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Geotechnical Report

July 7, 2024
24-03-EP

Aviest Engineering, Inc.
Attention: Mr. Shane McDougall
101 Rabbit Ridge Road
Woodland, ME 04736

Subject: Explorations and Geotechnical Engineering and Septic Design Services
New Terminal Building
Airport Road, Eastport, Maine

Dear Shane:

In accordance with my proposal dated June 17, 2024, I have made a geotechnical assessment for the proposed new Terminal Building at the Eastport Municipal Airport on Airport Road in Eastport, Maine. This report summarizes my findings and geotechnical recommendations, and its contents are subject to the limitation set forth in Attachment A.

The purpose of my work was to explore the subsurface conditions at the site and to provide recommendations for foundation design and earthwork relative to the proposed construction. The geotechnical assessment has included the observation of three test pits, visual soil inspection, and a geotechnical evaluation of the findings as they relate to the proposed construction, and preparation of this report. Additionally, I have completed a site evaluation and septic design for the proposed building based on anticipated use.

PROPOSED CONSTRUCTION

I understand the proposed building will occupy a footprint of approximately 2,600 square feet in plan dimension. Spread footing and frost wall construction is planned for the structure. Additionally, a paved access drive and parking is planned to the east and northeast of the proposed building. I understand the finished floor grade is proposed at elevation 60 feet (Project Datum.)

I further understand the terminal building sees an average of 5 passengers per day and has no full-time employees.

EXPLORATIONS

Three test pits (designated TP-1 through TP-3) were made in the vicinity of the proposed building on June 20, 2024 by Downeast Masonry and Construction based on the currently available site map, and field located by taping from existing site features. One additional Test

Pit (STP-1) was made in the area of a proposed new subsurface wastewater disposal field, also on June 20 with the backhoe.

The approximate locations of the explorations are shown on the attached Sheet C3: Grading Plan (Sheet 1). The test pit logs (except STP-1) are attached as Sheets 2 and 3. The location and log for STP-1 is located in the Disposal System Application.

SITE CONDITIONS

The area of the proposed construction is currently paved and slopes gently downward from south to north. The existing terminal building is located north of the proposed building. The apron and runways are to the west, with access from Airport Road from the east.

The test pits encountered sod and fill soils over sandy soils. The fill soils were generally silty sand with varying amounts of gravel. Pavement subbase was encountered to depths of 14 to 16 inches below the ground surface. Below the subgrade, the soils encountered in the three test pits were inconsistent. Test Pit TP-1 encountered loose sandy fill over fine sand; TP-2 encountered medium dense sand with clods of clayey-silt and cobbles; and Test Pit TP-3 encountered gravelly silty sand fill, over potentially weathered bedrock. Test Pits TP-1 and TP-3 encountered relic topsoil and organics at depths of 70 inches and 48 inches, respectively. The building test pits were extended to 6.0 to 7.0 feet below the ground surface.

Groundwater seepage was observed in Test Pit TP-1 at 4.5 feet below the ground surface. Redoximorphic mottling was observed below 16 inches in Test Pit TP-3. Groundwater evidence was not observed in Test Pit TP-2. Seasonal high groundwater levels should be expected within 1 to 2 feet of the ground surface.

Please refer to the attached exploration logs for more detailed descriptions of the subsurface findings.

EVALUATION AND RECOMMENDATIONS

General Findings

The native medium dense sandy soils are suitable to support the proposed foundations on conventional spread footings provided the area is adequately prepared. Spread footings should bear on at least 6 inches of compacted Crushed Stone over native, medium dense subgrades; the Crushed Stone will provide a dry and stable working pad, particularly if construction takes place in wet times of the year.

It is possible that excavation work will encounter shallow bedrock. Based on the test pits, the bedrock appears to be highly weathered. Bedrock, if encountered, will likely be removable with a large excavator or a hoe-ram.

Planning and design of the project should consider that the site soils are frost susceptible with a high fines content and that the site has a shallow groundwater table.

Site and Subgrade Preparation

Site preparation should begin with the construction of an erosion control system to protect drainage-ways and areas outside the construction limits. Exposed soils will be subject to erosion. When practicable, vegetation adjacent to the construction site should remain undisturbed to lessen the potential for erosion. Care must be exercised during construction to limit disturbance of bearing soils. Rubber-tired construction equipment should not operate directly on the native soils when wet. Final cuts to building and pavement subgrade should be made with a smooth-edged bucket to help reduce strength loss due to soils disturbance.

