough School District
690 Cope Industrial Way
Palmer, AK 99645

Job No.: 22013 Date: July 2022

Plate 1

Log of Boring 2

Exploration: July 26, 2022
Equipment: CME 85 Truck
Location: SW Corner of Parking
61° 36' 27.1" North
149° 5' 46.3" West



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Job No.: 22013 Date: July 2022

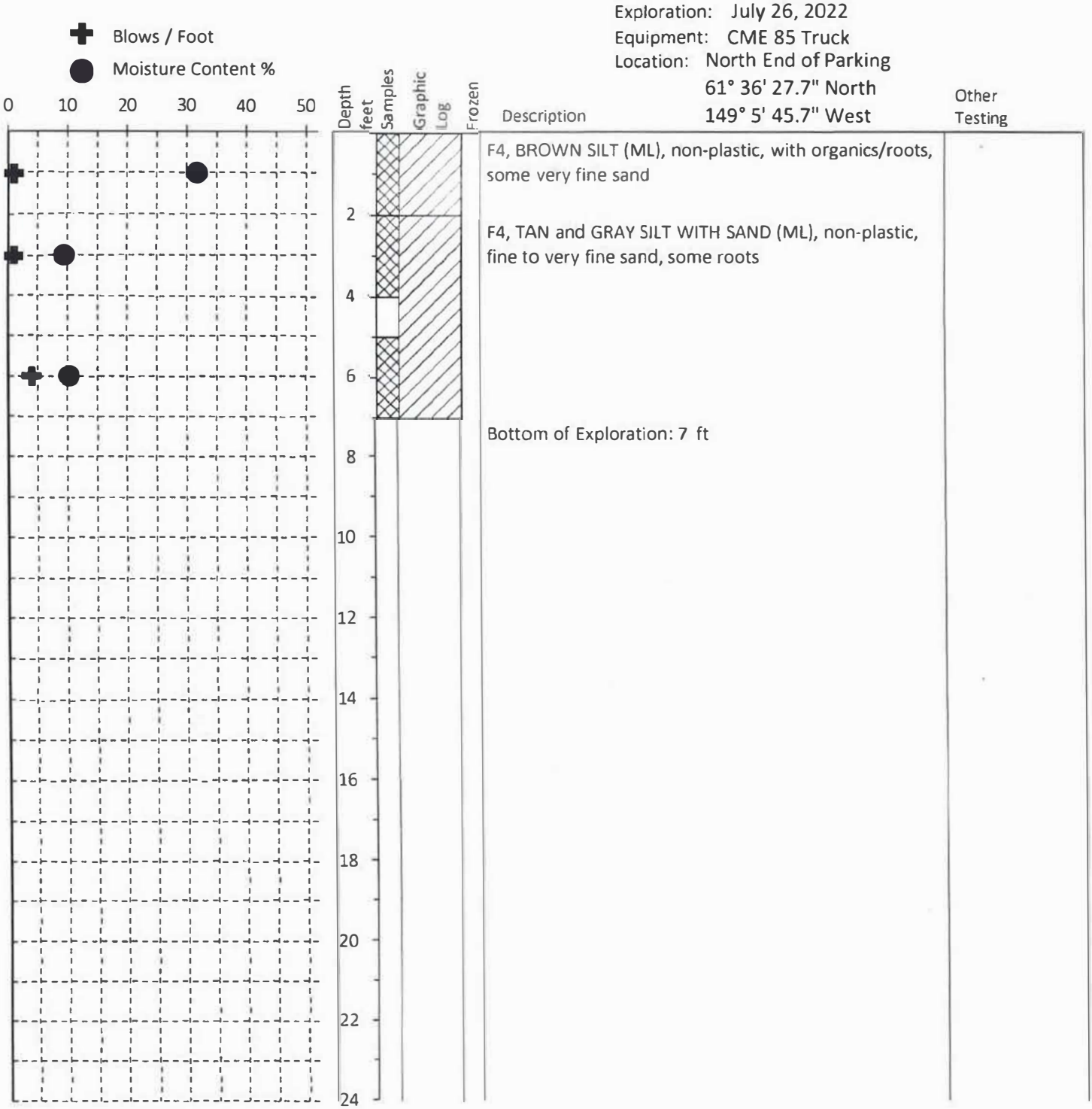
Log of Boring 2

Academy Charter Storage Building
Matanuska-Susitna
Borough School District
690 Cope Industrial Way
Palmer, AK 99645