All topsoil should be removed from beneath the proposed building area, as well as areas subject to traffic loads, including relic topsoil at depth, as encountered in TP-1 and TP-3. Additionally, loose sand should be removed from beneath proposed foundations. If overexcavation is required below new spread footing foundations (such as in the area of TP-1), excavation should extend 1-foot laterally for each foot of vertical overexcavation.

Excavations must be properly shored and/or sloped to prevent sloughing and caving of the sidewalls during construction. All excavations must be consistent with OSHA trenching regulations.

Groundwater seepage will be encountered during excavation work, particularly during periods of precipitation. Ditching and sumping and pumping techniques should be adequate to control groundwater within foundation excavations.

Foundation Design

For footings on properly prepared subgrades, a net allowable soil bearing pressure of 2.5 ksf is recommended. Post construction settlements are expected to be ½ inch or less.

The design freezing index for Eastport, Maine area is approximately 1,500 Fahrenheit degree days. Considering this, footings and slabs exposed to freezing temperatures should have at least 5.0 feet of soil cover to provide frost protection. A gradual transition of 3H:1V slope or flatter should be provided from the 5-foot depth away from the foundations to reduce the effects of differential frost. Rigid insulation may be used as a means to reduce the frost depth if desired. Each inch of expanded polystyrene may replace 1 foot of non-frost susceptible soil. Rigid insulation should be extended laterally one foot for each foot of depth it is replacing.

Backfill and Compaction

Although a wide range of soil materials can be used successfully, granular soils with good drainage characteristics provide significant advantages particularly in wet conditions or during cold weather construction. It should be anticipated that fill to be placed during construction will come from off-site sources as the site soils will not meet these specifications. The following materials are recommended:

Granular Fill: Mixture of sand and gravel meeting the MDOT 703.19 Granular Borrow – for Embankment Construction (March 2020 publication.) Granular fill is recommended for use as:

- Raise in grade in paved areas (not within pavement structure)
- Raise in grade in landscape areas
- Backfill outside of frost zone

Structural Fill: Clean, non-frost susceptible sand and gravel free of organics and other deleterious materials meeting the MDOT 703.06 Aggregate for Base and Subbase Type D gradation (March 2020 publication.) Alternately, if desired, the contractor may use a crushed aggregate product meeting the MDOT 703.06 Aggregate for Base and Subbase Type C gradation. Structural fill is recommended for use as:

- Backfill below foundations and slabs (where needed)
- Backfill adjacent to foundations within frost transition zone
- Backfill for repair of soft or yielding areas above water table

Crushed Stone: Crushed, washed, hard durable rock meeting the gradation requirements for ASTM D-448, No. 67 stone. Crushed Stone is recommended for use as:

- Foundation drainage stone
- Foundation working mat
- Backfill for repair of soft or yielding areas below water table

Placement and Compaction: Fill should be placed in horizontal lifts and be compacted. Lift thickness should range from 6 to 12 inches depending on the size and type of equipment such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. I recommend that fill placed adjacent to foundations and below paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. Crushed Stone should be compacted to 100 percent of its maximum Dry Rodded Unit Weight as determined by ASTM C-29.

Foundation Drainage

An underdrain must be provided around the perimeter of the foundation. The underdrain pipe should be a 4-inch diameter, rigid PVC-SDR35 pipe with perforations of ¼ to ½ inch (oriented

downward). The underdrain pipe should be bedded in at least 6 inches of ¾ inch Crushed Stone and wrapped in a geotextile filter fabric such as Mirafi 180N (or equivalent). The underdrain should be placed in the Crushed Stone working mat and must have a positive gravity outlet and be protected from freezing, clogging, and backflow.

Slabs-on-grade

The building's slab-on-grade should be supported by at least 12-inches layer of Structural Fill (or Crushed Stone).

A vapor retarder should be placed directly below the floor slabs to reduce water vapor transmission. It is recommended that a vapor retarder with a vapor transmission rate less than the slab floor covering be installed below the slab. The vapor retarder should be placed according to manufacturer's recommendations, including taping all joints and wall connections. Floor suppliers should be consulted for acceptable retarder systems that can be used along with their products.

Sidewalks and Entrances Design

At least 5 feet of clean granular soil (meeting the Structural Fill gradation specification provided) should be placed below the building entrance slabs and sidewalks to minimize frost impacts on these structures. To reduce the potential for abrupt differential movement due to frost action, transition of Structural Fill thickness should be gradual (3 horizontal to 1 vertical) and be provided from the 5-foot depth to the gravel base thickness at the sidewalk and parking lot structures (paved areas). This fill should be placed in 6 to 12-inch lifts and compacted to at least 95% of its maximum dry density (ref: ASTM D-1557.)