Plate 2

Log of Boring 3

Exploration: July 26, 2022
Equipment: CME 85 Truck
Location: North End of Parking
61° 36' 27.7" North
149° 5' 45.7" West



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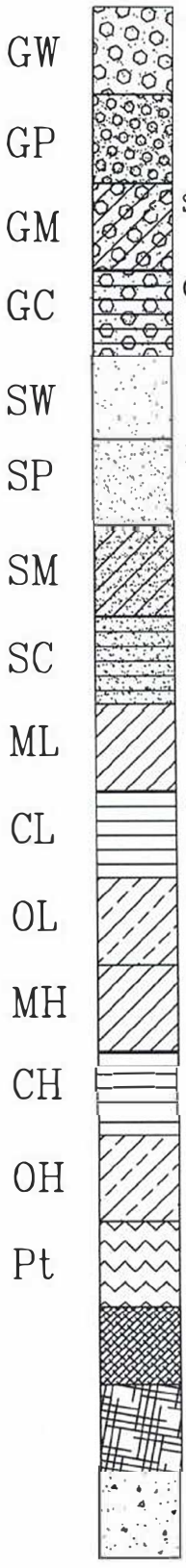
Job No.: 22013 Date: July 2022

Log of Boring 3
Academy Charter Storage Building
Matanuska-Susitna
Borough School District
690 Cope Industrial Way
Palmer, AK 99645

Plate 3

GRAPHICS LOG KEY



GW	WELL GRADED GRAVEL, SANDY GRAVEL
GP	POORLY GRADED GRAVEL, SANDY GRAVEL
GM	SILTY GRAVELS, SILT SAND GRAVEL MIXTURES
GC	CLAYEY GRAVELS, CLAY SAND GRAVEL MIXTURES
SW	WELL GRADED SAND, GRAVELY SAND
SP	POORLY GRADED SAND , GRAVELLY SAND
SM	SILTY SAND, SILT GRAVEL SAND MIXTURES
SC	CLAYEY SAND, CLAY GRAVEL SAND MIXTURES
ML	INORGANIC SILT, VERY FINE SAND, ROCK FLOUR
CL	GRAVELLY AND SANDY CLAY, SILTY CLAY
OL	ORGANIC SILT AND CLAY OF LOW PLASTICITY
MH	ORGANIC SILT
CH	INORGANIC CLAY, FLAT CLAY
OH	ORGANIC SILT, CLAY OF HIGH PLASTICITY
Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS
	ASPHALT CONCRETE PAVEMENT
	ROCK
	CONCRETE

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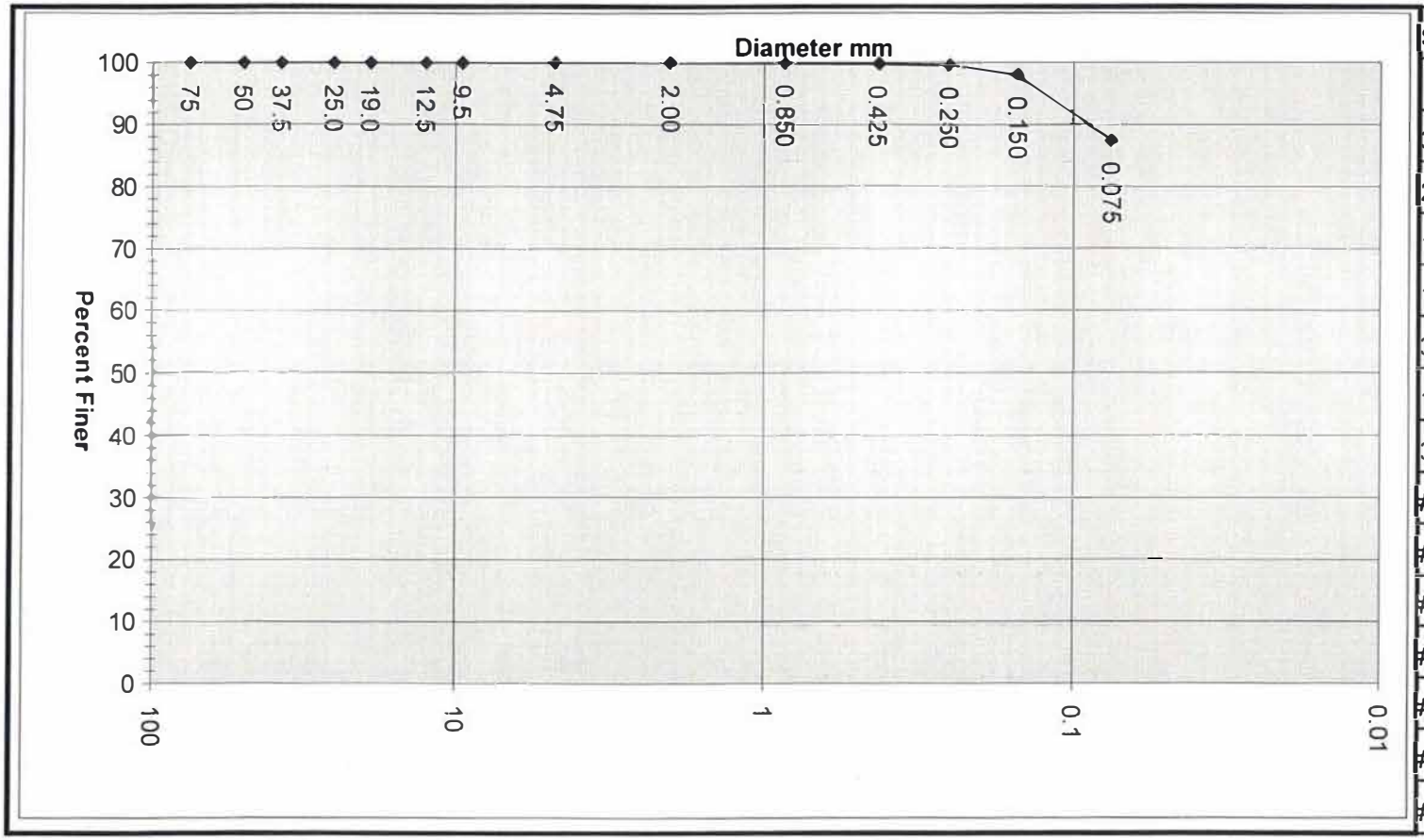

Sieve	Diameter	Percent
	mm	Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25.0	100
3/4"	19.0	100
1/2"	12.5	100
3/8"	9.5	100
#4	4.75	100
#10	2.00	100
#20	0.850	100
#40	0.425	100
#60	0.250	100
#100	0.150	98
#200	0.075	87.4

Client: **MSB School District**

Project ACS Storage Building

Sample Location: TH #1 @ 2.5' - 4.5'