Weather Considerations

If foundation construction takes place during fall or winter, foundations and the floor slab must be protected during freezing conditions. Concrete and new soil fill must not be placed on frozen soil and once placed, the soil beneath the concrete structures must be protected from freezing.

Site soils are moisture sensitive, and subgrades will be susceptible to disturbance during wet conditions. Site work and construction activities should take appropriate measures to protect exposed subgrades.

Construction Observation Services

I recommend project planning consider construction phase consultation services. Subgrade observations should be made by the geotechnical engineer to observe compliance with the design concepts, specifications and design recommendations and assist in design changes in

the event that subsurface conditions are found to differ from those anticipated prior to the start of construction.

Subsurface Wastewater Disposal

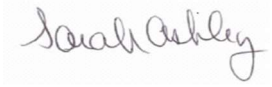
In accordance with my proposal, I have completed a site evaluation and have developed a septic design for the proposed facility. The completed Subsurface Wastewater Disposal System Application (HHE200) along with an Addendum that includes General Installation Notes, Septic Soils Information, Setbacks, and User Notes, has been submitted separately.

CLOSURE

It has been a pleasure to be of assistance to you on this project. If you have any questions, or if I may be of further assistance, please do not hesitate to call.

Sincerely,

Sash Engineering



Sarah L. Ashley, P.E.

Owner/Principal Engineer

ATTACHMENT A

Limitations

This report has been prepared by Sash Engineering for the exclusive use Aviest Engineering, Inc. for specific application to the proposed new Terminal Building at the Eastport Municipal Airport in Eastport, Maine in accordance with generally accepted soil and foundation engineering practices. No warranty, express or implied, is made.

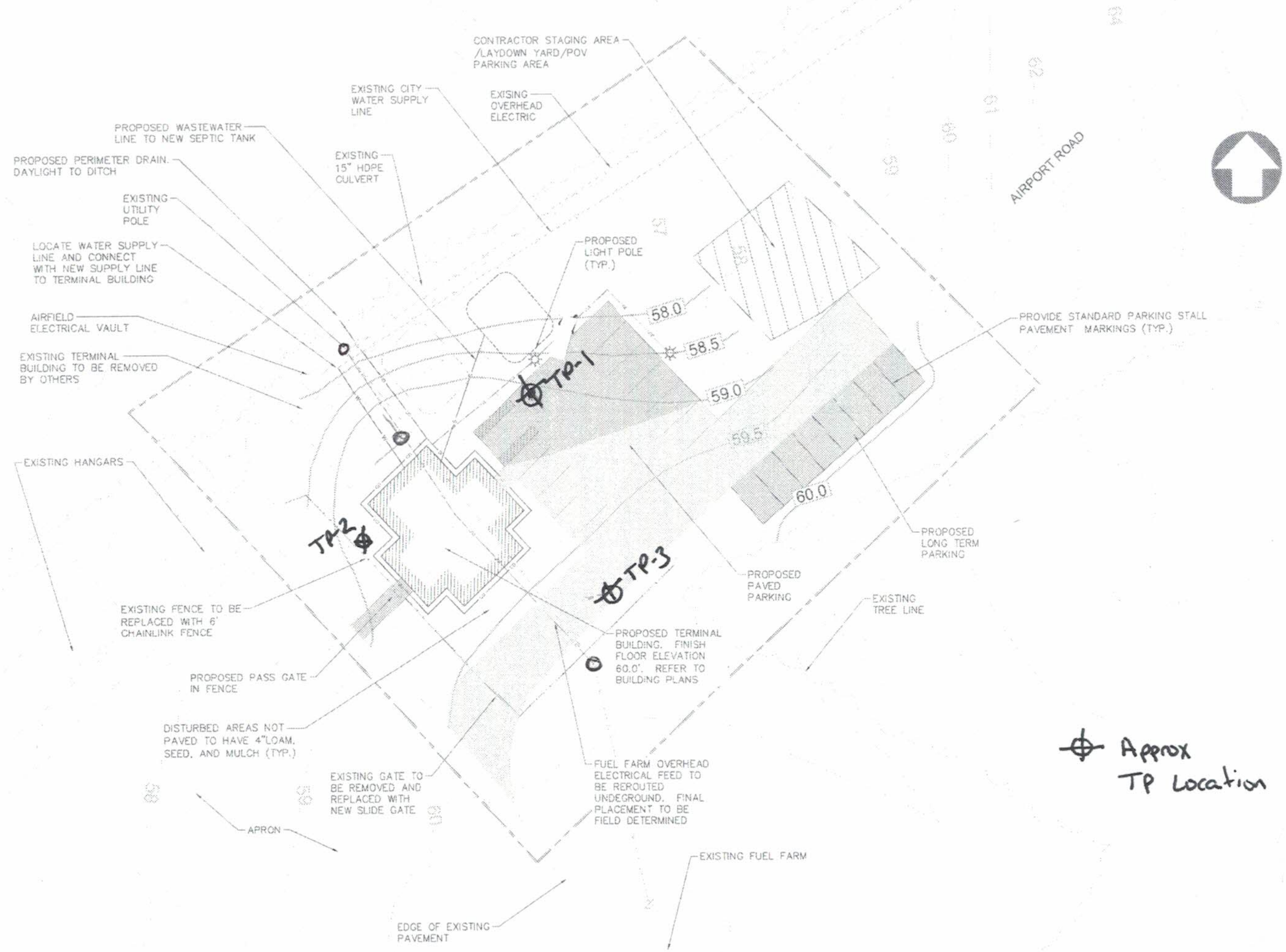
The analyses and recommendations in this report are based in part upon the data obtained from subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations appear evident during construction, it will be necessary to re-evaluate the recommendations of this report.