Soil Description: Silt

Unified Classification: **ML**

Date 8/8/2022

Sample Date: 7/26/2022

Proj. no: 22013

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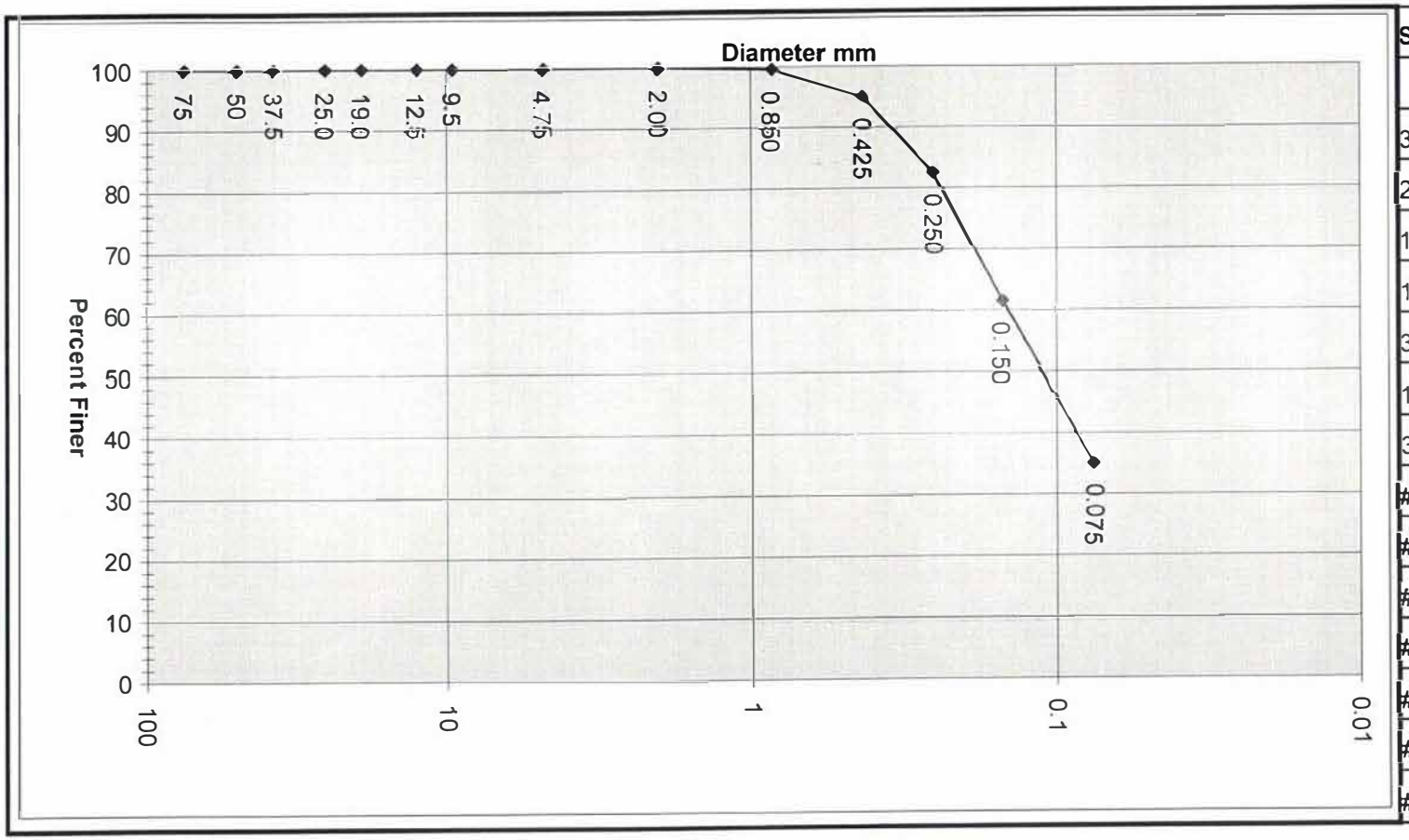

Sieve	Diameter	Percent
	mm	Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25.0	100
3/4"	19.0	100
1/2"	12.5	100
3/8"	9.5	100
#4	4.75	100
#10	2.00	100
#20	0.850	100
#40	0.425	95
#60	0.250	83
#100	0.150	61
#200	0.075	35.1

Client: **MSB School District**

Project ACS Storage Building

Sample Location: TH #1 @ 5' - 7'