The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic.

Water level observations have been made at the time of exploration work. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of groundwater may occur due to variations in rainfall, temperatures and other factors occurring since the time measurements were made.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that changes are made in the design, nature, or location of the project, Sash should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by Sash.

GENERAL NOTES



CONTRACTOR STAGING AREA /LAYDOWN YARD/POV PARKING AREA
EXISTING CITY WATER SUPPLY LINE
EXISING OVERHEAD ELECTRIC
PROPOSED WASTEWATER LINE TO NEW SEPTIC TANK
PROPOSED PERIMETER DRAIN. DAYLIGHT TO DITCH
EXISTING 15" HDPE CULVERT
EXISTING UTILITY POLE
LOCATE WATER SUPPLY LINE AND CONNECT WITH NEW SUPPLY LINE TO TERMINAL BUILDING
PROPOSED LIGHT POLE (TYP.)
AIRFIELD ELECTRICAL VAULT
EXISTING TERMINAL BUILDING TO BE REMOVED BY OTHERS
PROVIDE STANDARD PARKING STALL PAVEMENT MARKINGS (TYP.)
AIRPORT ROAD
58.0
58.5
59.0
59.5
60.0
TP-1
TP-2
TP-3
EXISTING HANGARS
PROPOSED LONG TERM PARKING
PROPOSED PAVED PARKING
EXISTING TREE LINE
EXISTING FENCE TO BE REPLACED WITH 6' CHAINLINK FENCE
PROPOSED TERMINAL BUILDING. FINISH FLOOR ELEVATION 60.0'. REFER TO BUILDING PLANS
PROPOSED PASS GATE IN FENCE
DISTURBED AREAS NOT PAVED TO HAVE 4" LOAM, SEED, AND MULCH (TYP.)
FUEL FARM OVERHEAD ELECTRICAL FEED TO BE REROUTED UNDEGROUND. FINAL PLACEMENT TO BE FIELD DETERMINED
EXISTING GATE TO BE REMOVED AND REPLACED WITH NEW SLIDE GATE
APRON
EXISTING FUEL FARM
EDGE OF EXISTING PAVEMENT

Approx TP Location

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING OVERHEAD ELECTRIC
- PROPOSED UNDERGROUND ELECTRIC
- EXISTING STORMDRAIN
- PROPOSED WATER LINE
- PROPOSED SEWER LINE
- AIRPORT PROPERTY LINE
- EXISTING AIRPORT BUILDING
- PROPOSED BUILDING
- EXISTING FENCE LINE
- PROPOSED FULL DEPTH PAVEMENT
- PROPOSED MILL, GRADE & FILL
- EXISTING CONTOURS
- PROPOSED CONTOURS
- WORK LIMITS
- CONTRACTOR STAGING YARD
- SAFETY BARRIER

DIG SAFE NOTE:

UTILITIES ARE PLOTTED FROM FIELD LOCATION AND ANY RECORD INFORMATION AVAILABLE, AND SHOULD BE CONSIDERED APPROXIMATE. OTHER UTILITIES MAY EXIST WHICH ARE NOT EVIDENT OR FOR WHICH RECORD INFORMATION WAS NOT AVAILABLE. CONTRACTORS MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING. ALSO CALL "DIG SAFE" AT 1(888)344-7233 [1(888)DIG-SAFE] IN MA, ME, NH, RI, AND VT WEBSITE: WWW.DIGSAFE.COM