Soil Description: Silty Sand

Unified Classification: SM

Date 8/8/2022

Sample Date: 7/26/2022

Proj. no: 22013

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LABORATORY TESTING SUMMARY

Academy Charter School
Matanuska-Susitina Borough School District

Exploration: July 26, 2022

Test Hole	Depth Feet	Moisture	Visual Classifications Frost Class	Unified Class	Pass #200 Other	Blows/6 inches (300#, 30" drop) NALPT Spoon	Sample Size Grams
1	2.5-4.5	10.0%	F4	ML	87%	1 1 1 1	902.8
1	5-7	4.8%	F4	SM	35%	1 2 3 3	1455.1
1	10-12	2.8%	F1	GP-GM		5 7 6 7	2297.9
1	15-16.5	5.0%	F2	GM		20 33 65	2433.8
1	20-21	7.2%	F3	SM		2 25 30 for 0"	889.5
2	0-2	40.4%	F4	ML		1 0 1 1	1126.5
2	2-4	10.9%	F4	ML		1 1 1 1	901.8
2	5-7	11.9%	F4	ML		2 2 3 3	1573.7
3	0-2	31.7%	F4	ML		0 1 0 1	1328.8
3	2-4	9.4%	F4	ML		1 0 1 0	1466.1
3	5-7	10.3%	F4	ML		1 2 2 3	1744.8

ASTM Soil Classification Chart

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

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name

[C] Gravels with 5 to 12% fines require dual symbols
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12X fines require dual symbols
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})2}{D_{10} X D_{60}}$

[F] If soil contains ≥ 15 % sand, add "with sand" to group name

[G] If fines classify as CL-ML, use dual symbol GC-GM or SC-SM

[H] If fines are organic, add "with organic lines" to group name.

[I] If soil contains r 15 % gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML , silty soil.

[K] If soil contains 15 to 29 % plus No, 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains L 30% plus No. 200, predominantly sand, add "sandy" to group name.

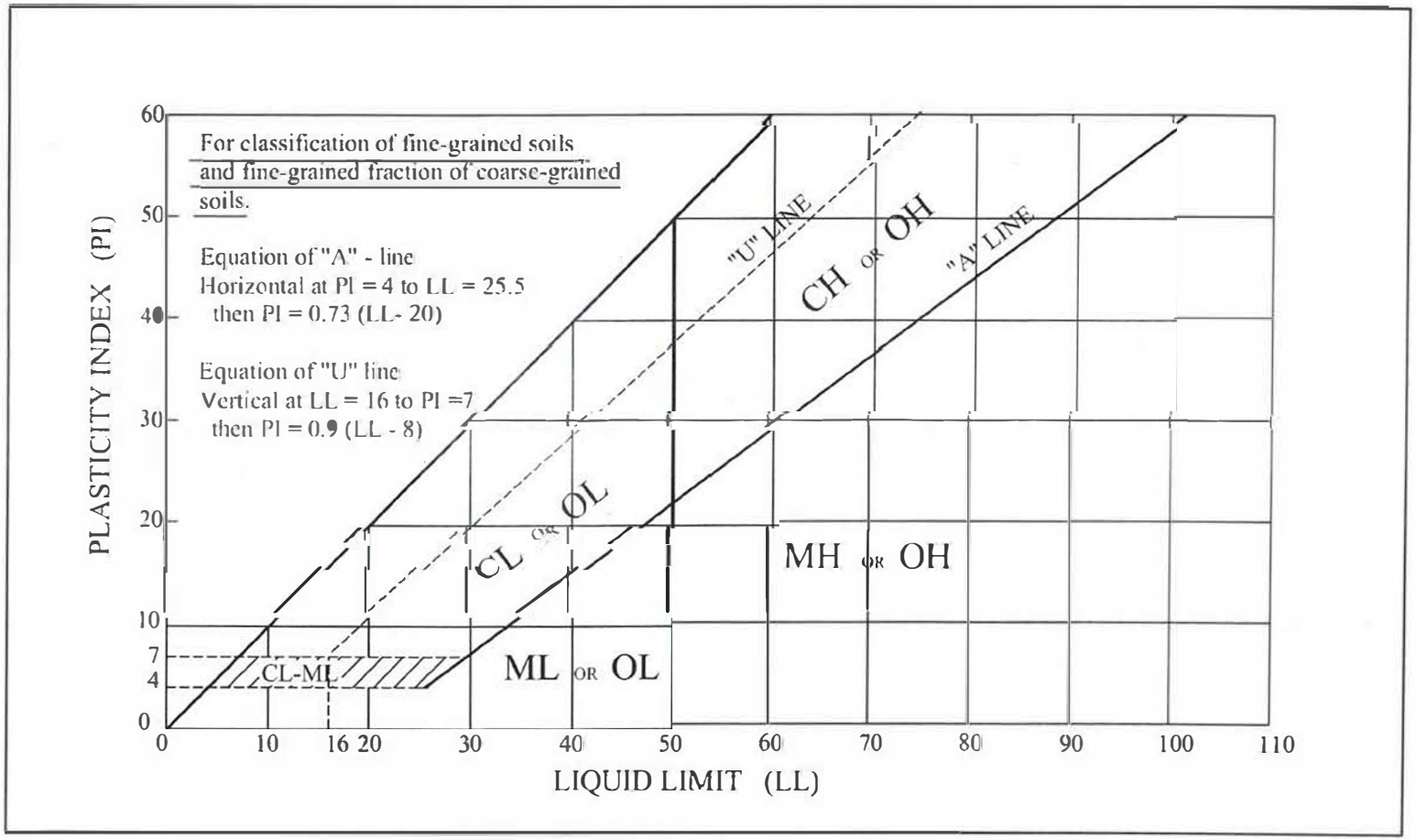
[M] If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Plasticity Chart

U.S. Corps of Engineers

Frost Design Soil Classification

Frost group	Soil Type	Percentage finer than 0.02mm, by weight	Typical soil types under Unified Soil Classification System
NFS	Sands and Gravelly soils	< 3	SP, SW, GP, GW
FI	Gravelly soils	3 to 10	GW, GP, GW-GM, GP-GM
F2	(a) Gravelly soils	10 to 20	GM, GW-GM, GP-GM
	(b) Sands	3 to 15	SW, SP, SM, SW-SM, SP-SM
F3	(a) Gravelly soils	>20	GM, GC
	(b) Sands, except very fine silty sands	>15	SM, SC
	(c) Clays, PI >12	----	CL, CH
F4	(a) All silts	----	ML, MH
	(b) Very fine silty sands	>15	SM
	(c) Clays, P1<12	----	CL, CL-ML
	(d) Varved clays and fine-grained, banded sediments	----	CL and ML CL, ML, and SM; CL, CH, and ML; CL, CH, ML, and SM

IBC-Site Class

Site class based on top 30m

TABLE 1615.1.1
SITE CLASS DEFINITIONS

SITE CLASS	SOIL PROFILE NAME	AVERAGE PROPERTIES IN TOP 100 feet, AS PER SECTION 1615.1.5		
		Soil Shear Wave velocity $\bar{v}_S$ (ft/s)	Standard Penetration resitance $\bar{N}$	Soil Undrained shear strength $\bar{s}_u$, (psf)
A	Hard Rock	$\bar{v}_S > 5{,}000$	Not applicable	Not applicable
B	Rock	$2{,}500 < \bar{v}_S \leq 5{,}000$	Not applicable	Not applicable
C	Very dense soil and soft rock	$1{,}200 < \bar{v}_S \leq 2{,}500$	$\bar{N} > 50$	$\bar{s}_u \geq 2{,}000$
D	Stiff soil profile	$600 \leq \bar{v}_S \leq 1{,}200$	$15 \leq \bar{N} \leq 50$	$1{,}000 \leq \bar{s}_u \leq 2{,}000$
E	Soft soil profile	$\bar{v}_S \leq 600$	$\bar{N} < 15$	$\bar{s}_u < 1{,}000$
E	—	Any profile with more than 10' of soil having the following characteristics 1. Plasticity index $PI > 20$: 2. Moisture content $w \geq 40\%$ and 3. Undrained shear strength $s_u < 500$ psf		
F	—	Any profile containing soils having one or more of the following characteristics 1. Soils vulnerable to potential failure or collapse under seismic loading such as liquefiable soils, quick and highly sensitive clays, collapsible weakly cemented soils. 2. Peats and/or highly organic clays (H > 10 feet of peat and/or highly organic clay where H = thickness of soil) 3. Very high plasticity clays (H < 25 feet with plasticity index PI > 75) 4. Very thick soft/medium stiff clays (H > 120 ft)		