GRADING PLAN

0 10' 20' 40'
HORIZONTAL GRAPHIC SCALE

SHEET 1

AVIEST ENGINEERING
120 RABBIT RIDGE ROAD
WOODLAND, MAINE 04736
TEL: (207) 227-1087

NO.	DATE	DESCRIPTION	BY	CK'D
2	6-7-2024	ISSUED FOR BID	AS	SMM
1	5-31-2024	FINAL DESIGN REVIEW	AS	SMM

EASTPORT MUNICIPAL AIRPORT
EASTPORT, MAINE

CONSTRUCT AIRPORT TERMINAL
A.T.P. PROJECT
3-023-0053-XX-2024

SHEET TITLE
GRADING PLAN

DRAWN BY	DATE
AS	JUNE 2024
CHECKED BY: SMM	A.E. PROJECT #: 240501
PROJ. ENG.: SMM	A.E. ARCHIVE #:

SHEET NUMBER
C3

Sash Engineering

TEST PIT LOG

Project: New Airport Terminal
Client: Aviest Engineering
Location: Airport Road, Eastport, ME

Project Number: 24-03-EP
Sash Representative: SLA
Excavation Firm: Downeast Masonry & Const.

TEST PIT TP-1

Date: 6/20/2024 Surface Elevation: 59' +/- Location: See Plan

SAMPLE NO.	SAMPLE DEPTH	DEPTH (IN)	STRATUM DESCRIPTION	TEST RESULTS
		1"	SOD	
		5"	DARK BROWN SILTY SAND, SOME GRAVEL (FILL)	
		14"	BROWN SILTY GRAVELLY SAND (FILL)	
			BROWN FINE SAND (FILL) < LOOSE >	
		70"		
		72"	TRACE ORGANICS	
		78"	GRAY FINE SAND	
			BOTTOM OF TEST PIT 78" BELOW GROUND SURFACE	

Notes: Water Seepage: Seepage at 54"

TEST PIT TP-2

Date: 6/20/2024 Surface Elevation: 59' +/- Location: See Plan

SAMPLE NO.	SAMPLE DEPTH	DEPTH (IN)	STRATUM DESCRIPTION	TEST RESULTS
		1"	SOD	
		6"	DARK BROWN SILTY SAND, SOME GRAVEL (FILL)	
		15"	BROWN SILTY GRAVELLY SAND (FILL)	
		24"	BROWN SAND AND SILT	
			BROWN SAND < LOOSE >	
		40"		
			GRAY SAND < MEDIUM DENSE >	
		66"		
			...WITH CLODS OF CLAYEY SILT, AND COBBLES	
		84"	< DENSE >	
			BOTTOM OF TEST PIT 84" BELOW GROUND SURFACE	

Notes: Water Seepage: None observed

Sash Engineering

TEST PIT LOG

Project: New Airport Terminal
Client: Aviest Engineering
Location: Airport Road, Eastport, ME

Project Number: 24-03-EP
Sash Representative: SLA
Excavation Firm: Downeast Masonry & Const.

TEST PIT TP-3

Date: 6/20/2024 Surface Elevation: 59.5' +/- Location: See Plan

SAMPLE NO.	SAMPLE DEPTH	DEPTH (IN)	STRATUM DESCRIPTION	TEST RESULTS
		1"	SOD	
		5"	DARK BROWN SILTY SAND, SOME GRAVEL (FILL)	
		16"	BROWN SILTY GRAVELLY SAND (FILL)	
			GRAYISH BROWN GRAVELLY SILTY SAND (FILL) <MEDIUM DENSE TO DENSE >	
		48"	(TRACE ORGANICS)	
		63"	GRAYISH BROWN GRAVELLY SILTY SAND <MEDIUM DENSE TO DENSE >	
		72"	POSSIBLE WEATHERED BEDROCK	
			BOTTOM OF TEST PIT 72" BELOW GROUND SURFACE	

Notes: Trace organics at 48" bgs Water Seepage: Mottling below 16"

TEST PIT TP-

Date: _____ Surface Elevation: _____ Location: _____

SAMPLE NO.	SAMPLE DEPTH	DEPTH (IN)	STRATUM DESCRIPTION	RESTRICTION

Notes: _____ Water Seepage: _____